

HANDO HAIN

The role of voluntary certification
in promoting sustainable natural resource
use in transitional economies



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LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following publications.

- I **Hain, H.** and Ahas, R. (2005) The structure and estimated extent of illegal forestry in Estonia. *International Forest Review* 7(2): 90–100.
- II Ahas, R., **Hain, H.**, and Mardiste, P. (2005) Social, economic and ecological effects of forest certification in Estonia. In *Confronting Sustainability: Forest Certification in Developing and Transitioning Countries*, edited by B. Cashore, F. Gale, E. Meidinger and D. Newsom. New Haven, CT: Yale School of Forestry and Environmental Studies Press: 171–202.
- III **Hain, H.** and Ahas, R. (2008) Can forest certification improve forest management? Case Study of FSC certified Estonian State Forest Management Centre. *International Forest Review* 9(3): 759–770.
- IV **Hain, H.** and Ahas, R. (2011) Impacts of FSC sustainable forestry certification in European forest management operations, In *Management of Natural Resources, Sustainable Development and Ecological Hazards III. Ravage of the Planet III*, edited by C.A. Brebbia and S.S. Zubir. Witpress, Southampton, UK. (148): 207–218.
- V **Hain, H.** and Ahas, R. (forthcoming) Impacts of voluntary certification on forest management practices in Europe: study of non-conformities raised during FSC forest certification audits. Submitted to *Forest Policy and Economics* on 15th of April 2012.

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	I	II	III	IV	V
Original idea	70%		70%	70%	70%
Study design	70%		70%	50%	50%
Data collection	100%	70%	100%	80%	80%
Data analyses	100%	50%	70%	70%	70%
Manuscript preparation	70%	30%	70%	70%	70%

ABSTRACT

The thesis examines the role and impacts of voluntary certification in East-European transitional economies. The study relies largely on the case study of Estonia, a post-Soviet country which regained independence in 1991. The thesis claims that voluntary certification functions as an effective complementary non-governmental tool to support implementation of sustainable forest management in transitional economies where governments are struggling to effectively guide sustainable usage of forest resources.

After regaining independence in 1991, Estonia was launched into an era of fast “capitalization” and neo-liberal policy making, which left the natural resources less protected. Forest properties were restituted; however the fresh owners often had no forestry experience. Economic depression in combination with weakly enforced liberal legislation led to unsustainable and largely illegal use of forest resources. The problems were voiced by environmental stakeholders and the reputation of the Estonian forest sector was damaged, harming also the growing timber industry and manager of Estonian state forests – RMK. As a result, these stakeholder groups started to seek options for non-state methods to rehabilitate Estonian forestry. A possible solution was seen in certification and since 1998 several key stakeholders engaged in setting the sustainable forest certification standard. In 2000 the first FSC forest certificate was issued to private forest owner Lembit Laks and in 2002, an FSC certificate was awarded to RMK, managing almost 1 million hectares of Estonian state forests.

Generally similar processes occurred in several other East-European countries. As the governments were transitioning into a new economy with varying speed, managers of (mainly public) forests adopted voluntary certification rapidly during the early 21st century. Results from analyzing the changes required from forest managers across East-Europe show that certification has had several positive impacts. The reputation and environmental awareness of certified managers has improved. The protection of biodiversity and ecological functions improved and there has been increased attention towards safety of forest workers. Other aspects however have remained unchanged, such as the extensive usage of clear-cuts. Yet certification has been only marginally adopted among the private forest owners, where the problems related to unsustainability were generally largest. In Estonia the situation in the private forests did not improve until stricter legislation was developed and enforced from 2004 onwards. Certification thus has limitations and a combination of state and non-state regulatory methods has been most successful.

This study claims that certification is a useful complementary tool to aid in sustainable forest management enforcement, especially in conditions where the government’s ability is limited, such as in transitional economies. However, it cannot replace the state functions, since certification is adopted first by more responsible forest managers and is less likely to be adopted by unsustainable forestry operations.

LIST OF ABBREVIATIONS

CB	Certification Body, sometimes also referred to as Conformity Assessment Body or CAB
CEE	Central and East- European region. For the purpose of this study, the following countries have been considered to be in this region: Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Montenegro, Poland, Romania, Russia, Slovakia, Slovenia, Ukraine.
EIA	Environmental Impact Assessment
ELF	Estonian Fund for Nature (Eestimaa Looduse Fond)
EMS	Environmental Management System (for example as described in the standard ISO 14001)
ERL	Estonian Green Movement (Eesti Roheline Liikumine)
EUTR	European Union Timber Regulation
FDI	Foreign Direct Investment
FSC P&C	FSC Principles and Criteria (these are the global foundation of the FSC forest management standards, used for certification)
FSC	Forest Stewardship Council
ISEAL	International Social and Environmental Accreditation and Labeling Alliance
ISO	International Organization for Standardization
NGO	Non-Governmental Organization
NRM	Natural Resource Management
NWGFC	Estonian National Working Group on Forest Certification
PEFC	Program for Endorsement of Forest Certification Systems (formerly Pan-European Forest Certification System)
RMK	The State Forest Management Centre (Riigimetsa Majandamise Keskus)
SFI	Statistical Forest Inventory (conducted yearly by Estonian Forest Survey Centre based on sample plots in Estonia, to gather data about forest resource and its utilization)
SFM	Sustainable Forest Management
SLIMF	Small and Low Intensity Managed Forests (a category of forest owners defined by FSC to enable lower cost of certification for small scale forest owners)
TRN	Taiga Rescue Network

I. INTRODUCTION

Resource use regulation is increasingly gaining focus as several natural resources are being used beyond a rate which can be sustained in the long term. Along governmental mechanisms voluntary market based tools, such as certification are gaining a foothold. Forest resource use has received perhaps most attention in past decades due to the alarming rate of deforestation in tropical areas. Various efforts have been applied to address the problem of forest degradation and deforestation, which stands tall among the other global environmental and social concerns, such as climate change, loss of biodiversity, population growth and increase in waste (Pearce et al. 2003; Gerwing 2002). The efforts range from grass root NGO demonstrations to national government regulations to global international negotiations at high level summits, such as the recent COP17. Although voluntary third party certification is not a new phenomenon, it was not until 1990s that a broadly accepted certification system was developed and adopted in the realm of sustainable natural resource management. The Forest Stewardship Council (FSC) was the first certification system to mainstream third party certification in forest management and found surprisingly rapid adoption among forest managers, especially in boreal and temperate forests in Europe and North-America. The interactions of certification with public sector resource management policies are especially interesting in East-Europe, where rapid adaptation of forest certification took place about a decade after the collapse of the Soviet Union.

This thesis studies the impacts of voluntary sustainable forest certification during the transition from the strict centrally controlled economy of the Soviet Union to a free market economy adopted by the post-Soviet countries and its potential in promoting sustainable forest management in East-Europe. The results are also helpful in drawing broader, global conclusions about the potential of forest certification to aid in the adoption of sustainable forestry.

Voluntary forest certification operates on the principle that markets can support sustainable forest management by demanding and preferring certified goods. Certified goods are linked to timber from certified forests, which are managed according to the agreed principles of sustainable forestry. To add credibility and ensure that these principles are followed in practice, compliance of the forest management with the sustainability requirements are checked by an independent third party certification body (CB) during forest management audits. Correct volume accounting and usage of the certification system trademarks is also checked by the CB during audits performed throughout the chain of custody of the wood based products (publication III).

The study topic is very important for several reasons. With about 400 million ha certified worldwide and over 30 000 timber industries using certified products (under FSC and PEFC certification systems), certification is becoming an important way to express and assure the sustainability of timber products. Large and sometimes powerful stakeholder groups are placing their trust partly or entirely in certification, which makes the question about its credibility and

benefits an extremely important one for businesses, environmental organizations and public bodies. Some of the most common ways how stakeholders are leveraging certification are explained below.

- Concerned environmental stakeholders, who are supporting certification, trust that it can enforce more sustainable practices on the forest management operations, who seek certification when the markets demand certified timber. They believe that increased volume and share of certified wood-based products in the marketplace helps to reduce destructive forestry practices and support sustainable forestry practices. Due to this, such stakeholders generally support the businesses, focusing often on retailers, who demonstrate preferential sourcing for certified products.
- Businesses in the timber and paper sector use forest certification mainly for assurance that the sourced products or raw materials are originating from sustainable sources and do not contribute to forest degradation or deforestation. Some businesses rely mainly on requesting certified products from their suppliers, while others combine this with their own supplier auditing and due diligence systems. In both cases certification helps to reduce the costs related to ensuring sustainable supplies. Ultimately businesses want to avoid usage of unsustainable products due to risks of negative public image or out of broader social and environmental responsibility. It is often easier and cheaper for large companies to require certified products from suppliers, than to verify the sustainable status themselves throughout the supply chain. As seen, businesses often place a high level of trust in certification as their own public image depends on the credibility of the certification scheme they use.
- There is also increasing evidence that some public sector bodies are relying on certification as an additional assurance of legality and/or sustainability of timber. In the recently adopted EU Timber Regulation (EUTR), certified status of material can reduce the risk that material imported to the EU is illegal (EU 2010; Capiroso 2011). Similar viewpoint has been accepted in United States in relation to Lacey Act and in Australia in relation to Illegal Logging Prohibition Bill.

In the current marketplace, where timber commodity is under public scrutiny, certification can be viewed as a practical and operational currency of trust. Third party assurance enables businesses to communicate their sustainable sourcing efforts to stakeholders and the general public. Certification enables companies to make sustainability claims about their supply chains without having to invest in expensive and time consuming supplier auditing and due diligence systems. For environmental organizations, supporting certification and pushing operations to certify or demand certified materials from their suppliers, is a more cost-efficient way to promote their agenda. For public agencies to support certification there must be evidence that it can drive positive change. This nature of certification as a currency of trust makes it valuable but also vulnerable in the case it appears not to be credible. A forest certification system which is credible and delivers positive results is important both for businesses

to safeguard their financial investments, as well as for environmental stakeholders to deliver upon their expectations. If forest certification fails to deliver in one of the two areas, the whole system collapses. The question whether certification delivers the promised benefits is crucial. Schepers (2010) accurately describes the key challenges of environmental certification systems in his study on the legitimacy of FSC certification: “Ecolabel governance schemes must both convince the world (or the relevant portion thereof) of their true concern for and ability to protect the environment and its peoples (moral legitimacy) and the industry participants of their ability to deliver premium prices on the goods certified by the scheme (pragmatic legitimacy). As the FSC case shows, this is not a small feat.”

This thesis studies the emergence and role of forest management certification in promoting sustainable forestry in a post-Soviet transitional economy, drawing from the example of policy making and certification process in Estonia. Late last century governmental efforts to control the natural resource use in post-Soviet countries were hindered by many complexities introduced by a turbulent political and economic situation. Uncontrolled and illegal resource usage was growing in many Eastern bloc countries (Kuemmerle et al. 2009). In Estonia, the right-wing parties in power adopted neo-liberal policies which allowed relatively free and uncontrolled use of the forest resource. Environmental stakeholders concerns were not heard or implemented in the policy discussions, which led to their exclusion and forced them to seek alternative measures to influence the forestry. At the same time the NGOs were voicing their concerns internationally by publishing reports on the extent of illegal forestry, which damaged the reputation of the entire Estonian forest sector. This was concerning for the industry and also for the State Forest Management Centre (RMK) who was implementing more responsible forest management than most private forest owners. In this landscape certification emerged as a non-governmental, market based tool, which led to certification of all Estonian state forests in 2002 (publications I and II). Rapid adoption of forest certification took place during early 21st century in many East-European countries. As in Estonia, certification was concentrated mainly in the publicly managed state forests. Results from all studied East-European countries indicate that certification introduced several positive changes. From this process, several useful lessons can be learned and broader conclusions drawn about the role of certification in transitional economies (publication IV and V).

This thesis claims that voluntary forest management certification functions as an effective complementary non-governmental tool to support implementation of sustainable forest management in transitional economies where governments are struggling to effectively guide sustainable usage of forest resources. This claim is supported by the following arguments, which this thesis defends;

- Certification in transitional economies has emerged partly as a reaction to the failing governmental efforts to regulate forest resource use;

- Certification has a positive role in bringing environmental considerations into central focus and engaging stakeholders in forestry discussions, which are often excluded in transitional economies;
- Certification generally has a positive effect in helping to enforce sustainable forestry practices; and
- Certification often fails to enforce sustainable forestry among unsustainable forestry operations where the need for positive change is largest.

The author of this thesis has worked for 10 years as an FSC certification auditor for the non-profit, mission based organization NEPCon and worked earlier in an Estonian NGO – Estonian Green Movement-FoE. The author's practical work experience has provided an in-depth understanding of certification, which was useful in preparing this thesis. However the data used for the study is entirely available in the public domain or has been gathered by means described in the methodology section. The author's personal and professional interest to work with environmental tools, which have a tangible positive impact on more responsible usage of natural resources, was an important driver for this research.

2. THEORETICAL BACKGROUND

2.1. Natural resource management and forests as common-pool resource

Natural resource management (NRM) is an increasingly important part of public policy making and deals with the regulation of the usage of geological (e.g. oil, minerals) and biological (e.g. forests, wildlife, fisheries) natural resources. Traditional NRM models include centrally controlled top-down and bottom-up resource use regulation (Fraser et al. 2006). Bottom-up methods promote regional or community involvement (Sodhi et al. 2011; Hartter and Ryan 2010). With increased complexities, there is increasing understanding that these traditional models are not flexible enough to ensure sustainable usage of natural resources. During the past decades hybrid and integrated NRM models have been developed and analyzed (Lockwood and Davidson 2010; Lovell et al. 2002), to allow using the strength of different traditional models while being flexible to accommodate to the fast changing regional, national and global context. Traditionally, natural resource management has been viewed as a public sector task, however, since the 1990s voluntary governance mechanisms such as certification are increasingly also seen as an important contribution in natural resource use regulation (Cubbage et al. 2007).

NRM decisions are closely linked with the classification of goods and resources. For this thesis, the focus is on natural resources rather than goods. In a simplified model, resources can be classified as public or private, where public resources are non-rival and non-excludable. Non-rivalry refers to a situation where consumption by one individual does not limit the consumption possibilities for other individuals. Non-excludability means that it is not effectively possible to control or limit the consumption of the resource. Examples of public resources are air, sunshine and wind, which are all freely available and the usage of them is hardly controllable. Private resources are typically limited and controlled resources such as agricultural products. Some types of natural resources however do not conform well into neither of these classifications. Consumption of deep water fisheries for example is difficult to control (non-excludability), however, the fisheries can be exhausted if the fishing levels are higher than their natural reproduction rate. This means that these resources are rivalrous. Such resources are classified as common-pool resources. Fisheries, groundwater, wild game as well as forests can be classified as common-pool resources (Ostrom 2010), since overconsumption will limit the possibility for other individuals to use them. There is also a fourth classification which is excludable, but non-rival. This is, however, more applicable to the goods and services, rather than natural resources. Table 1 illustrates these four quadrants of goods and resources.

Table 1. Classification of resources

	Excludable	Non-excludable
Rivalrous	Private resources e.g. agricultural products; minerals	Common-pool resources e.g. fisheries, forests, groundwater
Non-rivalrous	Club goods (resources) e.g. paid digital media; telecommunication services;	Public resources air, sunshine, wind

Source: Adopted from Ostrom 2010.

Management of natural resources belonging to the common-pool quadrant is challenging due to the inherent risk of over-consumption (Bullock and Collier 2011). For example, in the case of large public forests, it is impractical and very costly (although not impossible) to exclude people from consuming non-timber forest products, using the forests for recreation, gathering firewood, branches or even Christmas trees. Since the physical resources are limited, the possibility to gather these decreases with increased usage. Even the function of forest to provide a quiet and natural environment for recreation decreases when the forest is full of holiday-makers. Without a mechanism to regulate the extent of usage, the forest becomes vulnerable to congestion, overuse, pollution, and potential destruction (Siren 2006). This problem of potential overuse of common-pool resources is often known also as the tragedy of the commons (Hardin 1968). Hardin used an example of a commonly used pasture land, to illustrate the notion that since each herder acts rationally in their own self-interests and puts as many cows on the pasture as it can support, this inevitably leads to over-exploitation without external regulation. This is why traditionally the governments were seen as optimal institutions for regulation of common-pool and public resources while the markets were seen as optimal systems for production and exchange of private resources (Ostrom 2010). This dichotomy is however being abandoned as evidence shows that self-governing or user-governed institutions can be as successful as governmental institutions in regulation of public and common-pool resources (Dietz et al. 2003).

The other critical issue related to the common-pool resources is the problem of negative externalities (Ozturk et al. 2009). In the natural resource use context externalities are the economic effects of resource usage, which are not accounted for and thus are not properly transmitted through the price (Cubbage et al. 2007). The effects of externalities are incurred by people or parties, who were not involved in the decisions or actions causing the externality. Externalities can be positive (there are unaccounted benefits to others) or negative (there are unaccounted costs to others). In the case of forest resource management, negative externality is for example degradation of the forests due to harvesting, which may negatively affect the opportunities of people to use the

forest for collection of non-timber forest products or for recreation, forcing them to purchase the non-timber forest products or pay for recreational activities elsewhere. The party harvesting the forests would not in this case take upon himself these extra costs caused to others, and hence they will also not be reflected in the price of the sold material.

Various solutions are used to overcome the problems of negative externalities and overexploitation. Assigning and accounting for the full economic value of ecosystem services is being increasingly discussed to overcome the problem of negative externalities (Thompson et al. 2011; Weiss et al. 2011). In economic terms this is called internalization of the externality (the full costs would have to be paid by the producer). Progress towards this revolutionary economic shift in the global marketplace is however still slow due to the difficulties of measuring the value of ecosystem services in financial terms. Another, softer approach is to appeal to the moral motivations and increase the general social responsibilities and awareness regarding the ecological vulnerability of common-pool natural resources (Turaga et al. 2010). By doing this one can increase the general social intolerance towards overexploitation and unsustainable usage of natural resources. This essentially challenges the traditional economic notion of *homo economicus*, which claims that a person is always behaving in its own economic self-interest.

Voluntary certification, among other policy tools, is trying to use both of these suggested remedies: assigning more economic value to the ecosystem services as well as appealing to and raising the awareness of consumers and businesses about the importance of sustainable usage of natural resources. By enforcing sustainable forest management, certification aims to internalize the externalities related to forest resource usage (Merlo and Briales 2000; Overdevest and Rickenbach 2006a). The tool of certification is simultaneously trying to appeal to the altruistic motives of *homo reciprocans* (consumers preferring certified end products) as well as divert greater economic benefits towards the parties with more responsible behavior.

2.2. Certification of sustainable forest management

Sustainable forest management (SFM) is one of the key concepts used throughout the last two decades to address biodiversity loss, forest degradation and deforestation. The mechanisms to promote and enforce SFM, can broadly be classified into two categories. In the traditional government-based model, better forest management is promoted by law enforcement, which is carried out by public state authorities on national and sub-national levels. The alternative mechanism is the market-based model, where SFM is promoted by markets and consumers via requesting products from sustainably managed forests. Forest certification is a prime example of such a system (Klooster 2010). Once a forest manager commits to participate in a certification system, compliance with the agreed principles of SFM are “enforced” by third party certification bodies.

Participation in the scheme is voluntary, however only by maintaining its certified status, can the forest manager sell and label its products as certified, thus meeting the market demand for products from sustainably managed forests (publications II and III).

Forest certification is increasingly gaining legitimacy in promoting sustainable forest management (Auld and Gulbrandsen 2010) and increasing environmental awareness among consumers and retailers has been instrumental in this growth (Howard and Allen 2010). The increasing consumer demand for third party assured sustainably produced products is evident from the growth of different ecolabels such as FairTrade, FSC, UTZ etc. Also academic research in relation to environmental certification has notably increased during the past decades (Seuring and Müller 2008). In the scientific community, voluntary, market-driven certification systems are generally seen as a legitimate part of global natural resource use governance systems (Cashore 2002). The emergence of forest certification process (Cashore et al. 2004), its development into influential policy-making authority (Cashore et al. 2003) and confrontation with governmental forestry initiatives (Jenkins et al. 2004) have been thoroughly studied by several scientists. Forest certification and FSC certification in particular, has gained praise as a practical tool that has played the largest role in the improvement of social, ecological and economic aspects of forest management practices during the post-Rio period (Putz and Romero 2001, Stringer 2006). Finally, the functional mechanism of forest certification has been nominated arguably as the most advanced case of nonstate-driven rule making dynamics globally in the environmental field (Cashore 2002). All these claims strengthen the important position of certification in resource use regulation and underline the importance of understanding its potential and impacts (publication III).

Environmental certification has also introduced new terminology into the certification landscape and has altered the traditional ways of classifying the systems and standards. Traditionally certification standards have been classified into process and performance standards. Typically process standards are management system standards (e.g. ISO 14001), since they prescribe methods, but not actual targets or goals. No product labeling is normally allowed in relation to management system standards. Typical performance standards are product standards, since they define specific properties, the product shall meet (e.g. timber strength grading standards). With the rise of market driven environmental certification, this distinction is becoming blurred. Product labeling is important to link the goods to the sustainable markets, however conformance with both process and performance requirements is expected by the wide range of stakeholders engaged in sustainability certification. During the last decade the term “environmental and social standards” has been adopted to indicate standards with the main focus of promoting higher environmental and social responsibility within the supply chain and among producers (Müller et al. 2009; Seuring and Müller 2008). Evidence exists that such market-driven accountability systems are increasingly gaining international legitimacy (Bernstein 2011). In 2002, International Social and Environmental Accreditation and Labeling

Alliance (ISEAL Alliance) was established. ISEAL Alliance is a global association focusing exclusively on social and environmental standards, with the main function of safeguarding the integrity and setting best practices for the development of social and environmental certification systems (see <http://www.isealalliance.org>). In this new landscape of third party certification, key values are transparency, stakeholder involvement and positive on-the-ground impact (Auld and Gulbrandsen 2010; Schepers 2010). This makes the quality and effectiveness of certification a priority topic of study in relation to the promotion of sustainable usage of natural resources, such as forests.

2.2.1. The functional mechanism of forest certification

Forest certification emerged in the early 1990s as an alternative; market based initiative, to promote sustainable use of forest resources and help avoid forest degradation and deforestations (Auld et al 2008). The basic idea of certification is that forest managers, who follow internationally agreed and published principles of sustainable forestry (forest management standard), can apply for a third party certification. If no major deviations (non-conformities) from the requirements are found during the audit, the forest manager is awarded a certificate of sustainable forest management and timber from the forest can be labeled with the brand of the certification scheme. If non-conformities are found in the management practices with the standard, these are recorded and will become mandatory for the forest manager to fulfill, if they wish to receive certificate or maintain certified status. Certificates are issued for a fixed period (five years in the FSC system); however continued conformance to the standard is checked by certifiers during surveillance audits, which are done at least annually and in case of major non-conformities, more frequently. If a non-conformity is not properly addressed, it shall be upgraded to a major non-conformity. Failure to address a major non-conformity leads to the suspension of the certificate. In order to enable markets to display preferential sourcing for goods from sustainably managed forests, the material needs to be traceable throughout the supply chains and distinguishable on the marketplace. Companies, who source timber from certified forests and want to sell it as certified, shall apply for chain of custody certification. During chain of custody audits, the auditors check correct accounting for the material volumes in the supply chain and proper usage of the certification trademarks to avoid “greenwashing” and misuse of the certification marks (publication III). This functional mechanism of certification is illustrated on Figure 1.

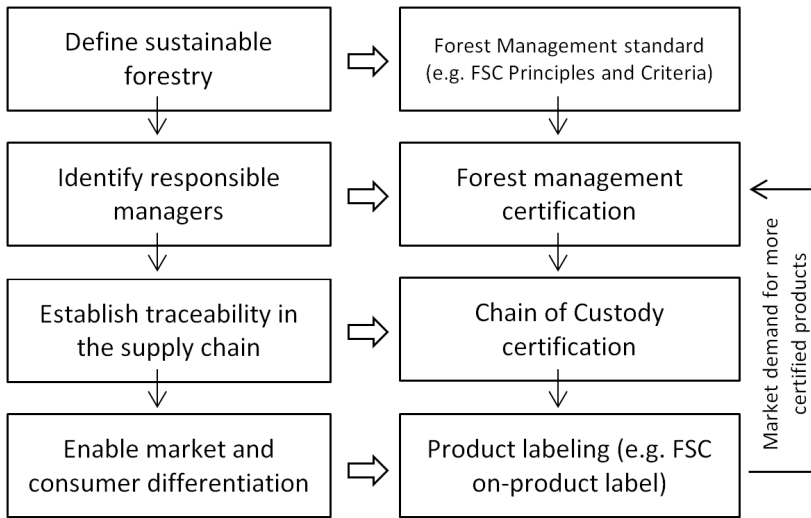


Figure 1. The functional mechanism of forest certification

The idea of certification was initially based on assumed willingness of responsible end consumers to pay a premium price for environmental friendly goods. However a growing volume of research has revealed that the price of certified timber as well as final products are very seldom higher or only insignificantly higher at best in the forest sector (Merry and Carter 1997). Thus the market situation reveals that success of certification is not actually dependent on the willingness of end consumer to pay a price premium. Instead it is increasingly clear that the whole certification endeavor is being driven by large corporate retail chains that are using certification as part of their green sourcing strategies (Rametsteiner and Simula 2003). Corporate wholesalers and retailers are also arguably the only agents in the global marketplace who have the power to motivate primary and secondary processors to certify (Morris and Dunne 2004). This shift towards corporate driven certification has been studied among the scientific community (Cashore 2002; Cashore et al. 2003) and a considerable amount of scientific research has admitted that forest certification systems does not need to include any direct role of the end consumer, as long as there is demand for certified products somewhere along the supply chain (Cashore 2002).

Currently there are two main forest certification systems in the world. FSC was the first forest certification system, established in 1992 by a community of concerned industry and environmental and social NGOs. It emphasizes stakeholder involvement and transparency. PEFC (Programme for the Endorsement of Forest Certification) was established in 1999, as an alternative to FSC, which was seen not so suitable for small forest owners and was also considered too strict in relation to environmental requirements by some stakeholders. In 2004, PEFC became an umbrella organization, combining all the existing major forest certification schemes (except FSC) (PEFC 2011). FSC is a member organization and the general

assembly of FSC is the highest decision making body. All members are divided into economic, social or environmental chambers and affiliation can be chosen by applicant members. Each chamber has equal voting strength with regard to passing motions. Additional dimension to balance the voting power is division of members into participants from north and south (developed and developing countries). The described decision-making structure is also used for standard development, which is one of the reasons why FSC certification is considered to have the best and most advanced democratic system of standard setting (Cashore 2002; Cashore et al. 2004). This in turn is the fundamental reason why FSC is viewed upon as the most credible forest certification system on the market by NGOs as well as several other stakeholders (Ozinga 2004). Although both FSC and PEFC certification systems are globally significant, this thesis focuses mainly on FSC certification for following reasons. In East-Europe FSC certification has been the main certification system used. Due to the transparent and inclusive nature of standard setting, FSC forestry standards represent a more broadly accepted agreement of sustainable forestry (Gulbrandsen 2008). Due to higher requirements of transparency, summaries of all FSC forest management certification reports are publicly available, which enabled the evaluation of the requirements posed on the forest management operations. Finally, the certification principles and criteria used in FSC forest certification are the same globally, which enables the certification impacts to be compared across all East-Europe.

2.2.2. Standards: defining sustainable forest management

The assessment of forest management practices has to be related to certain performance indicators if any claims about the level of forest management are to be made. Measurable performance indicators of good forestry are useful since they provide a means to assess and demonstrate progress towards sustainable forestry.

In the FSC certification system, good forestry is defined through FSC Principles (10) and Criteria (56) (FSC P&C) which are globally applicable. The FSC P&C covers a broad scope of issues (Table 2) from legal compliance and land tenure (principles 1 and 2), to specific topics, such as indigenous people or management of high conservation value forests. The standard contains one principle with economic focus (principle 5), two principles with social focus (3 and 4) and two principles with mainly environmental focus (6 and 9). Principles 7 and 8 are focusing on system elements (forest management plan and monitoring respectively). As seen, the FSC standard is a good example of a social and environmental standard, which is a hybrid, combining performance and system elements (see section 2.2). The full version of the FSC Principles and Criteria is publicly available on the FSC homepage (FSC 2011) under the documents section.

Table 2. Principles in the FSC forestry standard and number of criteria under each principle (indicated in parenthesis after the principles name)

P1: Compliance with laws and FSC Principles (6)	P6: Environmental impact (10)
P2: Tenure and use rights and responsibilities (3)	P7: Management plan (4)
P3: Indigenous peoples' rights (4)	P8: Monitoring and assessment (5)
P4: Community relations and worker's rights (5)	P9: Maintenance of high conservation value forests (4)
P5: Benefits from the forest (6)	P10: Plantations (9)

Since FSC P&C have been defined by globally representative stakeholder groups, they are meant to serve as a basis for evaluating good forestry in all regions and forest ecosystems. Due to this the FSC P&C are somewhat general and do not include a sufficient level of detail to effectively guide certification activities on-the-ground (Cauley et al. 2001). Therefore FSC P&C are meant to be further adopted for usage in specific countries or regions by developing indicators for each criterion. The indicators help to interpret the criteria in the national context and set more specific, measurable basis for auditing. This process is called national adaptation and is done ideally by FSC National Offices (formal representatives of FSC in a given country) or by a certification body (in case there is no National Office). The actual FSC forestry standard used for certification, is always based on the globally applicable FSC Principles and Criteria, however compliance is evaluated against a regionally adopted set of indicators.

FSC P&C have been developed within a global multi-stakeholder process and FSC is arguably the organization with the most recognized international standard for well managed forests (Gulbrandsen 2008). Due to the broad recognition and credible process of standard setting, the FSC Principles and Criteria can be considered a legitimate example of an international non-state agreement of sustainable forestry. Holding this assumption, conformance of the forestry operation with the requirements indicates sustainable forestry is being practiced and non-conformities indicate the opposite. The non-conformities identified by the independent certification bodies indicate gaps between the forestry practices and sustainable forestry and fulfillment of raised non-conformities indicate progress towards more sustainable forest management practices. These assumptions are critical for the concept of this study, since the author is evaluating progress towards more sustainable forest management based on the uptake and implementation of certification.

2.2.3. Extent and spread of forest certification

During the last 15 years, a combined area of almost 400 million ha has been certified under the two leading forest certification schemes: FSC and PEFC. A significant part of the forest industry has adopted certification as a necessary means of business, which is evidenced by the total number of approximately 30 000 chain of custody certificates issued to timber industries under the two schemes.

The first FSC certificates were issued in 1993, a year after the establishment of the organization. In 1995, the first four certification bodies were formally accredited to conduct FSC certification. A year later the first certified final product entered the market. By 1998 the scheme had established itself rather firmly, with about 10 million ha of forest land certified and about 300 chain of custody certificates issued (FSC 2011). Since then, the certified forest area has been steadily increasing (Figure 2), with the majority of the certified forests being in North America (39%) and Europe (42%) (FSC 2011). As of August 2011, the FSC certified area is 140,5 million ha globally. 1 049 FSC forest management certificates have been issued, covering 79 countries. The number of chain of custody certificates has followed the trend and as of August 2011, there are over 21 000 valid FSC chain of custody certificates issued (FSC 2011) with over 10 000 of those issued in Europe. According to FAO data (FAO 2010) the global forest area is 4,03 billion ha, out of which 1,2 billion (30%) is primarily used for production of wood and non-wood forest products. In this context, the FSC certified forest area of 140 million ha equals to 3,5% of global forest area and 11,7% of the global forest area used primarily for production.

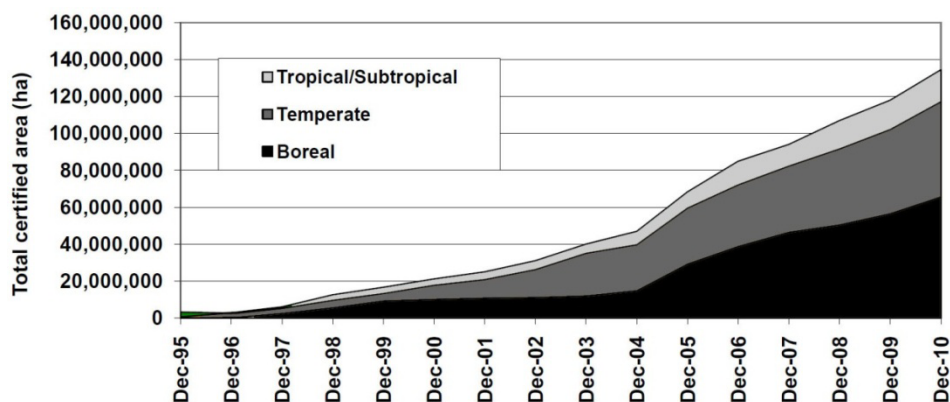


Figure 2. Growth of FSC certified forest area during 1995–2010 (Source: FSC 2011)

Under the competing umbrella of PEFC, 234 million ha have been certified as of June 2011 (PEFC 2011). The PEFC certified area in Europe is 69 million ha. Although the global certified area under PEFC is larger than FSC, the uptake and adoption of PEFC system among the industry is lower. The number of chain of

custody certificates issued under PEFC system as of June 2011, is 8 248, which is about 40% of the FSC chain of custody certificates (PEFC 2011).

The adoption of certification among East-European forest managers has been especially rapid during the first decade of the 21st century, as seen in Figure 3. While in 1999, the share of certified forest areas in East-Europe was below 9% of the globally certified area, by 2008 it had reached 35% – over one third of the globally certified forest area. While the certified area in West-Europe has slightly decreased, East-Europe together with the United States and Canada have been the regions with the fastest increase in FSC certified forest area. The speed of FSC certification in East-Europe is partly explained as a reaction to the problems of the transition period studied in publication I.

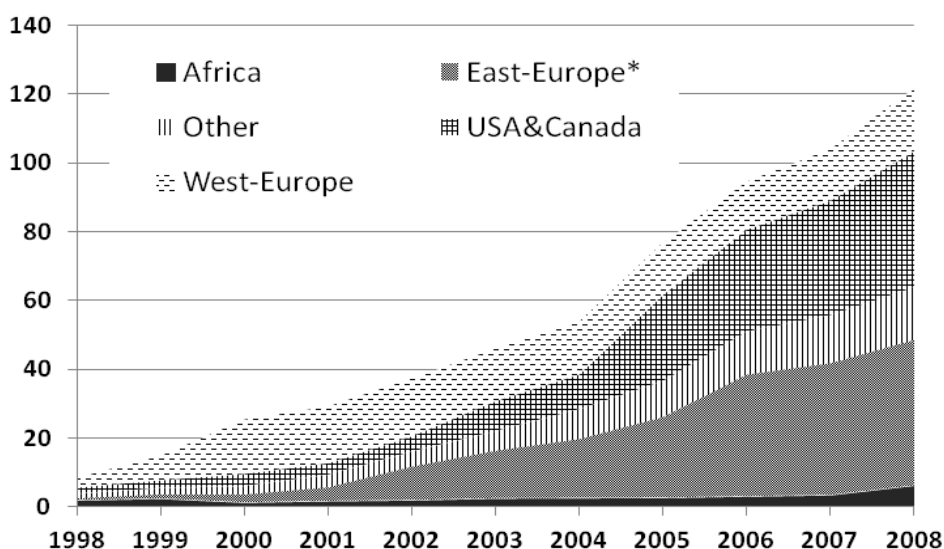


Figure 3. The FSC certified forest area in different world regions during 1998–2008 (million. ha) (Source: FSC 2009)

*East-Europe includes Russia, Belorussia and Ukraine.

2.2.4. Forest certification impact studies

Extensive research has been done on the comparison of forest certification systems (Clark and Kozar 2011; McDermott and Cashore 2008; Cashore et al 2002; Dingwerth 2008; McDermott et al. 2008; Masters et al. 2010). The impacts of certification have been analyzed from economic, environmental and social perspectives. Most research indicates lack of price premium for certified material (Cubbage et al. 2010; Araujo et al. 2008; Gomez-Zamalloa et al. 2011), however evidence of increased market access or possibility to maintain it exists (Araujo et al. 2008). On the other hand, a study in the United States among 91

FSC forest management certificate holders, revealed that only a few managers had experienced increased market access due to certification and in general the expectations related to increased market access were not met by certification (Overdevest and Rickenbach 2006a).

Environmental benefits of certification have been identified by several authors (Jenkins et al. 2004; Cashore et al. 2006). For example Cerutti et al. (2011) found that in Cameroon FSC certified forestry operations had to reduce the logging volumes on average by 18% compared to the practices used prior to certification. Retention of biodiversity elements, such as biodiversity trees, snags and deadwood is one focus area in principle 6 of the FSC P&C (FSC 2002). Increased retention and presence of biodiversity elements will lead to better protection of biodiversity in the managed areas (Rosenvald et al. 2011; Löhmus 2011b) and related suggestions for further improving the FSC forest management standards have been made (Löhmus and Kraut 2010). Conclusions regarding the ability of forest certification to reduce deforestation on global level are however still unclear. While the forest cover is maintained in certified forest areas, it is argued that reduction of felling in certified forest may increase pressure to log in other, non-certified areas (Gullison 2003). Also the limited share of certified forests means that the issue of deforestation is addressed only in fragmented patches and thus the broader positive impact of certification is limited (Gulbrandsen 2010; Atyi and Simula 2002). In conclusion, while certification has had positive environmental impact in certified forest areas, the broader issues of deforestation, fragmentation and wildlife conservation can only be properly addressed by landscape level protection, which certification does not always enable (Bennett 2001; Putz and Romero 2001). A point of criticism towards FSC has been its decision to enable certification of forest plantations. About half of the certified forest area in developing countries are industrial forest plantations, which are typically monocultures of fast growing species with low level of biodiversity (Gulbrandsen 2010). Certification has clearly less positive ecological effects in such types of forest estates; however the same eco-label is used on material from certified plantations and natural forests.

The key social benefits of certification are frequently claimed to be better communication with stakeholders and better public environmental image (Keskitalo et al. 2009). Certification is also seen as positive tool by some forest managers to reduce the risk of negative media campaigns and boycotts (Keskitalo et al. 2009). Although rather extensive research now exists on the impacts of certification, most authors are careful to draw conclusions and evidence has been presented both for and against the positive impacts of certification.

Some studies have also focused on identifying companies' motivation for certification and analyzing if the expectations of certificate holders were realized (Araujo et al. 2008; Auld et al. 2008). The most common reasons why companies decide to certify fall into three broad categories: economic reasons such as better or secured market access; public reputation reasons, such as better communication with stakeholders and more secure public image as good forest

managers and thirdly internal reasons such as improvement of forest management and practices.

Quite a few authors have also analyzed the identified non-conformities to evaluate the impacts of certification. Newsom et al. (2006) studied the non-conformities raised in the United States during FSC forest certification. Masters et al. (2010) studied the non-conformities raised in Canada during audits of FSC, CSA and SFI forest certification systems. Both studies concluded that significant changes were required from most operations undergoing certification and if implemented, forest certification will have a positive impact on the forest management. Masters et al. (2010) also noted that the changes required within FSC forest certification were of a much greater magnitude than within the other forest certification systems. Rusli and Nabilah (2009) have studied the certification impacts in Malaysia based on non-conformities. They conclude positive impacts in several areas, however emphasizing the importance of long term perspective and adherence to the certification requirements in practice. In conclusion all of the above studies reveal that certification is requiring practical changes from the certified operations.

The FSC certification system generally enjoys the support of most large international environmental organizations. WWF was a key founding member of FSC and maintains strong support towards FSC certification (WWF 2010). Greenpeace also maintains general support for FSC certification although has repeatedly drawn attention to its weaknesses and the need to put more effort in ensuring the credibility of FSC certification system (Greenpeace 2010). FSC certification has also received criticism from some environmental organizations for not introducing sufficient changes on the ground, for approving the business as usual and for greenwashing. The director of Rainforest Foundation UK, one of the founding members of FSC, has even called FSC “The Enron of forestry”, claiming that due to competition between the certifiers, the quality of certification is not credible and business interests dominate (Mongabay 2008). The criticism of the Rainforest Foundation is more thoroughly detailed in a report published in 2002 (Counsell and Loraas 2002). A major weakness of FSC is seen in the direct financial link between certification bodies and the certified companies who pay to certifiers for the certification process, which in turn allegedly results often in certificates being issued in cases when practices do not meet the standards. A dedicated FSC watch website has been set up (<http://www.fsc-watch.org/>), which provides information on the weaknesses of the FSC system and documents the unsustainable activities of specific FSC certified operations.

3. CASE STUDY AREA – ESTONIA

This thesis evaluates the effectiveness of voluntary certification in promoting sustainable use of natural resources in transitional economies. The emergence of certification has been analyzed mostly using the case study of Estonia (publications I and II). Transitional economies in the context of this study are economies of post-Soviet East-European countries, which are in transition from the Soviet time centrally controlled economy towards a neo-liberal, democratic, market-based economy. The pace of this transition has been varying in different countries and in most cases the transition by now is arguably over. However, even by the time this study is concluded, 20 years after the collapse of Soviet Union, the societies and economies in these countries are still being influenced by the heritage of Soviet era (Rabikowska 2009).

3.1. Resource use regulation in post-Soviet Estonia

Estonia was one of the republics of Soviet Union during 1944–1991 and gained independence in August 1991. In May 2004, Estonia became a member of the European Union and in August 1994 the last Russian military troops left the country. The forest land in Estonia is approximately 2.2 million hectares, which is 51% of the total country's area (EFSC 2003). Currently the state owns approximately 40% of total forest land, which is managed by FSC certified State Forest Management Centre (RMK), a state owned limited company operating for profit. Another 36% of the forests are privately owned forests. No restitution claims have been made for the remaining forests areas and these are currently not being actively managed. RMK is legally representing the owner of these forest lands and is gradually starting to take over the management. Table 3 gives an overview of forest ownership and protection in Estonia. Partly as a result of the restitution process, Estonian private forests are very fragmented with 43% of the private forest properties below 10 ha in size (CFPS 2002).

Table 3. Estonian forest area (ha) and ownership structure (publication II)

	Total forest area	Commercial forest	Forests with management restrictions
State (RMK)	834 200	603 800	230 400
Private	795 570	1 109 900	261 700
Other*	576 030		
Total	2 205 800	1 713 700	492 100

*The category represents forest lands which are planned to be restituted or privatized in near future. RMK is presently legally representing the owner of such areas.

Sources: EFSC 2003, Land Board 2004

Although the historical background of post-Soviet countries in general was similar, the extent and speed of reforms in each country were different and thus generalizations are difficult to make. Compared to most other post-Soviet countries Estonia chose a faster and more radical path towards liberal economy and emphasized economic growth over social and environmental considerations (Adam et al. 2009). After regaining independence in 1991, the Estonian government faced the task of transforming the Estonian economy from a communist centrally planned state-controlled model into a democratic, market-based capitalist model. This process has been analyzed and described by several authors (Kallas 2002) and it is generally accepted that Estonia was one of the fastest countries to initiate and sustain the transformation (Savchenko 2002).

One of the key distinctions of several post-Soviet countries is a very brief history of private ownership of land and real estate. This is important in the context of this thesis, since it impacts the forest resource management patterns. During the Soviet time all land and real estate was state owned and after regaining independence, a process of privatization was launched. In countries that had been independent prior to Soviet occupation, such as the Baltic countries for example, the properties were given back to the descendants of the historical owners from whom the lands had been expropriated through nationalization and collectivization during the Soviet era (Holt-Jensen and Raagmaa 2010). This process of restitution has partly restored the historical justice, but has also resulted in fragmented land ownership. The new owners of the land did not usually have the experience to manage and maintain the agricultural or forest properties – a situation favoring mismanagement of and speculation with the resources for the sake of gaining quick profits (publication I).

In early post-Soviet Estonia, as in most other post-Soviet countries, a combination of several factors resulted in the unsustainable and weakly controlled use of natural resources (publications I and II).

- Right wing policy and neo-liberalism. A principal goal of the government was to link Estonia fast and strong to a western capitalist economy, which led to favoring foreign direct investments (FDI) and neo-liberal, relatively uncontrolled economy. The main parties in power during the late 1990s were Reformierakond (Reform Party) and Rahvaliid (People's Union). The Reform Party was representing primarily the business sector and promoting rapid liberalization of the economy. Although more center-oriented, Rahvaliid was advocating support of rural population and strict control over the forest resource would not have favored their position. The economic situation of the rural population was weak and income from forest felling was significant in many parts of Estonia. Since forests are one of Estonia's main natural resources, this was seen as an opportunity to boost Estonian economy and restrictions over the use of forest resources were minimized. The Forest Act adopted in 1998 abolished the requirement to have a forest management plan and turned it into a voluntary document (Forest Act 1998). No felling permit was required and thus it was virtually impossible to determine the legality of the ongoing felling activities. Although it was required to declare intended

felling by notifying the local authorities, no confirmation or response to the forest owner was required. From 1998 until 2004, when changes in the Forest Act were adopted, there were thus in reality no restrictions in relation to the felling activities.

- Rapid adoption of legislation similar to western countries, without considering the historical Soviet heritage (FDP 1997; Forest Act 1998). A natural tendency for the Estonian government was to adopt the political framework of western countries. Western legislation, which had been designed for democratic society with long history of private ownership, did not always yield the expected results in a society which had been much more strongly controlled and where private ownership was a new phenomenon. Additionally the weak economic situation of the Estonian people, especially in rural areas, was not considered when a forest legislation similar to a country with one of the highest economic wellbeing in the world, was adopted. For the Estonian forest policy, Finnish forest regulation system was used as an example. The 1997 Estonian Forest Policy was compiled with Finnish governmental aid and coordinated by Finish consultancy company Oy Indufor during 1994–97. Despite NGO protest the liberal Forest Policy (1997) and the Forest Act (1998) were approved by the parliament (Ahas 2003).
- Hastily conducted reforms. The forest policy reform was initiated almost concurrently with the land reform (restitution process), which resulted in legislative vacuum and inefficient control over the use of the forest resources (Ahas et al. 2002). The establishment and rapid increase of private forest property brought along the fast growth of the timber industry. At the same time the Soviet structures for forestry administration were abolished without yet managing to establish effective and functional new structures.
- Lack of transparency and exclusion of public stakeholder groups. Due to strong focus on the economic growth and transition to capitalist model, the third sector – non-governmental organizations – were effectively excluded from political discussions (Holt-Jensen 2010). Although formally public participation in the development process was favored, the proposals by third sector were in general not considered or implemented (Kultuur ja Elu 2004). NGOs became especially uncomfortable with the state's approach during the creation of the Estonian Forestry Development Program in 1996–1998 (Kallas 2002; FDP 1997). Their critique of the government's forest policies was very visible in the media in 1996–7, and made the Ministry of Environment less eager to cooperate with them. This resulted in isolation of the NGOs which forced them to seek alternative options to influence forestry practices.
- Lack of reliable forestry data. At the turn of the century there was no reliable information available neither about the forestry activities, nor about the forest resources. During 1998–2003, the only sources of information concerning ongoing activities in private forests were the felling declarations, which had to be sent to the local environmental board prior to felling. However, since the declarations did not need to be confirmed, misdeclaring and not declaring the fellings was common (see information in 3.2). Due to abolishment of the

requirement to have a management plan, reliable data over the forest resources in private forests was also missing, until the statistical forest inventory program (SFI), which was launched in 1999, had operated at least for few years, to start producing reliable information (Valgepea 2007).

- Crime and corruption. The early 1990s have been called “an ‘anarchic’ transition period” (Holt-Jensen 2010) and general rise of crime, organized crime and corruption during the early post-communism phases of transition have been described by several authors (Holmes 2009). Reasons behind this are complex but can be associated with young and inexperienced governments, the legislative vacuum, turbulent economies and low level of law enforcement. Illegal logging and forest-related crime increased rapidly in post-Soviet Estonia, as described in section 3.2.
- Weak law enforcement. Lack of enforcement is known to favor increased legal violations, especially in societies under economic depression and pressure to seek quick profits. In the forest sector a general feeling of impunity among forest owners and enterprises was the combined result of weak legislation and the lack of transparency. The officials were responsible for the economic damage to the owner and largely for this reason seizure or confiscating of assets used for illegal acts was not practiced until 2003. Even in the case of a conviction, the criminals faced small punishments compared to the potential revenues. For example, a fine of 300 euros was charged in 2002 from a person who repeatedly organised illegal clear-fellings covering a forest area over 30 ha in the biggest and oldest Estonian national park – Lahemaa National Park (Kaar 2003).

3.2. The rise of illegal forestry in Estonia

As a combined result of the aspects described in 3.1, unsustainable and often illegal usage of forest resources grew rapidly in Estonia around the turn of the century (publication I). Since adoption of the liberal Forest Policy in 1997, the felling volumes increased. Adoption of the Forest Act in 1998 reassured continued lack of control over resource use and in private forests the volumes increased almost four times during 1997–1999 as seen on Figure 4.

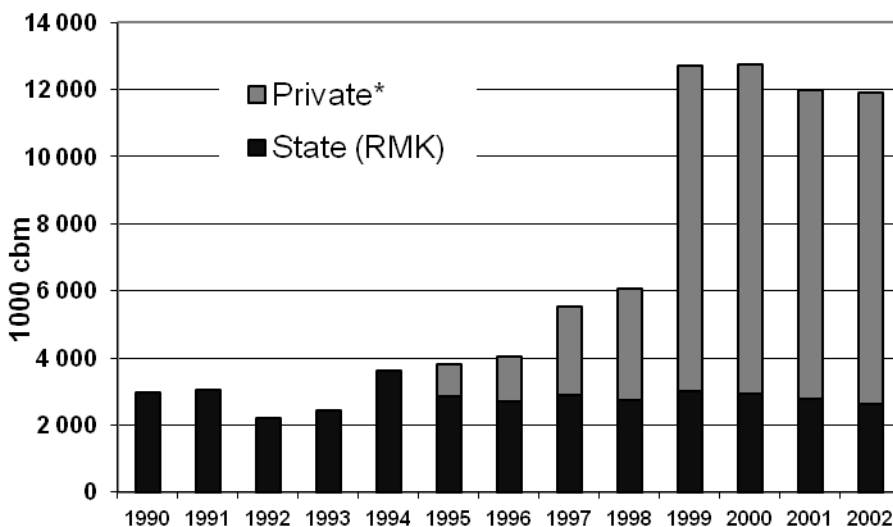


Figure 4. Annual felling volumes in Estonia 1990–2002 (publication II)

*From 1999 to 2002 the felling volumes are given according to statistical forest inventory data (EFSC 2001 and 2003). The division of felling volume between state and private sector is not known before 1995.

Sources: Yearbook 2001; Yearbook 2002; EFSC 2001; EFSC 2003; RMK 2002; RMK 2003

Comparison and analyses of official statistical data revealed that over 50% of the timber felled in private forests was likely of illegal nature (publication I). Interpolations of the official data showed that forest theft constitutes approximately 2,3% of all the timber extracted in Estonian forests (incl. state forests), which equals to 260 000 solid cubic meters, considering the total felling volumes (11,5 million cbm in 2002, according to EFSC 2003). This estimate was based on the assumption that the Environmental Inspectorate was able to discover approximately 70% of the thefts on the basis of the measured volume. This level of effectiveness was in turn based on several interviews with forest experts from the state and private sector. Comparison of felling amounts declared by the owners of private forest and results of statistical forest survey data for 1999 and 2000 displayed a 63% discrepancy in timber volumes harvested in private forests. While the felling volumes declared by forest owners were smaller than actual volumes harvested, the felling area reported was 62% larger than the results of statistical forest survey indicate. This indicates that approximately 60% of the timber measured by volume was harvested without an actual felling right because the felling declaration required by the Forest Act had not been submitted or had been submitted with false data. Although it is also probable that in some cases the felling declarations were not accurate due to forest owner's lack of knowledge, such one-sided and large divergence is still a clear sign of general deliberate misdeclaring for the purpose

of being able to harvest timber volumes beyond allowed limits or outside of the allowed areas (publication I).

Among the various aspects of illegal forestry, tax fraud in all its various forms is certainly the most difficult one to quantify. During the studied period there were no governmental statistics on the matter and a large part of the data which would enable evaluations was confidential. According to the estimation of the Estonian Forest Industries Association provided in 2001, 30% of the exported timber was related to tax fraud (Soon 2001). According to the estimation of the Estonian Green Movement (EGM 2002), this figure was at least 50%. In Ida-Viru county, tax violations were discovered in all forest- and timber-related companies that were inspected by the Tax Board in January-July 2002 (Ilisson 2002). In the course of preparing the Estonian Forest Development Programme, which was approved by the Parliament in November 2002, the expert group on preventing illegal forestry estimated that the government loses up to 20 million euros each year due to forestry-related tax frauds (EFDP 2002). This amount at the time equaled to approximately 1% of the total national budget of Estonia in 2002. Although accurate estimates are difficult to provide, based on various evaluations and expert opinions gathered during interviews, it was evident that a large proportion (30–90%) of timber harvested in private forests during the period was related to tax fraud.

To complement the above given estimates of illegal forestry, data from several field inventories carried out by the Estonian Forest Survey Centre during 1998–2000 (Maamets 2000; Maamets and Aruoja 1998; Maamets et al. 2000; unpublished field data) was analyzed (publication I). Conclusions were drawn mainly by finding the average share of violations in all field study counties for each type of violation. Although the requirement for the management plan was abolished in 1998, a commitment to maintain sustainable harvesting rates was included in the Forest Act: “The forest owner is obligated to ... manage his forests and allow his forest to be managed only in a way ... that is in accordance with the principles of sustainable use of forest resources” (Forest Act 1998). Since management plans had been prepared for all the forest properties under inventory, clearly stating the sustainable rates of forest resource use, harvesting substantially more than prescribed as sustainable was considered as a violation of the Forest Act in this case. Depending on the rural municipality under observation, overharvesting was noted in 50–90% of the cases (publication I). In Vaivara rural municipality the felling was clearly oriented on economically more valuable species like pine and spruce; where about double of the 10 year sustainably allowed volume had been felled within 5 years (Figure 5).

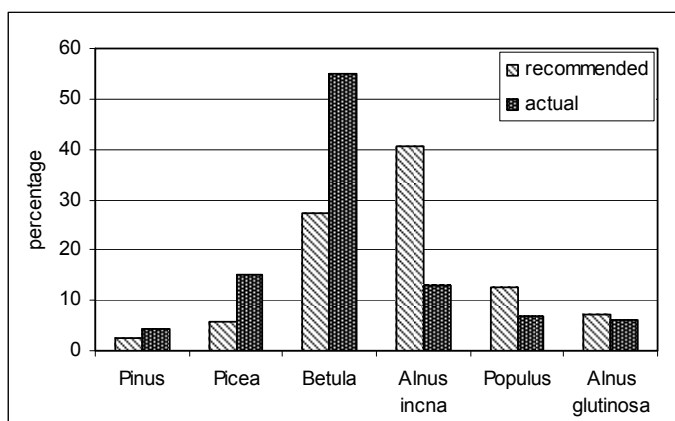


Figure 5. Felling volumes prescribed for ten years compared to actual volumes harvested with 5.2 years in Vaivara municipality (publication I)
Source: Maamets et al. 2000

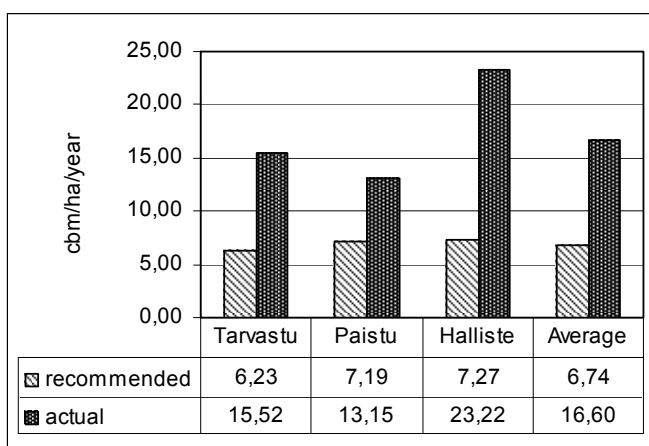


Figure 6. Actual felling intensity compared to the intensity suggested by the management plan in three rural municipalities of Viljandi county (publication I)
Source: unpublished field data gathered by Estonian Forest Survey Centre

In the rural municipality of Tudulinna, overharvesting was noted in the case of 64% of the land units where felling had taken place; in Vaivara, the respective figure was 50%. In Pajusi, 70% of the thinning sites were illegal since the forest coverage left after the thinning was below legal requirements. In the rural municipality of Türi, overharvesting was especially severe. During the field work, an average of three years had passed since the management plans (made for a period of ten years) for land units in this municipality were compiled. During that time, already more than double the pine (*Pinus sylvestris*) volume

which was prescribed to be felled during ten years had been harvested. Furthermore, this timber was mostly felled in places not designed to be harvested since only 28% of the felling by volume had taken place in prescribed areas. In the rural municipalities of Halliste, Tarvastu and Paistu, an average of 90% of timber originated from fellings where intensiveness exceeded the prescribed limit (Figure 6). Another major problem identified by the field inventories was the lack of regeneration after logging. Virtually no planting or sowing was observed in municipalities under revision and, in the cases where natural regeneration had occurred, the main species was the economically low-value *Alnus incana*. For example, in the rural municipality of Tudulinna, none of the clearcuts had been regenerated but 40% of them had regenerated naturally. In the rural municipality of Türi, no regeneration had been carried out, neither had any areas regenerated naturally (publication I).

Table 4 summarizes the estimates of illegal activities and indicates a significant share of illegal timber in relation to not reporting the planned felling as well as violation of legislation during felling. Although these estimates are not exact, it is evident that uncontrolled usage of forest resource was a significant problem during the transitional period of the Estonian economy. Due to rapid economic transition and many reforms, the government was not able to maintain an overview of the forest resources and their use. As a result, significant volumes of illegal material were exported to the European Union (Byström and Lloyd 2002) (publication I).

Table 4. Possible extent of violations in private forests in Estonia 1998–2002 (publication I)

Category of violation	(%)
I Violation of felling rights	
Forest theft	2
Lack of submission of felling declaration	63
II Violation of felling regulations	
Overharvesting	60–90
Neglecting legal regeneration requirements	70–90
III Tax frauds	30–90
Estimated total*	Ca. 70 %

* In reality, all forms of violations are overlapping with each other and there is no statistical method to evaluate the degree of this overlapping. Thus, a statistical average value of all the categories, except forest theft, is indicated.

3.3. Reaction and emergence of certification

The failure of adopted public sector policies to effectively control the forest resource usage resulted in a high degree of illegal and unsustainable forestry activities that had a detrimental impact on the reputation of the entire Estonian forest sector (Guertin 2003). Although the majority of the violations occurred in

private forests, most of the private owners were not concerned by the bad reputation, since forestry was not the main activity for them. As the public discussion and criticism escalated, the issue was raised in various European institutions and also on European markets (Guertin 2003). With increasing feedback from official EU institutions and signals of European partners, concern over the negative reputation of the Estonian forest sector started to increase also among the Estonian forest and timber industry (Kiisholts 2004). While NGOs continued to express concerns over the unsustainable use of forest resources, the industry was forced to start taking steps to parry the accusations of using illegal timber, such as implementation of wood tracking systems and ordering independent third party verification audits (publication II).

During the period, the Ministry of Environment, who is responsible for regulation of the forestry activities, focused on forest theft as the measure of illegal forestry. Due to this, the officially reported statistics on illegal activities continued to be relatively low, remaining below 1% (Keskkonnaministeerium 2004). This created frustration among NGOs as well as responsible timber industries, since without recognizing the full scope of the problem, successful public sector measures were unlikely to be adopted. At the same time public participation of the third sector in the forest policy formulation was limited and ineffective (Kultuur ja Elu 2004). These factors forced the stakeholders, and even some officials, to seek for alternative measures of forestry regulation (Tõnisson 2000), which created favorable conditions for adaptation of forest certification. The key enablers for certification in Estonia as proposed by the author are following (publication II).

- National environmental NGOs were seeking alternative ways to influence forestry practices. Already by the middle of the 1990s there was general dissatisfaction among national environmental NGOs with the liberal forest policy and unsustainable usage of forest resources. Although efforts were made to engage in forestry discussions with the public sector, in most cases NGOs felt their voices were not being heard. When the Forest Policy and subsequent Forest Act were adopted (in 1997 and 1998 respectively) despite strong criticism of environmental NGOs, they had almost lost hope of being able to influence the public forest policy making and were open to use and support alternative, market-based mechanisms.
- Active support for certification by international environmental NGOs. As the news about unsustainable forestry spread among the concerned international community, support for alternative methods increased also among international partners. Upon the initiative of Estonian Green Movement (ERL), NGOs began meeting to discuss certification issues in 1996 and 1997. ERL cooperated closely with the Taiga Rescue Network (TRN) – a transnational network of organizations committed to protecting boreal forests – which had been active in FSC certification issues when TRN's coordinator Karin Lindahl was on the FSC Board. Soon another major environmental NGO, the Estonian Fund for Nature (ELF), became involved as well, as did other NGOs. International donors and environmental NGOs supported the national

efforts with both ideas and funds. In fact Estonia's environmental NGOs were funded primarily by foreign donors in the 1990s and early 2000s.

- Desire for alternative regulation mechanisms among some public officials. Although government never publicly approved the high NGO estimates of illegal forestry, several officials recognized the problem and were also seeking alternative methods to regulate forest resource usage (Tonisson 2000). The Forestry Department at the Ministry of Environment began studying certification issues in 1998. In 1998 and 1999, the State Forestry Department financed studies of certification principles and analyses of the draft Estonian Sustainable Forestry Standard. It is paradoxical that the same Forest Policy of 1997 and Forest Act of 1998, which led to the most uncontrolled era of forestry in Estonia, also gave an important push for the forest certification to become a reality. The Estonian National Forest Policy, which was approved on June 11, 1997, recognizing the importance of sustainable forest management, set development of forest certification as one of Estonia's goals (FDP 1997; Kallas 2002). The 1998 Forest Act prescribed separation of the normative functions of state forests from its practical management. This in turn led to establishment of the State Forest Management Centre (RMK) in 1999 who became the largest holder of FSC forest management certificate in East-Europe at the time.
- Desire and need to improve the reputation of Estonian forestry. When the State Forest Management Centre (RMK) was established in 1999, it faced a daunting situation. On one side, the organization was handed over the task of being responsible manager and good caretaker of Estonian national forests. Yet, the reputation of Estonian forest sector in general was weak and there was common notion that illegal and uncontrolled activities in forest sector were increasing. The need to redeem the good reputation of Estonian state forest management and prove its compliance at the high level of international requirements was perhaps the most important impetus for certification of RMK. Frustration about lumping good and bad forestry together was felt and expressed also among some responsible private forest owners (Alvela 2008), however only a few went all the way to seek and achieve certification. A key reason for the first Estonian private owner to certify his forest management was the desire to demonstrate that not all private owners are managing forests for fast income and at the expense of sustainability (Alvela 2008).
- To a lesser extent, ongoing certification discussions in neighboring countries (Oja 2001) and slowly emerging market demand for certified products.

A short description of the emergence of forest certification follows (publication II). The Estonian National Working Group on Forest Certification (NWGFC) was formed in November 1998 by thirty interested organizations and individuals whose goal was to create an Estonian sustainable forestry standard (Tonisson 2000). Environmental NGOs played the primary initial role in bringing together interested parties and exchanging information and in spring 1999 the working group decided to take FSC principles and criteria as the basis for their work. Several forestry experts were involved and a representative of the Danish

FSC working group, Peter Feilberg helped to evaluate the quality of the certification standard. In December 1999 the draft sustainable forestry standard was approved and field tested in the following year. In 2000 the idea of Pan-European Forest Certification (PEFC – now renamed the Programme for the Endorsement of Forest Certification Schemes) was introduced to NWGFC and much of 2000 was spent arguing about the differences. Eventually the discussions led to a split between the members. FSC was supported primarily by NGOs and RMK, and PEFC by industries and forest scientists. Despite this division, NWGFC's sustainable forestry standard was approved in December 2000 by 23 organizations and individuals. Although the NWGFC was established in 1998 primarily to develop FSC certification in Estonia, the specific FSC working group was not launched until October 2000 by 11 groups and individuals. In September 2001 FSC international presented provisional conditions for accepting the national working group, which were not met until 2004. The working group then proceeded to work on the Estonian National FSC standard and approved this in April 2008. However the standard also needs to be approved by FSC International and has thus not been used for certification in the field yet. Figure 7 illustrates this process in time.

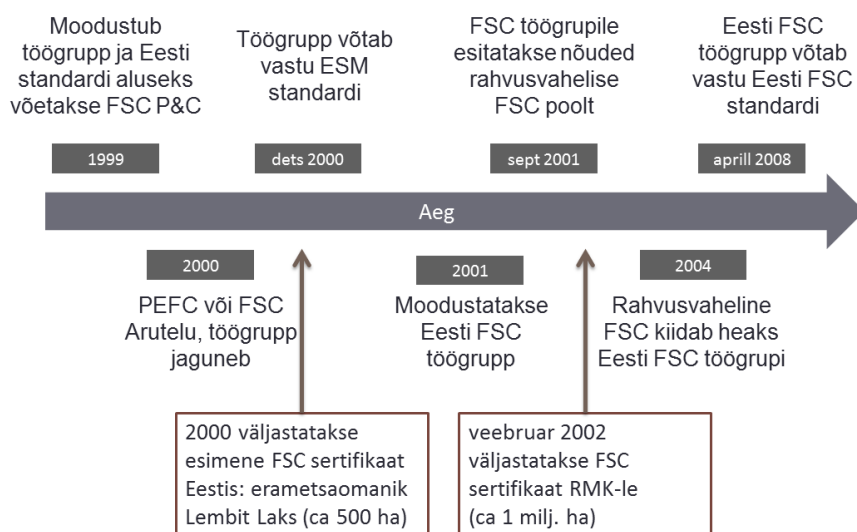


Figure 7. The process of emergence of FSC certification in Estonia.

In parallel with the work of the NWGFC and FSC working group, the practical forest management certification in Estonia began in 2000 with the first forest management certificate in Estonia being issued to a private forest owner Lembit Laks, covering about 300 ha of forest land. The State Forest Management Centre (RMK) started preparing for certification soon after it started operating in 1999 and achieved certification in February 2002. Certification of the entire

state forest was a landmark event, since at the time it was the largest single certified forest management unit in all of East-Europe. The FSC certification of RMK was done concurrently with ISO 14001 EMS certification. Throughout the process it was perceived by RMK that an FSC certificate would garner additional recognition of the good level of forest management of Estonian state forests among the general public, trade partners, and forest managers in neighboring countries (Lillemets 2004). Since there was no Estonian national FSC standard, the FSC certification of Lembit Laks and RMK were conducted according to the certifiers interim standard, which was formulated based on the NWGFC standard with a few modifications and additional points to make the standard more auditable (Feilberg 2004).

Since 2002, the certified forest area has remained rather stable in Estonia. RMK and the first certified private forest owner Lembit Laks have both maintained their FSC certified status. In November 2010, RMK was also awarded the PEFC forest management certificate (PEFC 2011). Certification was generally not undertaken among private forest owners. Some members of Rakvere private forest owners association had their forest areas FSC certified in 2005, however the certificate was suspended in 2006 due to the inability of the certified group to address some non-conformities in timely manner (SmartWood 2006). It was not until in February 2010, when about 51 000 ha of private forests were certified under PEFC certification scheme at the initiative of Estonian Private Forest Union (Erametsaliit 2011). For the purpose of this study the event has been considered to happen too late after the “problematic era” of Estonian forestry and the effects are also too early to evaluate. The chain of custody certification uptake among industry was rather slow in the beginning, however by 2011 the majority of the larger timber industries had adopted FSC certification (FSC 2011).

4. DATA AND METHODS

The study methods have been divided according to the phase of the study. In the first phase the public sector attempts to control forest resource usage and resulting problems in post-Soviet transitional economy was studied based on Estonian case study (publication I). In the second phase the emergence and impacts of sustainable forestry certification in these transitional economies were studied. This phase in turn can be divided into in-depth Estonian certification case study (publications II and III) and broader European level study on impacts of certification (publication IV and V).

4.1. Forest resource regulation and illegal forestry in Estonia

To establish a clear framework and clarify the terminology related to forest violations, reports and working papers from four main international programs related to illegal forestry were studied. These were: Forest Law Enforcement Governance and Trade process (EC 2003); the G8 action plan against illegal logging (G8 2002); World Bank initiatives against illegal logging (FLEG 2001) and The Pan-European Process (MCPFE 2003). During past two decades, illegal forestry has also been the focus of many influential environmental NGOs and several related publications were analyzed in this phase of the study.

The original part of publication I is focusing on forest resource regulation by the public sector and its failures, resulting in high share of illegal logging in Estonia. Public sector forest resource regulation was analysed and described based on the available public documentation. Additionally, the author was working in Estonian Green Movement at the time of the study and was active in working and lobby in the Ministry of Environment, due to which he was able to contribute personal knowledge. A central part of this phase of the study was analyzing the nature of illegal forestry and estimating the extent of this problem. For this part, information from four main sources was gathered and analyzed (publication I).

- 1) Official statistical data – gathered from Environmental Inspectorate, Statistics Office of Estonia, State Forest Management Centre, Centre of Forest Protection and Silviculture, Estonian Forest Survey Centre and Estonian Tax Board. This included a large volume of quantitative data, which was compared and analyzed to draw conclusions on the types and share of forest related violations.
- 2) Information collected by the Estonian Forest Survey Centre by using the statistical forest inventory method (SFI) was used as a comparison material. It includes information about forest resource and forest management activities based on the generalization of field data gathered in 1999–2001 from randomly placed small sample plots in the Estonian woodlands. The original data tables and detailed description of the methodology used for making field measurements as well as methods of statistical analyses used

for data generalization are available in the Official State SFI report (EFCS 2001) issued by Estonian Forest Survey Centre.

- 3) Data from field inventories – empirical data via field inventories was gathered by experts of the Estonian Forest Survey Centre (Maamets 2000; Maamets and Aruoja 1998; Maamets et al. 2000) from seven Estonian rural municipalities (Tudulinna, Türi, Vaivara, Tarvastu, Paistu, Halliste, and Pajusi) during the period of 1998 to 2000. During the field inventory, the quality and extent of completed forest management operations was compared with the forest management plans prepared for the sites under review. At the time of fieldwork, on average 3.9 years out of the ten-year management period had passed. Exact methodology for gathering the field measurements and generalization of the initial raw data is provided in the articles and reports of the studies (Maamets 2000; Maamets and Aruoja 1998; Maamets et al. 2000).
- 4) Qualitative expert interviews – to gain in-depth knowledge of the topic and additional insights, interviews with a broad spectrum of experts, officials and stakeholders related to forestry were carried out during 2001–2003. The following number of interviews was conducted: 5 state foresters, 4 timber businessmen, 3 state institution employees.

Results of this phase of the study were combined with qualitative analyses of the statistical and field inventory data and quantitative information gathered from documentation and during expert interviews.

4.2. Emergence and impacts of forest certification in Estonia

The aim of this research phase was to analyze in depth the process of emergence and adoption of forest certification in Estonia as a response to the wide scale uncontrolled use of forest resources. Secondly the actual impacts of certification and its potential to enforce more sustainable forestry practices were analyzed. For general background, materials since 1995 were analyzed and records of certification meetings were studied. A combination of three methods was used for the original research portion. For complete picture on the impacts, it was considered important to study the perception of external stakeholders as well as the staff of certified operation themselves (publication II and III). For empirical results, field measurements on felling sites were conducted. The methodological framework for this research was partly provided by Yale School of Forestry and Environmental Studies. Under the lead of Benjamin Cashore, the faculty was arranging a conference on the emergence and impacts of certification in transitioning countries and the author contributed a paper (publication II). Structure of the paper together with general guidance on what was expected in each section was provided for the authors. Results from the conference were published in a book (Cashore et al. 2006).

Qualitative expert and stakeholder interviews (publications II and III). In January 2004, questionnaires regarding the emergence and adaptation process and

impacts of certification were sent to 28 key individuals, who represented different stakeholder groups and institutions interested in forest certification. The respondents were subjectively selected based upon author's opinion of who has most information about practical implementation and impacts of certification. To increase the authenticity of the results, the respondents were carefully selected from among specialists with best knowledge about certification and forestry. 11 completed interview responses were received by February 2004. Since the response level was considered too low for broad scale opinion, an additional 13 interviews were carried out during February and March of 2004. Based on the feedback and information gathered, generalizations were made and conclusions drawn.

Questionnaire on the perceived impacts of certification among the staff of certified organization Estonian State Forest Management Centre (RMK) (publication III). The questionnaire was aimed exclusively on the evaluation of certification impacts as perceived internally by the certified organization staff. The full scope of certification evaluation criteria was used in the questionnaire. This resulted in a list of 94 different aspects that certification could have potentially influenced, which were grouped into 23 categories and six main focus areas (public relations; employees and work environment; economic relations; information and monitoring; forest management and environment; documentation). The respondents were asked to express their opinion regarding the impact of FSC certification for each aspect on the five point Likert scale indicating perception from strongly positive to strongly negative impact. The questionnaire was made available online from 29.11.2004 until 17.12.2004 and responses were recorded in SQL database. To gain accurate results, RMK employees from various levels in the organization were chosen. The number of staff to whom questionnaire was sent and the response level is shown in Table 5. The results were analyzed in SPSS. To compare certification impacts on single aspects, the combined frequency of strongly positive and positive answer for each aspect was used. Although combined share of positive answers was used as main index during comparison, the combined frequency of negative answers and also frequency of neutral answers was used where appropriate (publication III).

Table 5. Division of RMK staff who received the questionnaire and the achieved response level (publication III)

Position	Structural unit	Request sent out	Responses received	Response level (%)
various	central office	8	6	75,0
chief forester	regional office	5	4	80,0
head forester	forest district	66	30	45,5
forester	forest district	344	69	20,1
not specified	various	—	2	—
TOTAL		425	111	26,1

Field inventory of RMK felling sites prior to and after certification (publication III). During the field visits, selected indicators were measured on 30 randomly selected clearcut sites harvested in 1999 (before certification) and on 30

randomly selected clearcut sites harvested in 2004 (three years after certification) in Southern Estonia, Elva, Ilumetsa and Taheva forestry districts. Field visits were conducted in November 2004, since this is usually the latest time in Estonia without snow cover. During the field visits 9 following indicators were measured/evaluated on all clearfelling sites: number of live biodiversity trees (pc/ha); number of standing dead trees and parts of stem (pc/ha); amount of lying deadwood left on the felling sites (pc/ha and m/ha); amount of soil damage in length (m/ha); damage to remaining trees (yes/no); presence of buffer zones along open landscapes and watercourses (yes/no); signs of garbage or pollution on the site (yes/no); compliance of felling area borders with the felling site borders on the map (yes/no); changes in water regime of water courses as a result of felling activities (yes/no). The indicators measured were directly derived from FSC standard requirements. 30 clearfelling sites visited were harvested in 1999, a year after RMK as a state stock company was established and two years before certification. The other 30 visited clearcut sites were harvested in 2004, during the year of field visits, two years after FSC certification of RMK. It is thus assumed that the differences between 1999 and 2004 sites are largely a result of FSC certification. The main aim of the field study was to provide empirical quantitative results on impacts of forest certification. It should be noted however that the indicators cover only a small part of the scope of FSC standard.

4.3. Forest certification impacts in East-Europe

In this phase of the research, the impacts of certification were studied directly based on the actual requirements which have been issued to the East-European forestry operations by certification bodies (publication IV and V). This methodology has several advantages. The data is systematically gathered by auditors based on consistent accreditation requirements and made publicly available. Non-conformities are raised based on empirical evidence identified in the forest management operations by auditors and reflect the areas where on-the ground forestry practices are below the defined criteria of sustainable forest management. Since addressing the non-conformities is compulsory to maintain certified status, these are the areas where certification effectively enforces sustainable forest management practices on the participating operations. On the other hand the areas, which are regulated by the standard, but where no or little non-conformities were raised, are areas where forest practices are already in compliance with sustainable forest management criteria. Aspects of positive compliance can only be indirectly evaluated via absence of non-conformities, since these are normally not systematically described in the certification report public summaries. Furthermore it is not known to what extent the positive compliance was triggered by the certification process (operation improving practices in anticipation of the certification assessment) rather than being approval of status quo.

For the initial sample all FSC certified forestry operations in CEE region as well as West-Europe with valid forest management certificates as of 1. of September 2009 were used. In countries with over 20 forest certificates (Germany, Lithuania, Russia, Sweden, UK), the sample was limited by randomly selecting 20 forest certificate holders. This resulted in a sample of 427 forest certificate holders from 32 countries. For each certificate holder in the sample, the latest assessment report public summary from the homepage of the certification body or from FSC public database (info.fsc.org) was downloaded. The assessment reports were used, since compliance with full standard is always checked during assessment, while only a subset of requirements may be checked during annual audits. All non-conformities were manually extracted from the reports and entered into a spreadsheet program. The sampled reports contained 2 177 non-conformities, out of which 1 000 non-conformities were randomly sampled for analyses. The sample was equally balanced between East- and West-Europe, enabling the results for the study area to be compared with West-Europe. This helps to identify the features which are more prominent for the transitional countries and to distinguish those from the general, global or European wide certification impacts. The East-European region in the context of this study are post-communist countries, often classified as CEE (Central- and East-European) countries. In this thesis the following countries are considered as CEE countries: Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia, Slovenia and Ukraine. Montenegro does not have any FSC certificates and was not considered relevant for this study. The West-European countries are all the EU countries not included in CEE region plus Switzerland and Norway. Since Cyprus and Malta do not have any FSC forest management certificates, they were not considered relevant for this study. Geographical division of the resulting 1 000 non-conformities is indicated on Figure 8, which shows a good representative sample across the CEE study region as well as comparison West-European region.

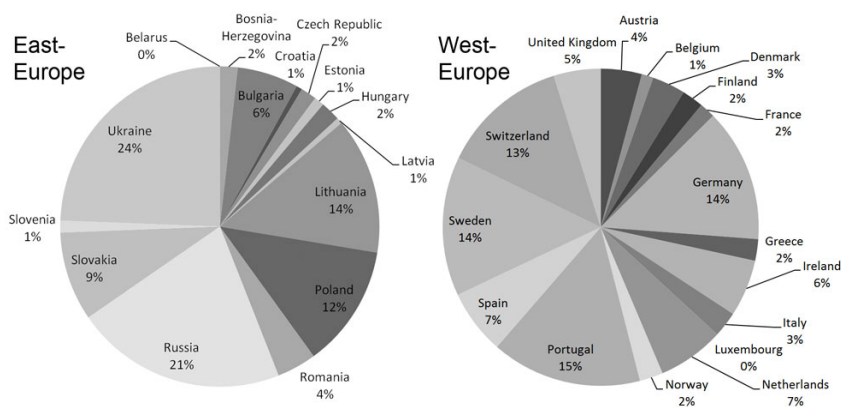


Figure 8. Division of the analyzed non-conformities between countries (500 in each region) (publication V)

For data analyses, each non-conformity was classified into one of the pre-determined categories (adopted from Newsom et al. 2006). To ensure consistent classification, a calibration exercise was done, during which 400 non-conformities were associated with the categories independently by both authors of the fourth and fifth publication. The calibration exercise led to some adjustments in the categories. The final categories are indicated in Table 6. The classification has four broad categories with specific topics in each: A – forestry and silvicultural topics; B – ecological topics; C – Social topics; D – System elements. Non-conformities were only classified under topics in category D (system elements), when they were so general they could not be associated with any specific topic under other three categories (A, B, or C). Category D6 includes formal non-conformities which are not related to forestry, such as sales document formulation and usage of FSC trademarks.

Table 6. Categories for classification of the non-conformities (adopted from Newsom et al. 2006) (publication IV and V)

A Forestry activities and silviculture	B Forest ecology elements	C Social and economic elements	D Systems elements
1. Roads and skid trails	1. Soil and erosion	1. Communication and conflict resolution with stakeholders, neighbors and communities	1. Management plan and rate of harvest
2. Restoration	2. Aquatic and riparian areas	2. Special cultural sites	2. Environmental Impact Assessment (EIA)
3. Regeneration and reforestation	3. Threatened and endangered species	3. Worker wages and living conditions	3. Monitoring
4. Conversion to non-forest uses	4. Protected areas, reserves and HCVF	4. Worker safety	4. Inventory
5. Chemical use and garbage disposal	5. Woody debris, snags and legacy trees	5. Training (incl. contractors)	5. Mapping
6. Exotic species and pests	6. Landscape-level considerations	6. Illegal activities and trespassing	6. Chain of custody; trademark and group certification*
7. Fire; prescribed burning	7. Use of lesser known species; deciduous species	7. Compliance with national and international laws	
8. Clearcut use and size	8. Non-timber forest products (incl. recreation and hunting).	8. Profitability of operation	
9. Forest machinery and chain saws		9. Long-term tenure	

**This category (D6) includes formal non-conformities which are not related to forestry practices, such as sales documents formulation, usage of FSC trademarks and administrative management of group certificate members.*

Although targeted and systematic, the method used has some limitations. The non-conformities provide accurate information about what the operations have been required to change. However the results of certification are also dependent on the set of requirements based on which the compliance evaluation is conducted. Although the FSC P&C are global, the indicators in the national standards are somewhat different, potentially influencing the results in each country. Secondly existing legislation and its enforcement partly determine the baseline performance of the operations. For example usage of health and safety equipment is legally well regulated and enforced in Sweden (high baseline

performance), which may be the reason why no non-conformities regarding this topic were observed in Sweden. It should not be concluded that the forest management quality in certified operations is necessarily indicating the overall forest management quality in Europe. As noted by several authors, the operations that are most progressive are most likely to adopt certification (Newsom et al 2006). Non-conformities reflect the areas where forest management operations did not meet the standard at the time of certification initial assessment; however it is logical to assume that operations take steps to improve their practices in preparation for the assessment. The used method thus has tendency to under-estimate the positive impact of certification in enforcing sustainable forest management. Indeed research indicates that operations take significant steps to improve their performance prior to certification. For example Cubbage et al. (2010) found that in certified forestry operations in Argentina and Chile, the raised non-conformities were the cause of only about 36% of the changes, which were undertaken due to the certification process. This indicates that the positive impact of certification is in fact larger than can be evaluated only based on raised non-conformities.

5. RESULTS

5.1. Certification impacts in Estonia

5.1.1. Certification impacts as perceived by stakeholders

Increase of general environmental awareness and more positive attitude towards sustainable forest management was commonly observed by respondents (publications II and III). One of the most significant changes brought to Estonia through certification is increased discussion and involvement of various stakeholders. These impacts are related to the whole process of standard setting and emergence of the certification debate. Discussions in 1998 in the NWGFC involved the participation of more than 40 organizations and representatives. Environmental NGOs appear to have gained increased influence through the certification process by virtue of gaining more opportunities to spread their message and to directly monitor activities in the forestry sector (Trapido 2004). Several ideas of the environmentalists (such as biodiversity trees, protected areas, felling-free spring season, landscape ecology considerations in management plans) have made it into the daily practice of RMK through certification. In the following sections the stakeholder views about social, economic and environmental impacts are presented.

Social impacts (publications II and III). According to most respondents, certification of RMK has increased focus on the forest workers safety considerations. Dedicated safety trainings have been increased, presence of personal protection equipment and safety equipment in machinery is required now more strictly and the situation is being monitored systematically. Quite strict policies were established compared to earlier practices as such issues were largely neglected in Estonia earlier. On the negative side, some forestry officials claim that access to timber resource has been limited and felling volumes are decreasing due to certification. They argue that it increases unemployment in the countryside and people without special training lose the possibility to work for RMK. Some forest industries also claim that the reduced felling activities in spring period (spring truce concept) increases unemployment. Only very few respondents did recall positive influence of certification to the local inhabitants and small-scale local businesses. Interviews also showed that people dealing with tourism and catering of forest berries and mushrooms are worried about the large share of clear-cut forestry as tourists value more natural landscapes and forests. Lack of suitable forests for picking of forest berries and mushrooms is especially visible in agricultural regions with fewer forests. Tourism is however one of the few and seasonally variable sources of income in Estonian poorest remote regions.

Economic impacts (publications II and III). Economic impacts of certification were one of the most controversial topics. Respondents generally agreed that certification has changed market options for manufacturing companies whose clients demand FSC certification; however economic impact on RMK activities was almost always unclear. Certification entails additional costs,

which were highlighted by all stakeholders. Costs are not easy to estimate, as they involve both the direct costs as well as indirect costs to bring management into compliance with FSC requirements (the costs of training, purchase of safety equipment etc.). In general stakeholders did not believe that certification has big potential to increase revenues. Price premium for certified material was mentioned only in very few, exceptional cases. Access to certain new markets or possibility to maintain or receive new contracts was mentioned by several industry representatives. In conclusion, while among timber industry certification was seen to have indirect economic benefits, in forest management level, the economic impacts of certification are perceived as neutral or negative, due to the combined direct and indirect costs of certification.

Environmental impacts (publications II and III). A majority of positive impacts were perceived to be related to this area. Protection of the environment has gained more importance, environmental NGOs have been able to intervene more strongly into management decisions and the Estonian state as a large forest owner has gained a better environmental image. Extensive environmental trainings were held in RMK for their own staff and also for contractors. As a direct result of conditions raised by the certifier, guidelines and procedures for implementation of certain works (such as forwarding, drainage systems renovation etc.) were established or improved in order to minimize negative impacts to ecosystems and soil (personal communication). Following specific environmental impacts of the certification were observed by the questioned stakeholders:

- RMK is keeping records and systematically planning measures to protect endangered species and biodiversity values. The same goes for sites of historical heritage and value.
- Methodology for preservation of biological diversity has been created and is implemented. Conservation of key biotopes, interesting natural sights, dead wood and biodiversity trees are being implemented, although such an approach is still being objected by some foresters.
- Many discussions have emerged from the implementation of the spring truce concept in RMK. Prior to certification RMK established a special strategy for forest management during spring and summer. RMK has voluntarily cancelled most of felling works for the period of April 15 to June 30 to minimize disturbing of breeding animals and birds. In RMK this period is used for vacations and other forestry activities such as forest regeneration, tending of young stands and maintenance of machinery. According to environmentalists and the general public the spring truce has improved the state of the environment and created a positive image for RMK (Eesti Päävaleht 2004, Schank 2004).
- Significant progress has been made in stopping establishment of new amelioration networks in forests. In 2001, when RMK was preparing for FSC certification, it was decided among the organization that new drainage systems were not to be established in state forests (Schults 2004). For renovation of existing drainage systems and establishment of new forest

roads, environmental assessment and respective planning is being carried out prior to field work engagement (Schults 2004).

- Work has been initiated to limit the use of chemical substances and usage of exotic species has stopped. Usage of certain hazardous chemicals has been stopped.

Along with positive impacts, some concerns were also raised (publications II and III). Skeptical forest officials indicated that lots of resistance and misunderstanding is caused by the call to leave deadwood and biodiversity trees in the forest, as it is seen as a waste of resources as well as aesthetically ugly and disturbing. There are also concerns among some foresters that too many areas have been signed for conservation purposes, which limits possibilities for forest management. Some people are quite critical of the spring truce. The period is considered to be too long and the entire approach of a felling ban is thought to be too radical. Finally some critical environmentalists emerged among respondents who find that certification looks nice only on paper, while forest management practices remain unchanged, destruction of landscapes and soils continues, as does the use of chemicals. They say that certification was a tactical step taken by RMK to fool environmental NGOs and the international audience. The share of such opinions was however rather marginal.

To summarize the common perceptions of certification impacts, the following positive and negative aspects can be listed (publications II and III).

Table 7. Main positive and negative or neutral impacts of certification perceived by stakeholders and experts

Main positive impacts	Main negative or neutral impacts
<ul style="list-style-type: none"> – Increased environmental awareness among RMK staff and contractors – Less disturbance of fauna during spring time due to felling-free period introduced – Increased safety and health care of forest workers – Increased reputation as a good forest manager among international (and national) stakeholders – Increased possibility for NGOs and environmentalists to participate in decision making – Increased share of biodiversity elements in felling sites – Improved protection of endangered species and biodiversity values during felling – Less intensive use of chemicals 	<ul style="list-style-type: none"> – No decrease in the share of clear-cut forestry – Increase of unemployment due to higher qualification requirements for forest workers – No benefits introduced for local inhabitants and community – Limited access to timber due to higher felling restrictions

5.1.2. Certification impacts as perceived by RMK

Questionnaire responses of RMK employees showed that in general highest positive impact has been observed in the areas of employee awareness and work environment as well as regarding increased availability of information and better monitoring systems (publication III). The analyses clearly demonstrates less positive impacts regarding documentation system and economic performance of RMK. Impact evaluations vary greatly among subcategories of environmental considerations during forest management, however exceptionally high improvements have been observed regarding prevention and minimization of environmental risks. Table 8 and Table 9 highlight results for most positive and negative aspects identified by RMK staff respectively. Review of the tables shows that a high degree of concord exists among respondents regarding positive impacts. At the same time, one can observe a high share of neutral answers regarding negative aspects. This shows that significant differences in opinion exist regarding possible negative impacts of certification among various respondents. As seen, it is perceived by RMK staff that environmental awareness has strongly increased among contractors as well as RMK staff. Increased reputation of the Estonian state forest manager both internationally as well as among Estonian stakeholders and partners is highlighted as a positive change among the large majority of the respondents. Many of the other positive changes are related to better maintenance of biodiversity and prevention of environmental damage. Finally, increased considerations for work safety also clearly emerged as a positive change.

Table 8. Aspects which received largest percent of positive answers (publication III)

	Aspect	Positive (%)	Neutral (%)
1	Environmental awareness among contractors	95,5	0,0
2	RMK reputation on international level	92,8	0,0
3	Environmental awareness among RMK employees	92,8	0,0
4	Extent of leaving biodiversity trees on felling sites	92,8	0,0
5	Presence of equipment for prevention and alleviation of environmental damage in forest machinery	91,0	0,0
6	RMK reputation among Estonian environmentalists and Environmental NGOs	90,1	1,8
7	Common understanding among RMK staff regarding significance of biological diversity elements (snags deadwood etc.)	90,1	4,5
8	RMK reputation among Estonian media and public community	88,3	1,8
9	Presence of safety equipment among contractors	88,3	0,9
10	Presence of equipment for prevention and alleviation of environmental damage among RMK forest workers	87,4	0,0

	Aspect	Positive (%)	Neutral (%)
11	Presence of equipment for prevention and alleviation of environmental damage among contractors	86,5	0,0
12	Presence of safety equipment in forest machinery	85,6	0,9
13	RMK reputation among RMK partners	84,7	1,8
14	Acknowledgement and assessment of environmental risks prior and during forest operations	84,7	0,0
15	Decreased felling volume during spring season	82,0	6,3
16	Decreased cases when felling worker is working alone in forest	79,3	0,0
17	Extent of leaving deadwood	79,3	0,9
18	Prevention and minimization of soil damage	79,3	3,6
19	Increased quality and amount of information on RMK homepage	78,4	0,0
20	Availability of new written informational material regarding RMK activities	78,4	0,0

Table 9. Aspects which received largest percent of negative answers (publication III)

	Aspect	Negative (%)	Neutral (%)
1	Increased volume of irrelevant and not necessary documentation	93,7	4,5
2	Share of roundwood sold to local people and industry	51,4	43,2
3	Number of contractors	47,7	36,9
4	Number of partners	27,9	53,2
5	General structure and usability of documentation system	57,7	15,3

RMK's own perception generally confirms the perception of stakeholders about the areas where contrary to the expectations, certification has not had a positive impact (publication III). Many environmental stakeholders had put high hopes in certification as a tool to promote novel forest management methods, previously not widely used in Soviet-Estonian forestry. For example a lively discussion regarding possibilities for using non-clearcut methods was ongoing during the initial certification phase, and many saw much higher potential for non-clearcut forestry in Estonian forests, than was being practiced. More strict preference for mixed stands and better utilization of non-timber forest products are other examples of areas where large possibilities for improvement exist according to environmental stakeholders. The results from RMK staff indicated that certification has not had a significant impact in relation to the following areas: increase of non-clearcut forestry and selective felling; stronger preference for mixed forests stands; increasing the usage of noble hardwoods; commercial utilization of non-timber forest products (publication III).

5.1.3. Certification impacts observed on the field

To evaluate the effects of forest certification on practical forest management, results of 9 indicators from 30 clear-cut sites of 1999 and 2004 were compared (publication III). Table 10 shows the statistics and significance of changes in indicators. Although the internal variations within variables are quite high, there is clear increase in the amount and volume of all biodiversity elements (biodiversity trees, snags and deadwood) in 2004 as compared to 1999. Measurements of soil damage do not indicate improvement in 2004 as compared to 1999. In fact the observed mean extent of soil damage was slightly higher in 2004 than in 1999; however this difference is statistically not significant. It should be noted that the results regarding soil damage might be distorted since recent soil damage from 2004 was likely easier to be discovered during field inventory.

Table 10. Values and significance of change (T Test results) for field survey variables for years 1999 and 2004 (publication III)

Variable	Mean 1999	Mean 2004	t	df	Sig.
Live biodiversity trees (pc/ha)	6,64	16,71	4,339	58,000	,000
Dead biodiversity trees (pc/ha)*	0,49	2,10	3,256	33,661	,003
Lying deadwood (m/ha)*	1,83	15,43	2,554	30,161	,016
Lying deadwood (pc/ha)*	0,45	3,26	2,502	30,653	,018
Soil damage (m/ha)	3,73	3,80	,390	58,000	,698

*Equal variances not assumed.

In addition to the aspects analyzed above, other indicators were recorded on each visited site on a yes or no basis (publication III). The summary results are provided in Table 11 for each registered indicator. Since some aspects (e.g. buffer zones), were not applicable in all sites, the first column for both years indicates a number of sites where the aspect was relevant and when it was thus evaluated. The second column indicates the number of cases where the indicator was observed to be true. The third column indicates percent of true cases from relevant cases to enable better comparison of results between years. As seen there is most significant difference regarding buffer zones. While in 2004 buffer zones were left in 75% of all cases where it was applicable, in 1999 buffer zone had been left only in one case out of 8 possible sites. The impact of certification on the habit of leaving buffer zones along open landscapes and public roads is significant, considering the fact that a specific condition requiring buffer zones to be left was raised against RMK during certification assessment (SmartWood 2002). Considering the small number of observed cases and small difference between years, no conclusions should be made about other indicators, although it could be speculated that increased use of harvesters has resulted in a higher level of damage inflicted to surrounding and remaining trees. Another possible reason for higher share of damaged trees in 2004 could simply be caused by the fact that fresh bark damage is easier to notice. Although the number of cases when garbage was observed in felling sites was higher in 2004, it is likely that

the sites are cleaned by RMK after certain period of time and some of the recently logged areas had not yet been cleaned after felling (publication III).

Table 11. Results of other aspects observed during field inventory (publication III)

	issue relevant	1999 cases observed	%	issue relevant	2004 cases observed	%
Buffer zones left along open landscapes and major roads	8	1	13	8	6	75
Remaining trees damaged during harvesting	21	2	10	29	5	17
Distorted waterflow in natural watercourses	4	1	25	6	1	17
Garbage observed on harvesting site	30	1	3	30	7	23
Possible violation of felling area borders*	30	2	7	30	3	10

*The results for this category could be incorrect due to the fact that the felling area borders have changed in some areas during forest inventory. Author used the maps available from forest districts during field survey; however in some cases the maps might have been outdated.

5.2. Certification impacts in East-Europe

To verify the results from the Estonian case study and enable drawing conclusions for transitional economies, a broader East-European level evaluation of certification impacts was conducted (publication IV and V). The same methodology was applied also in West-Europe as a comparison region to identify impacts which are more unique for the East-European transitional region. Since there are hundreds of forest management certificates in Europe, an in depth case study approach could not be used and a different methodology was required. The potential of certification to change the forest management practices can be most directly evaluated based on the aspects that have been adjusted and improved by forest managers as a direct result of the certification process. The non-conformities issued to certified operations by certification bodies provide exactly such data. The results are presented by the four general categories: A – forestry and silvicultural topics; B – ecological topics; C – Social topics; D – System elements. Summary of most common overall non-conformities is then provided together with the comparison of the issues between East-Europe and West-European countries.

Category A – forestry and silvicultural aspects. More non-conformities were raised regarding chemical usage and disposal in CEE region (42) than for all the other topics in category A together (Figure 9). FSC requires operations to minimize chemical usage and also bans usage of certain hazardous chemicals. 13 out of 42 non-conformities were direct result of the operations using chemicals banned by FSC. The other area of common violations is related to lack of proper equipment and maintenance of forest machinery and chain saws. Mostly the FSC requirements here are related to minimizing negative environmental impacts. For

example 6 non-conformities were related to lack of oil absorbents in machinery and several others were raised since operations were not using biodegradable oil in hydraulics or as chain saw oil. In still other cases direct leakage of oil was observed. Usage of too narrow spectrum of species for regeneration, lack of sufficient tending of young stands and insufficient usage of natural regeneration stand out in relation to forest regeneration. In conclusion the most common non-conformities even in this category of silviculture are related to maintaining or avoiding damage to the ecological functions of forests (avoiding hazardous chemicals, minimizing negative impacts of forest machinery; using wide variety of species and natural regeneration) (publication IV and V).

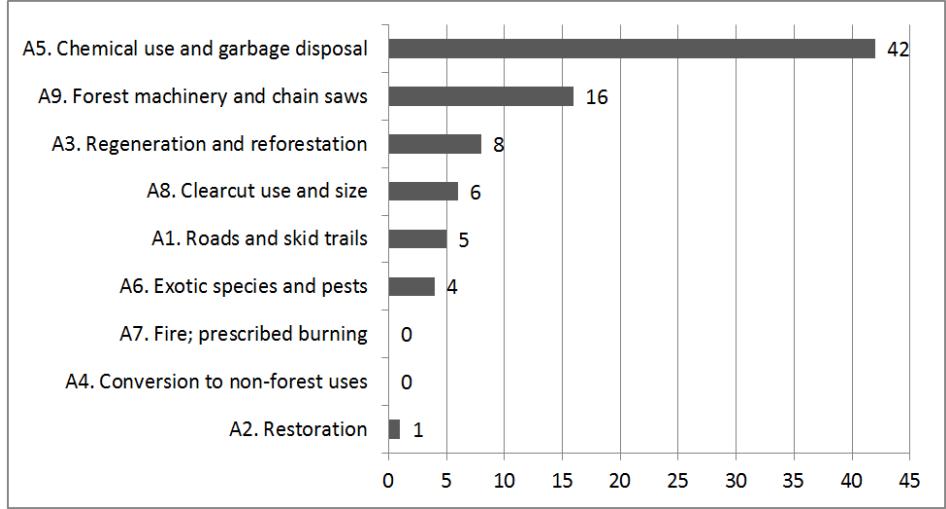


Figure 9. Number of non-conformities raised in category A – forestry and silvicultural aspects (publication IV)

Category B – ecological aspects. Problems identified in relation to protected areas can be classified into: a) lack of sufficient initiative to find and designate areas for protection; b) lack of implementing proper measures to ensure survival of the identified protection values (Figure 10). The latter is related to insufficient monitoring or conducting harmful management activities in the protected areas. Non-conformities related to threatened and endangered species include the same types of violations: most commonly lack of species or their habitat inventories, followed by lack of proper protection. Next three topics are all related to maintaining the ecological values and functions of forest ecosystem by avoiding damage to special features or elements present in the forest. B5 addresses ecologically valuable woody parts such as old standing trunks, deadwood at various levels of decay; biodiversity and legacy trees. B2 focuses on water related features and B1 on soil. In almost all cases the raised non-conformities are directly targeting removal of (mainly in case of woody elements) or damage to (soil and special water related areas) the elements (publication IV and V).

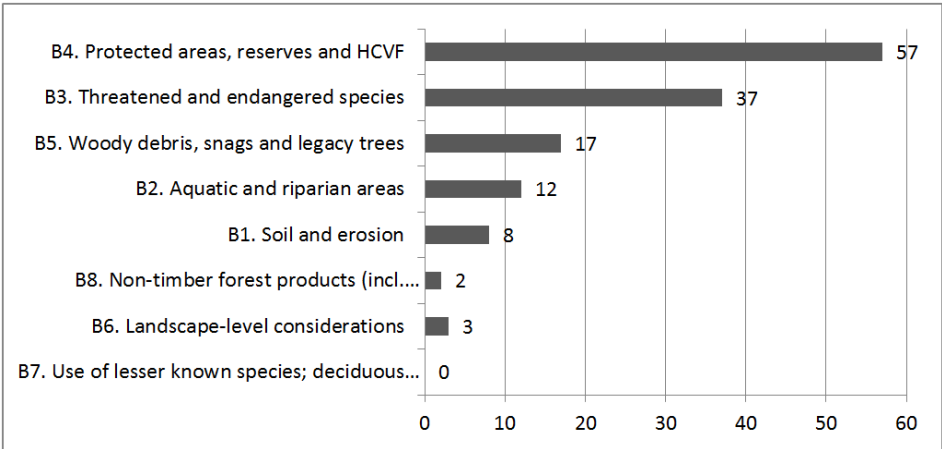


Figure 10. Number of non-conformities raised in category B – ecological aspects (publication IV)

Category C – social and economic aspects. Most non-conformities in this category were related to a lack of communication and transparency (Figure 11). A majority of the non-conformities raised regarding communication and conflict resolution (C1) are direct results of missing or insufficient stakeholder communication by forest management operation. Lack of compliance with worker safety requirements has also resulted in high share of non-conformities. The non-conformities related to safety can be classified broadly into direct lack of required personal protection equipment and system level non-conformities such as inadequate safety training. Related requirements are normally very objective and compliance is usually strictly enforced by certification bodies (publication IV and V).

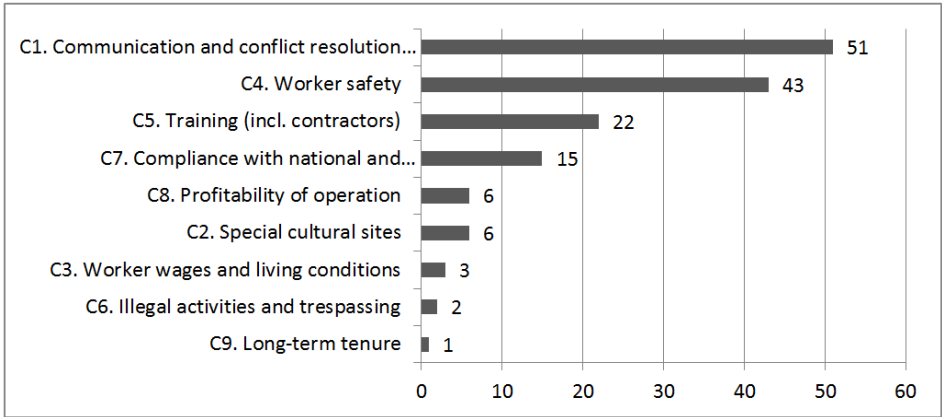


Figure 11. Number of non-conformities raised in category C – social and economic aspects (publication IV)

Category D – system elements (publication IV and V). General non-conformities which were not related to any specific topic under other categories are indicated here. FSC standard has a whole principle dedicated to monitoring (principle 8) as well as for a management plan (principle 7). From the system elements, monitoring is most often found to be inadequate in comparison with the FSC standard (Figure 12). The generic non-conformities conclude that monitoring is not done with sufficient scope, scale or intensity. Similarly most non-conformities raised in relation to the management plan conclude that the management plan is not sufficiently detailed. It should not be concluded that in most cases there is lack of a management plan; rather the level of details does not correspond with the expectations of the certification body. Non-conformities raised due to too intensive felling were also classified under the same topic (D1). However only 2 non-conformities in CEE region were raised because of too high felling volumes.

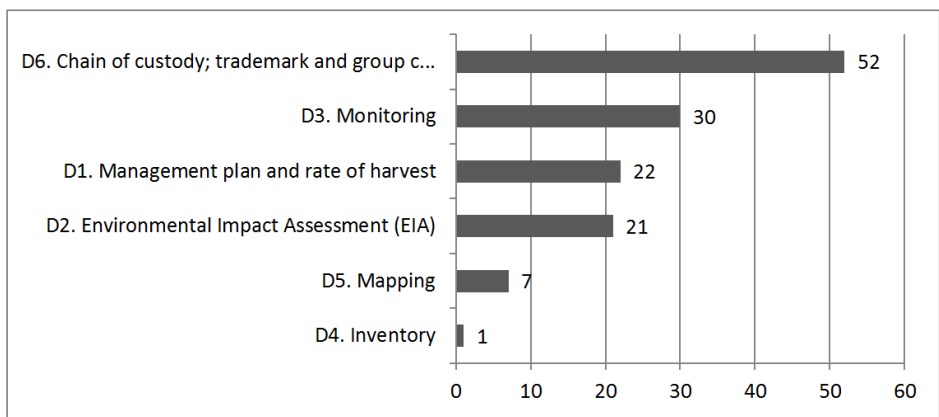


Figure 12. Number of non-conformities raised in category D – system elements (publication IV)

Across all categories, the total largest number of non-conformities was raised under category C – social and economic focus (149), followed by category B – ecological focus (136). Silvicultural aspects and system elements received equally less non-conformities (82 and 81 respectively). Table 12 shows the number of non-conformities raised under each topic in CEE region and also in the comparison West-European region. Protection of ecologically valuable forest areas is challenging for forest managers, since this topic received the highest number of non-conformities (57, 13%). This is followed by public communication and conflict resolution which is directly related to transparency and social impacts of the forest management (11%). Usage of too many or unsafe chemicals also appears to be wide scale problem, since almost 10% of the non-conformities have been raised in relation to this. Similar proportion of

non-conformities has also been identified against fulfilling the requirements for workers safety and usage of personal protection equipment. About 8% of the non-conformities are related to insufficient protection of threatened and endangered species. Environmental concerns, such as damage to, or removal of, forest elements vital for sustaining healthy forest ecosystem, are also areas where improvements are commonly required from forestry operations. Among system elements most frequently the monitoring systems are required to be improved, followed by management plans (including rate of harvest) and environmental impact assessment. As seen, the main areas where FSC drives sustainable management practices are related to environmental and social aspects (publication IV and V).

Table 12. Number of non-conformities in each topic in East-Europe (CEE) and West-Europe (WE) (publication V)

Category	CEE	WE	Total	Category	CEE	WE	Total
A1. Roads and skid trails	5	1	6	B8. Non-timber forest products (incl. recreation and hunting)	2	9	11
A2. Restoration	1	0	1	C1. Communication and conflict resolution with stakeholders, neighbors and communities	51	36	87
A3. Regeneration and reforestation	8	8	16	C2. Special cultural sites	6	5	11
A4. Conversion to non-forest uses	0	1	1	C3. Worker wages and living conditions	3	6	9
A5. Chemical use and garbage disposal	42	35	77	C4. Worker safety	43	31	74
A6. Exotic species and pests	4	1	5	C5. Training (incl. contractors)	22	29	51
A7. Fire; prescribed burning	0	4	4	C6. Illegal activities and trespassing	2	3	5
A8. Clearcut use and size	6	6	12	C7. Compliance with national and international laws	15	8	23
A9. Forest machinery and chain saws	16	6	22	C8. Profitability of operation	6	11	17
B1. Soil and erosion	8	14	22	C9. Long-term tenure	1	1	2
B2. Aquatic and riparian areas	12	11	23	D1. Management plan and rate of harvest	22	34	56
B3. Threatened and endangered species	37	14	51	D2. Environmental Impact Assessment (EIA)	21	8	29
B4. Protected areas, reserves and HCVF	57	52	109	D3. Monitoring	30	28	58
B5. Woody debris, snags and legacy trees	17	17	34	D4. Inventory	1	2	3
B6. Landscape-level considerations	3	7	10	D5. Mapping	7	4	11
B7. Use of lesser known species; deciduous species	0	9	9	D6. Chain of custody; trademark and group certification	52	99	151

**Categories, which were included in the regional comparison (total number of non-conformities is 20 or more) are indicated in bold typeface.*

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Although certification appears to focus on the same broad areas throughout Europe, some very clear differences between East-Europe and West-Europe emerge (publication IV and V). These are important to highlight for an accurate picture on the impacts and potential of certification to act as a catalyst for positive change specifically in transitional CEE conditions. The most significant difference by large was related to threatened and endangered species. 73% of

the non-conformities in this topic were raised in East-Europe. Significant shortcomings in inventory of the species habitats as well as actual protection of the known habitats were identified by auditors. 73% of the non-conformities in relation to forest machinery and chain saw maintenance were also raised in East-Europe. Environmental impact assessment (EIA), which is somewhat novel concept in forestry, appears much more difficult to adopt in East-Europe since 72% of the non-conformities in relation to this system element were raised there. Compliance with legislation is also more challenging in East-Europe (65% raised in East-Europe). Analyses of the non-conformities under this topic indicated that all of the non-conformities related to awareness about international conventions were raised in East-Europe. Compliance with workers safety requirements and stakeholder consultation was also lower in East-Europe, since close to 60% of the non-conformities in these areas were raised in that region. In West-Europe there were more non-conformities raised in relation to management plan and training (ca. 60%). 64% of non-conformities in relation to soil damage and erosion were raised in West-Europe.

6. DISCUSSION

6.1. Certification – introducing change

In the study the impacts of certification have been evaluated based on a wide variety of data sources including opinion of stakeholders and experts, perception of certified operation and field observations. The changes required from certified operations by third party certification bodies were thoroughly analyzed. It is not surprising that results from Estonia and East-Europe reveal broad scope of positive changes which have been driven by the voluntary certification process (publications II, III, IV and V). The Estonian results are generally well harmonized with the East-European results and throughout we can see stronger focus on ecological and social aspects, rather than economic or traditional silvicultural issues. This is a good sign, since sustainable forestry should bring these issues in the central focus. Specific examples of non-conformities were found requiring the share of protected areas to be increased; making specific information publicly available; pro-actively conducting stakeholder consultation; conducting an inventory of high conservation value forests; stopping usage of certain dangerous chemicals; reducing the volume of used chemicals; leaving ecological elements (such as deadwood, biodiversity trees) on felling sites; providing safety equipment for forest workers (publications IV and V). These are attainable and objectively measurable requirements and thus positive changes have happened in forestry operations who have maintained certified status. The benefits of certification are easiest to measure directly in relation to certified operations and most authors researching this question have come to similar conclusions. Rametsteiner and Simula (2003) concluded that the requirements raised during certification show that “... improvements in forest management practices in Europe due to FSC certification are indeed likely to occur. Areas for improvement are most likely related to the management processes of organizations, especially in planning and monitoring.” Certification has proven to drive positive change towards sustainable forestry in the certified operations in almost all regions, including North America (Newsom and Hewitt 2005; Masters et al. 2010), Latin- and South America (Espach 2006) and in Asia (Rusli and Nabilah 2009).

The positive role of forest certification however should not only be studied in the context of auditing of specific forest management units. The entire process related to certification, including the standard setting, public debates and stakeholder consultation have a potential to engage stakeholders, raise environmental awareness and introduce new ecological concepts into broader forestry practices and debate. Indeed, the possible function of certification as a mechanism for learning and transfer of knowledge is well established in research literature (Rickenbach and Overdevest 2006) and although debate remains over how successful certification is in this, more recent results indicate that certification in fact does function as a mechanism for transfer of knowledge between

ecologists, stakeholders, auditors and foresters to certain extent (Araujo et al. 2009; Overdevest and Rickenbach 2006). This thesis has shown that the potential of certification to engage stakeholders in forestry debate is especially significant in post-Soviet countries, where participatory democracy is new or yet to be fully adopted by governments and society is still learning to express their opinion and engage in public debate. In Estonia certification has appeared to be a very powerful tool to engage stakeholders into forestry discussions. Several excluded groups were effectively engaged into the forestry debate during the process of preparing Estonian Sustainable Forestry Standard (publication II). These conclusions are supported by certification case studies in other CEE countries, which have concluded that one of the most significant benefits of certification in transitional countries has been its ability to foster open and transparent communication between stakeholders and foresters (Actins and Kore 2006; Tysiachniouk 2006). Through a debate among a wide group of stakeholders, novel forestry practices have been identified, documented in the standards and made known to the forest managers as was demonstrated in the case of Estonia for example by implementation of the spring truce concept (publication II). In this way the model and process of certification has helped to improve the standards, which in turn has a positive effect on the operational level management practices.

Finally the results of this study help to illustrate another, possibly more fundamental, strength of FSC voluntary certification system, which lies in the very differences it has compared to the public sector policy tools. On a global level, the idea of certification was born and implemented in early 1990s partly due to a post-Rio frustration and disappointment over the government's inability to agree on a globally binding instruments to address forestry problems (Freer-Smith and Jean-Michel 2008). Similar dynamics were clearly demonstrated in Estonia, where certification largely emerged as a reaction to governmental failures with the aim to help more sustainable management of forests and to fight the bad reputation of Estonian forestry (publication II). During past decades the whole region of East-Europe has been struggling to demonstrate the sustainability of its forest management. This is also one of the causes why certification was very rapidly implemented during the past decade in CEE region as a reaction caused by the need for alternative to public policies as well as the need to prove sustainable forest management to western consumer countries (publications I and II). In this light, one could ask what are these differences that make the voluntary non-state governance mechanism, such as certification, so unique. The question is the central topic among many researchers and not easily answered. However its market-driven nature is often seen as the primary difference. It provides certification the momentum and degree of self-regulation which is difficult to achieve by the public sector. The negative externalities associated with common-pool resources are internalized not because of legal requirements but due to market demand. Ironically the level of stakeholder involvement and transparency which FSC system exhibits is also sometimes seen as superior to that of public institutions. According to Garrelts and Flitner (2011) "FSC's governing structure

shows high standards by all comparison in terms of democratic, multilevel decision-making and commitment to politically and economically weaker actors. No single interests can easily dominate the decision-making process, as it ... may generally occur in liberal democratic institutions.” These principles were demonstrated in the study area where the degree of society involvement in forestry grew partly due to the standard setting process but also due to increased requirements for public communication and transparency for certified operations. The fast growth of certification in transitional economies as a means to demonstrate good forestry practices is also an indication of trust. Using certification to demonstrate sustainable forest management indicates that the forest managers as well as western buyers trusted the certification mark more than the public sector statements about level of forest management. This situation is not unique to CEE transitional region as trust in public institutions is generally low in areas with weak law enforcement and high corruption. Third party certification enables trust to be extended between companies in timber sector regarding the sustainability and origin of the forestry products, however it is vulnerable and dependent on the ability of certification to deliver what it promises (Murphy and Lawhon 2011).

6.2. Introducing change or approving business as usual – the regional difference

Majority of certified forest areas are located in regions with relatively well established forest management practices, such as North-America and Europe (Figure 2). Already in late 1990s researchers started to ask if certification is indeed introducing significant change in the boreal areas where it is most widespread (Cote 1999). Recent study from Sweden concludes “the assumption that greater improvements should be found on land owned by categories with a higher degree of certification, and in particular according to the FSC standard, could not be confirmed” (Johansson and Lidestav 2011). One logical justification to this may be that the existing forest management practices are already largely meeting the certification standard. This leads to further questions about the economic feasibility of certification in areas with relatively good level of forest management.

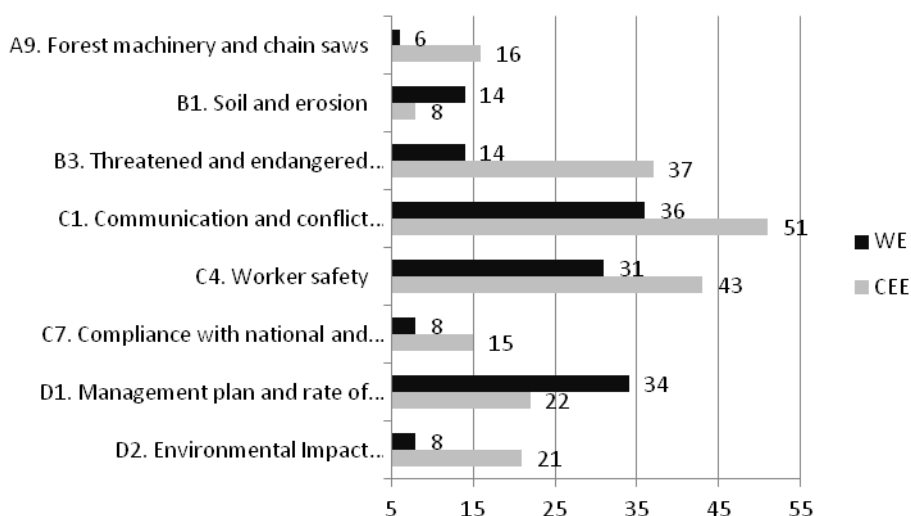


Figure 13. Number of non-conformities raised for selected topics in West-Europe and Central- and East-Europe (CEE)

In this study we have compared the impacts of certification between the transitional CEE region with that in West-Europe (Figure 13). Although the differences are not very extensive, it appears that East-European forest managers have a longer road to travel in reaching sustainable forestry (publication IV and V). Biodiversity considerations are less rooted in the daily practice in East-Europe, where significantly more non-conformities were raised in relation to inventory and monitoring of endangered species, while in West-Europe the non-conformities are related mainly to ensuring protection of known areas/species. This indicates that while West-European countries struggle to ensure protection of the identified areas, the East-Europe is still having problems identifying these areas in the first place. However it should also be considered that the biodiversity level and area with potential high conservation value forest is higher in East-Europe where forest management intensity was relatively low during Soviet period. Environmental practices, such as environmental impact assessment are more novel and unknown to East-European forest managers. Usage or hazardous, banned chemicals is more common-place in CEE region, while the process of replacement of such chemicals seems to have been faster in more developed and economically better off Western-European countries. On social side, results suggest significantly lower level of transparency and public communication in East-Europe. It should also be considered that in East-Europe there are more public sector certificate holders, which further strengthens the importance of the positive impact of certification in promoting transparency. Providing proper personal protection equipment also appears less rooted in daily practices in East-Europe. Similar performance gap was noticed in relation

to forest machinery, which allows claiming that machinery in West-Europe is newer and better equipped to avoid environmental damage. In West-Europe more non-conformities were raised in relation to formal issues such as usage of FSC trademarks, formulation of sales documents and making claims about the certified status of material. None of these have impact on the actual forest management practices. Based on these results it appears that the baseline performance in CEE region has been lower in comparison with the standard and certification has introduced higher degree of change. In West-Europe, possibly due to higher general compliance, auditors have focused more on formal requirements and the actual requirements for changes have been less significant (publication IV and V). Same trend was observed on a global level based on analyses of non-conformities (Newsom and Hewitt 2005). Auld et al. (2008) concludes that “operations in less-developed countries were statistically more likely to have conditions on communication and conflict resolution with stakeholders, neighbors, and communities; training; worker safety; non-timber forest products; and worker wages and living conditions than operations in developed countries.”

Considering that the share of certified forest area in tropical regions is very small, it is likely that certification has had the largest positive cumulative impact on sustainable forestry perhaps in the transitional region of East-Europe. In the post-communist emerging markets the pressure from western consumer countries was high enough to enforce large-scale certification. At the same time the level of existing forest management was good enough (especially in the publicly managed forests) to allow rather fast adoption of certification. This also explains the very rapid adaptation of forest certification in this region during a relatively short amount of time (Figure 3).

6.3. Where voluntary mechanisms fall short

Although certification has played an important role in helping to implement more environmental friendly forest management, its power to enforce sustainable forestry is limited. Areas emerge, where little evidence exists for a push towards positive change. Revision of non-conformities from CEE as well as the comparison region reveals that certification in general has had virtually no impact on the felling volumes and intensity of forest management (publication V). Only 2 non-conformities were raised in CEE region (1 in West-Europe) in relation to too intensive felling volumes and only one of them was raised as a major non-conformity, which has to be addressed prior to certification. This means that only one forest operation out of 427 in the sample had to implement changes in relation to felling volumes prior to becoming certified. These results may be explained partially by the complexity of the topic as well as the different possibilities to interpret the certification standards. The FSC criterion 5.6 states “The rate of harvest of forest products shall not exceed levels which can be permanently sustained”. In practice many aspects such as the age structure,

sanitary conditions and species composition will need to be considered in determining the sustainable felling volumes. Detailed analyses of the issues related to harvesting volumes requires significant time and is thus challenging within a third party certification audit with limited duration. The sustainability of felling volumes in FSC certified state forest has also been repeatedly debated in Estonia. In 2007 the National Audit Office of Estonia published a report concluding that the manager of Estonian state forest does not have correct overview about the felling volumes (Riigikontroll 2007). The report was followed in 2010 by another one from the National Audit Office of Estonia which concluded that the felling volumes in Estonian state forest are not sustainable since present felling volumes cannot be permanently sustained and the area of certain forest site types is decreasing (Riigikontroll 2010). These claims were evaluated during the FSC certification audits and although non-conformities were raised against the state forest manager by the certification body requiring improvement of monitoring of felling volumes as well as making more information publicly available, the forest manager has not been required to make any changes in the actual volumes of wood harvested (Rain-forest Alliance 2007, 2010). Sustainability and felling volumes are also related to the quality of forest inventory, which appears to be another aspect, difficult to evaluate within certification process. Out of 1 000 total analyzed non-conformities only 3 were related to the quality of forest inventory. The short duration of forest audits (from few days to a week or more in rare cases) makes it difficult to evaluate this aspect properly. Specific qualifications are required to be able to formulate firm conclusions regarding the quality of forest inventory data.

Areas of less impact within the certified entities have been described, however certification impacts are also spatially limited to the certified entities only. Since certification by its nature is looking on the activities within a single forest management enterprise, it is not able to tackle the problems which extend across several forest management estates. This is true at least until majority of the forest managers in a region are certified. Even then the certification bodies may not properly address the landscape level issues, as the focus during each audit is still isolated on a single forest manager and no holistic analyses across certified entities is undertaken by the certification bodies. As Auld et al. (2008) puts it: "landscape-level planning is necessary to address concerns such as the management of large predators requiring millions of hectares of contiguous habitat and the appropriate placement of productive plantation forests versus areas for ecological protection." Although criteria 6.1 in FSC P&C requires operations to consider landscape level issues (FSC 2002), review of the non-conformities in this thesis reveals that in practice operations are only rarely required to implement related changes (Table 12). Fragmentation and green corridors are not addressed in any of the non-conformities and only few are dealing with buffer zones. This is probably also partly result of weak criteria in the standards, however the limitations of certification to introduce change within the certified entities is clear.

Certification appears to be rather limited in its ability to have a positive impact on forest managers with very high or low level of forest management. Earlier it was concluded that the magnitude of positive change driven by certification is smaller in areas with better baseline forestry performance. Better forest managers are faster to certify, however they are not required to implement significant changes by the certification process. On the other hand it is also observed that certification does not happen in areas or among managers with weakest forestry performance. The tropical region where forest degradation and deforestation is most significant is also the region with smallest certified area (Figure 2). Besides majority of the certified areas in tropics are plantations (Gulbrandsen 2010) or managed by companies who are already the top performers (Nebel et al. 2005). Results from this thesis also confirm that certification is not successful in reaching lower performing forest managers and thus it is least likely to enforce sustainable forestry among the owners who are operating most unsustainably. In the case of Estonia, certification was adopted in state forest to restore their reputation of good forest managers; however it did not solve the problems in private forests, where illegal and unsustainable logging was widespread (publications I and II). The situation in private forests did not improve until stricter legislations was developed and enforced from 2004 onwards. These considerations demonstrate a significant shortcoming of certification, which is the source of a significant share of criticism. Better performers are certifying their usual practices without the need to implement change and worse performers simply do not certify as long as markets exist for non-certified material.

Lastly, the study confirms that certification is more likely to have a positive impact on the large scale forest managers and exclude small forest owners. In most of CEE region, certification was adopted by large managers of state forests and in Estonia only a single individual private forest owner was certified until PEFC group certification was introduced in 2010. This problem is not unique to countries with transitional economies, however East-Europe has some distinctive features which inhibit certification among private owners even more. In post-Soviet period, organization and cooperation among private forest owners was minimal, making it difficult to exchange information, promote certification, and communicate effectively. Private forest owners have adopted cooperation very slowly, since after half a century of centrally controlled economy and collective farms, there was generally low level of trust for joint activities and the fresh land owners valued independent decision making.

Globally the relative cost of certification is higher for small owners and at the same time the reputation benefits introduced by certification are normally not as significant for them. This means that without sufficient financial incentives, small-scale owners are less likely to adopt certification. Certification thus becomes attractive for small-holders only in the case of sufficient financial benefits, however price premiums are rare in case of certified roundwood, especially in boreal regions (Chen et al. 2010). This has been realized also among industry and in Sweden for example the forest owners association Södra

skogsägarna is paying a price premium for certified material to its members (Lidestav and Lejon 2011) to promote uptake of certification. The same study also concludes that the key reason for small forest owners to certify is related to expected economic benefits. Further barriers for small owners to certify have been identified as extensive required documentation and requirements which are not relevant or feasible for small-scale operations (such as monitoring of social impacts or environmental impact assessment) (Butterfield et al 2005).

Finally the question can also be raised on a broader, supply chain level – is forest certification as a resource use regulation tool effective for small-scale managers and enterprises? Preferential sourcing for certified material favors large suppliers and streamlined supply chains. This tends to exclude smaller operations for whom access to certification is often too costly without a price premium to pay for the direct and possibly also indirect costs of certification (Rickenbach and Overdevest 2006). The retail sector however is aiming to push the costs of certification down through the supply chain and making trade with certified material a norm, rather than paying a premium for certified products. This creates a high potential for preferential behavior in supply chains for larger organizations as well as managers, who can more easily absorb the costs. These risks are well described by Garrelts and Flitner (2010) in a recent article: “the FSC bears witness to the fact that carefully crafted multi-stakeholder-arrangements are far from being a guarantee to achieving the so-called win-win solutions. In fact, FSC’s success with the big retailers is largely tied to its failure as an instrument to support sustainable small-scale producers in developing countries”.

6.4. Improving certification – possibilities and limitations

The study results are useful input in improving the identified shortcomings of certification in promoting sustainable forest management across different regions and types of forest managers. Three key areas of improvement are suggested. Firstly, each certification system can be only as good as the standard it relies on. The areas identified within the study, where positive change has been marginal in the certified operations, such as regulation of felling volumes, can likely be improved by more clear, measurable indicators. It is important to ensure that the principles agreed in the standard setting process are properly described in the standard by unambiguous and auditable indicators.

Secondly the credibility and competence of the certifiers is crucial. Certification is expected to transfer information about the sustainability of material through the supply chain. It can do so only as long as the issued certificates can be trusted to prove what they are supposed to – that the certified operations comply with the standard. Credibility problems with some certificates have been voiced by NGOs (Greenpeace 2010) and the difference in the audit quality between auditors has also been claimed by scientists (Rametsteiner and Simula 2003).

Thirdly the accessibility of certification to small-scale forest owners should be improved if certification is to have a broader positive impact. This is related to the cost of certification and also the market demand for certified products. Since reputation benefits are usually not as relevant for small-scale owners, their certification is likely to happen only in the situation where the market benefits clearly exceed the costs. Majority of research, including this thesis, indicates that in East-Europe as well as elsewhere in the world, this condition is often not met (Crow and Danks 2010; Chen et al. 2010). FSC certification system has already made efforts to make certification more accessible for small-scale managers by development of SLIMF (Small and Low Intensity Managed Forests) certification procedures (FSC 2008). The procedures mainly aim to reduce costs and include for example options for reduced frequency of onsite audits and reduced obligations for certification body to report the results. Although there are exceptions, the costs of certification process are usually related to the credibility of the certification. It seems that in case of small-scale owners, the right balance is difficult, yet necessary to find.

Carefully planned and implemented improvements can increase the potential of certification further, however the thesis also demonstrates that certification in isolation from other policy tools will not be successful in addressing the broader problems of deforestation and forest degradation on global scale. Until now, the success of certification has been limited regionally, is slow among small-scale owners who are slow to adopt certification due to higher costs and less benefits and are virtually absent among low performers who simply do not certify. Over time the positive impact of improved certification systems may increase regionally and among small owners however the pure voluntary nature of certification makes it ineffective in enforcing change among low performers. At least this is true until there are any markets left for non-certified timber and with only about 10% of the world's forest areas being certified, this will likely continue to be the case in coming decades. The spatial limitations of certification to promote change only within the certified entity is another feature which cannot be easily changed without changing the very foundational properties of voluntary certification.

Although certification cannot replace the role of the state in resource management, it appears to be a powerful ally as demonstrated by the case of fast adoption of certification in CEE, which helped to implement more sustainable practices among many managers. Better uptake of certification has been documented in cases where certain basic public sector roles are fulfilled. Ebeling and Yasue (2009) studied and compared the impact of FSC certification in Bolivia and Ecuador. They concluded that the uptake and positive impacts of certification were greater in Bolivia, where the state provides better land tenure security, government enforcement of forestry regulations is stronger and laws are compatible with certification requirements to a higher degree.

It is acknowledged that present study has several methodological limitations, which need to be considered. The impacts of certification depend on the used standard and although the FSC Principles and Criteria are global, the indicators

can introduce differences between countries and regions. Certification is not the only process introducing change in the forest management practices and this is especially true in East-Europe, where the transition from Soviet systems introduced many changes. It is impossible to fully separate the impacts of certification from other factors influencing the performance. Finally it is recognized that the detailed reforms and policy tools used in post-Soviet CEE countries are somewhat different and do not reflect fully the Estonian experience. Still the certification impacts identified in this thesis in East-Europe overlap rather well with results from Estonia. The overall conclusions also align well with other certification studies in transitional economies (Cashore et al. 2006).

Continued growth and uptake of forest certification systems indicates that certification as a voluntary resource use regulation tool will be part of forest regulatory framework at least in the near future and probably longer. Understanding what certification can and cannot deliver is an important research topic and has huge practical value since businesses and operations are increasingly investing their finances and trust into certification systems. Suggested further research topics include the possibilities of making certification more accessible to small-scale owners which is linked to finding the right balance of power between retailers creating the market pull, the suppliers pushing the costs further down the chain and the forest owners possibly absorbing the costs. Globally, the uptake of certification is still lowest in the tropics, where the forestry problems are largest, thus analyzing the granular mechanism of certification in tropical and developing regions is also a further suggested research topic.

7. CONCLUSIONS

This thesis has evaluated the role of forest certification in transitional economies, such as the post-Soviet East-Europe. Focus was on the ability of certification to promote and enforce sustainable forest management. Using Estonia as a case study, the policy reforms in Estonia during the period since Estonia regained independence in 1991 until 2003 were studied (publication I). During this period, unsustainable usage of forest resources was commonplace, share of illegal activities was high and international as well as domestic reputation of Estonian forest sector was damaged. In the turbulent times of building a democratic society from the remnants of Soviet Estonia, focus was on economic growth. The ability of government to focus on sustainable management of natural resources was limited (publication I). The third sector stakeholder groups (such as environmental NGOs) who tried to engage in public policy making were often excluded when their views were endangering the economic progress. Together, environmentally concerned NGOs, industry and responsible forest managers who were concerned about the bad reputation of Estonian forestry, started promoting and working with certification as an alternative, market based, voluntary and non-governmental tool (publication II).

The process of standard setting brought together and gave voice to several important stakeholders. Discussions over the concept of sustainable forestry standard introduced new environmental ideas and brought focus to the ecological aspects of forestry. In 2002 all Estonian state forests were certified and the ideas made it into the daily forest management practices. Certification helped to restore the reputation of forest sector and increased the environmental awareness among RMK staff as well as the contractors (publications II and III). Interviews and field studies show that several changes were made in RMK to protect biodiversity and maintain the ecological functions of forests. Certification also introduced stronger focus on ensuring presence of safety equipment (publication III). The positive changes in Estonia towards more sustainable forest management aligns well with study results from CEE region (publication IV and V), where similar positive changes have been requested from forestry operations in environmental and social field.

Areas also emerged where certification is not driving change among the certified operations. Only in one case from almost 500 analyzed reports, was the manager required to implement changes in relation to the sustainability of its felling volumes prior to certification. The sustainability of felling in Estonian state forest has been questioned by National Audit Office of Estonia, however no direct requirements for reduction of felling have been raised by the certification body. This is possibly an indication of complexity and sensitivity of this aspect of forest management. The share of clear-cut management has remained unchanged in Estonia as well as in CEE region, although several environmental stakeholders advocate for increase in alternative methods to clear-cuts. The suggestion to consider options for partial adoption of alternative methods to maintain biodiversity in Estonian and North-European forest

landscapes has also been made by scientists (Löhmus 2011a). Although certification can drive positive change, it is less likely to happen regarding forest management practices which are deeply rooted in the region or which are sensitive and complicated to evaluate.

In CEE region, certification has been adopted mainly among state forest managers, while uptake has been limited among private owners. The small size of private forests results in relatively higher cost of certification per ha and without price premium the motivation to certify is small. However in East-Europe, the management in private forests also tends to be less sustainable due to lack of private ownership during Soviet time and resulting lack of forestry skills among private owners (publication I). This indicates that certification is generally adopted by higher performers to reward their good management. Forest owners who are managing forests less sustainable and where the need for improvement is largest, are less eager to certify since this requires changes often beyond what the owners are willing to make. This conclusion is important, since it sets limits to the effectiveness of voluntary certification to act independently from state-enforced policies. On the other hand, the study reveals that in comparison with West-Europe, impacts of certification have been much more significant in CEE region, since greater changes have been requested by certifiers from East-European operations (publication IV and V). This indicates lower conformance to sustainable forest management in East-Europe and shows that when certification happens, it has greatest potential among managers with lower level of baseline performance.

In conclusion the study has demonstrated the potential of certification to promote and enforce sustainable forest management among some managers, however limitations exist and certification alone will not be sufficient to ensure sustainable forest management. The positive impacts of certification in CEE region have been more significant than in higher performing West-Europe and fast adoption in the region was favored by relatively weak governance and enforcement during transitional times which created the need to demonstrate good forestry to western partners. Yet certification is slow to impact the most unsustainable performing forest operations that are least likely to certify. Higher market demand will enforce certification more strongly on lower performers, however in transitional economies, the focus is on fast profit making and investments into long term improvements are made reluctantly by low performers.

The impacts of certification could be further studied by analyzing the activities undertaken by certified operations in response to the raised non-conformities. Knowledge gaps exist to explain why certification has had little impact in affecting the felling volumes. Also possible improvements to help certification to address large landscape level problems such as fragmentation and deforestation can be further studies. Finally studies and comparison of certification impacts and functional mechanism between different geographical regions will help to identify further opportunities for improvement of certification as a tool to promote sustainable forest management.

SUMMARY IN ESTONIAN

Vabatahtliku sertifitseerimise roll keskkonnasõbraliku metsanduse edendamisel üleminekumajanduse tingimustes

Loodusvarade jätkusuutliku kasutamise tagamine on oluline ülesanne, mille täitmisel on roll nii avalikul kui erasektoril ja samuti kodanikuühiskonnal. Paljud loodusvarad on määratletavad nn ühisressurssidena, mille tarbimist on keeruline piirata, kuid mille kasutamisel tarbijad omavahel konkureerivad. Ühisressursside alla liigitatakse sageli kalavarud, põhjavesi ja tüüpiliselt ka metsavarud. Ühisressurssidena määratletud loodusvarade kasutuse reguleerimine on keeruline, kuna nende puhul on kõrgem ületarbimise risk ning suurem tõenäosus negatiivsete välismõjude (*externalities*) tekkeks. Traditsiooniliselt on loodusvarade kasutuse reguleerimisel olnud keskne roll avalikul sektoril, ressursikasutust reguleeritakse keskvalitsuse ja kohalikul tasandil. Keskkonnatingimuste halvenemine ja mitmete loodusvarade, eriti metsavarude, jätkuv vähenemine on aga näidanud, et vajalik on ka erasektori ja turgude kaasamine. Selleks, et turg hakkaks ise reguleerima loodusvarade kasutamist jätkusuutlikkuse suunas, on vajalik kasvatada nõudlust jätkusuutlike toodete järele. Samuti on vaja võtta ökosüsteemide poolt pakutavad teenused kasutusse nende õige majandusliku väärtuse alusel. See on keeruline ülesanne, kuid üheks vahendiks on 20. saj. lõpus tekkinud vabatahtlikud keskkonnaalased sertifitseerimisskeemid, millest üks edukaim on olnud FSC metsamajandamise sertifitseerimise süsteem.

Ühisressursside ja metsaressursi kasutuse reguleerimine ning ülal kirjeldatud probleemide lahendamine on olnud eriti keeruline endise Nõukogude Liidu järgsetes Ida-Euroopa riikides, kus möödunud 20 aasta jooksul on toimunud üleminek nn nõukogude plaanimajanduslikult majandusmudelilt kapitalistlikule turumajandusele. Käesolev doktoritöö uurib vabatahtliku sertifitseerimise rolli loodusressursside kasutuse suunamisel üleminekumajanduse tingimustes. Selleks vaadeldakse ja analüüsitakse FSC metsamajandamise sertifitseerimise arengut ja mõju säästva metsamajanduse edendamisel Nõukogude Liidu järgses Ida-Euroopas. Töö originaalosa koosneb Eesti juhtumiuuringust (publikatsioonid I, II ja III) ning sertifitseerimise mõjude uuringust kogu Ida-Euroopas (publikatsioonid IV ja V). Üleminekumajanduse tingimuste välja selgitamiseks ja üldistuste tegemiseks on sertifitseerimise mõju Ida-Euroopas võrreldud Lääne-Euroopaga (publikatsioonid IV ja V). Töös väidetakse, et sertifitseerimine täiendab edukalt avaliku sektori püüdlusi reguleerida metsaressursi jätkusuutlikku kasutust üleminekumajanduse tingimustes, kus valitsuse suutlikkus ühiskaupade kasutuse edukaks reguleerimiseks on piiratud. Tööga kaitsetakse järgnevaid väiteid:

- Säästva metsanduse sertifitseerimine oli üleminekumajanduse tingimustes osaliselt reaktsioon valitsuse suutmatusele reguleerida efektiivselt ressursikasutust.

- Sertifitseerimine on olulisel määral kaasa aidanud keskkonnateemade tähtsustamisel ning huvigruppide ja kodanikuühiskonna kaasamisel metsandusega seotud aruteludesse.
- Sertifitseerimine on positiivselt aidanud kaasa jätkusuutliku metsamajandamise arengule.
- Sertifitseerimine ei ole suutnud jätkusuutlikku metsamajandamist edendada nende metsamajandajate seas, kelle tegevus on kõige suuremas vastuolus jätkusuutliku metsanduse põhimõtetega.

Peale Eesti iseseisvumist 1991, toimusid mitmed olulised muudatused. Maad, mis olid eelmise Eesti Vabariigi ajal olnud eraomandis, anti tagasi endiste omanike järeltulijatele; Nõukogudeaegsed loodusvarade kasutust kontrollivad struktuurid kaotati; valitsus soodustas eraettevõtlust ning kasvama hakkasid mitmed tööstusharud, sh metsa- ja puidutööstus. Omandireformi ja mitmete poliitiliste reformide samaaegne käivitamine tõi kaasa üldise poliitilise ja seadusandliku vaakumi ning vähenes valitsuse võimekus seaduste täitmist jõustada (publikatsioonid I ja II). Metsasektoris tõid need muudatused endaga kaasa raiemahtude mitmekordse ja kontrollimatu kasvu ja ebaseaduslike tegevuste levimise (kuni 50% raiutavast mahust), mis omakorda mõjus negatiivselt Eesti metsanduse ja puidutööstuse mainele (publikatsioon I). Analoogilised protsessid toimusid ka mitmetes teistes Ida-Euroopa riikides, kuigi Eestis olid need eriti ilmsed kuna neo-liberalistlike reformide elluviimise tempo oli Eestis kiirem kui enamikes teistes endise Nõukogude Liidu riikides. Nendes tingimustes tekkis valitsusvälistel keskkonnaorganisatsioonidel ja tööstusel ühine huvi võtta kasutusele alternatiivseid metsaressursi kasutust suunavaid vahendeid, mis aitaksid parandada Eesti metsanduse toimimist ning mainet. Metsade sertifitseerimine, mis oli globaalselt alguse saanud 1990-tel tundus atraktiivsena ning aastal 2002 omandas FSC sertifikaadi kolm aastat varem moodustatud riigitulundusasutus RMK (publikatsioon II). Sertifitseerimise kasv oli 21. saj. alguses märkimisväärselt kiire ka mujal Ida-Euroopas, kinnitades sertifitseerimise unikaalset rolli üleminekumajanduse tingimustes.

Sertifitseerimise tekkeprotsessi ja mõjusid Eestis uuriti doktoritöö raames põhjalikult nii ekspertintervjuude kui raielankidel toimunud välitööde käigus (publikatsioonid II ja III). Tulemused näitavad, et sertifitseerimisel on olnud oluline positiivne roll metsamajandamise kvaliteedi parandamisel mitmes valdkonnas. Metsanduslikku diskussiooni kaasati uusi huvigruppe juba säästvat metsandust defineeriva standardi koostamise etapis, mille käigus tekkis mitmeid uudseid ideid, mis leidsid rakendamist ka praktikas. Sertifitseeritud riigimetsas tõstis sertifitseerimine üldist keskkonnavaladust teadlikkust nii RMK töötajate kui töövõtjate seas. Kasvas bioloogilist mitmekesisust toetavate elementide säilitamine lageraietel ning paremini hakati maandama ja kontrollima keskkonnariske. Nii RMK töötajate kui partnerite hinnang näitas üheselt, et oluliselt paranes turvavarustuse kasutamine metsatöödel (publikatsioonid II ja III). Samas ei rakendatud sertimist laialdaselt erametsades, kus vajadus positiivsete muudatuste järele oli üleminekutingimustes suurim. Raiemahtude vähenemise ja säästlikuma metsakasutuse erametsades tõid kaasa eelkõige valitsuse poolt

tehtud muudatused metsaseaduses ja selle rangem jõustamine, mis sai alguse aastal 2004.

Tulemuste laiendamiseks Ida-Euroopale tervikuna, uuriti töö raames sertifitseerimise rolli säästva metsamajanduse teostamisel läbi parandusnõuete, mis on sertifitseeritud majandajatele esitatud sertifitseerimise käigus (publikatsioonid IV ja V). Selleks koondati ja analüüsiti 500 parandusnõuet kõigist Ida-Euroopa riikidest, kus on sertifitseeritud metsamajandajaid. Tulemused kinnitasid Eesti juhtumiuuringu põhjal tehtud järeldusi, et sertifitseerimise käigus on nõutud mitmeid olulisi praktilisi muudatusi, mille rakendamine aitab otseselt kaasa säästva metsamajandamise rakendamisele. Sertimisel on olnud positiivne mõju näiteks kemikaalide kasutuse vähendamisel, keskkonnariskide maandamisel, kaitsealade ja kaitsealuste liikide kaitsel, bioloogilist mitmekesisust soodustavate elementide kaitsel ja säilitamisel, läbipaistvaval suhtluse huvigruppidega ja töötajate tööohutusunõuete rakendamisel. Tulemuste võrdlus Lääne-Euroopas tõstatatud parandusnõuetega kinnitas, et Ida-Euroopas on oluliselt rohkem esitatud nõudeid seoses läbipaistvuse ja huvigruppide konsultatsiooniga, ohustatud ja haruldaste liikide kaitsuga, keskkonnariskide maandamisega metsatöödel ja töötajate ohutusega (publikatsioonid IV ja V).

Töö tulemused kinnitavad hüpoteesi, et vabatahtlik sertifitseerimine on oluline täiendav võimalus soodustada jätkusuutlikku loodusressursside kasutust. Ida-Euroopas toimunud FSC leviku uurimise põhjal võib väita, et vabatahtlikel initsiatiividel on oluline roll olukorras, kus avaliku sektori võimekus ressursikasutust kontrollida ja suunata on piiratud. Samas on ka sertifitseerimise enda suutlikkus piiratud. Vabatahtliku iseloomu tõttu on sertifitseerimise kasutuselevõtt vähene väiksema vastutustundega majandajate seas. Selle tõttu paraneb heade majandajate praktika veelgi, aga halbade majandajate tegusviis ei muutu. Globaalsel tasemel kinnitab sama tendentsi sertifitseeritud pindala vähesus troopikas. Võimalik, et Ida-Euroopas on sertifitseerimise positiivsed mõjud olnud tänu suurtele muutustele globaalselt kõige suuremad. Majandamise tase on siin parem kui troopikas, ning seetõttu on sertifitseerimine suurematele majandajatele olnud atraktiivne ja teostatav. Üleminekuperioodil kasvanud segadus ja metsanduse halb maine on aga motiveerinud metsamajandajaid sertifitseerima. Samas on Ida-Euroopas toimunud sertifitseerimisejärgsed muudatused suuremad kui Lääne-Euroopas, kus kõrgema keskkonnateadlikkuse ja metsanduse parema korralduse tõttu on metsad paremini majandatud. Ida-Euroopas on aga tänu nõukogudeaegsele metsade alakasutusele bioloogilise mitmekesisuse ja kaitseväärtuse tase kõrgem kui Lääne-Euroopas, ja selle tõttu on keskkonnakaitsega seotud ettekirjutused ka Ida-Euroopas suuremad.

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REFERENCES

- Actins, A. and Kore, M. (2006) Forest certification in Latvia. In: Cashore, B., Gale, F., Meidinger, E., Newsom, D. (Eds.) *Confronting Sustainability: Forest Certification in Developing and Transitioning Countries*. Yale School of Forestry and Environmental Studies, New Haven, pp. 203–233.
- Adam, F., Kristan, P., Tomsic, M. (2009) Varieties of capitalism in Eastern Europe (with special emphasis on Estonia and Slovenia). *Communist and Post-Communist studies* 42(1): 65–81.
- Ahas, R. (2003) Estonian Land Reform. *Taiga News* 43(2003): 6.
- Ahas, R., Nuum, T., Tiru, M. (2002) Illegal forestry in Estonia. Estonian Green Movement-FoE: Tartu.
- Alvela, A. (2008) Sertimine suunab metsandust jätkusuutlikumaks (Certification guides forestry towards sustainability). *Eesti Mets* 2008(1): 22–25.
- Araujo, M., Kant, S., Couto, L. (2008) Why Brazilian companies are certifying their forests? *Forest Policy and Economics* 11(8): 579–585.
- Atyi, R.E. and Simula, M. (2002) Forest certification: pending challenges for tropical timber. *ITTO Tropical Forest Update*.
- Auld, G. and Gulbrandsen, L.H. (2010) Transparency in Nonstate Certification: Consequences for Accountability and Legitimacy. *Global Environmental Politics* 10(3): 97–119.
- Auld, G., Gulbrandsen, L.H., McDermott, C.L. (2008) Certification Schemes and the Impacts on Forests and Forestry. *Annual Review of Environment and Resources* 33:187–211.
- Bennett, E.L. (2001) Timber certification: Where is the voice of the biologist? *Conservation Biology* 15(2): 308–310.
- Bernstein, S. (2011) Legitimacy in intergovernmental and non-state global governance. *Review of International Political Economy* 18(1): 17–51.
- Bullock, C.H. and Collier, M. (2011) When the public good conflicts with an apparent preference for unsustainable behavior. *Ecological Economics* 70(5): 971–977.
- Butterfield, R., Hansen, E., Fletcher, R., Nikinmaa, H. (2005) Forest Certification and Small Forest Enterprises: Key Trends and Impacts – Benefits and Barriers. *Forest Trends*.
- Byström, M. and Lloyd, S. (2002) Responsible trade in the shadow of illegal logging: Swedish import of Latvian timber and wood products. Taiga Rescue Network, WWF Sweden and WWF Latvia.
- Capiroso, K.A.E. (2011) Legal and Sustainable? An exploratory analysis of the interactions between FSC and EU FLEGT forest regimes. Master's thesis. Department of Environmental Sciences Forest and Nature Conservation Policy Group Wageningen University and Research Centre The Netherlands.
- Cashore, B. (2002) Legitimacy and the Privatization of Environmental Governance: How Non-State Market-Driven (NSMD) Governance Systems Gain Rule-Making Authority. *An International Journal of Policy, Administration, and Institutions* 15(4): 503–529.
- Cashore, B., Auld, G., Newsom, D. (2002) Forest certification (eco-labeling) programs and their policy-making authority: explaining divergence among North American and European case studies. *Forest Policy and Economics* 5(3): 225–247.
- Cashore, B., Van Kooten, G.C., Vertinsky, I., Auld, G., Affolderback, J. (2003) Private or self-regulation? A comparative study of forest certification choices in Canada, the United States and Germany. *Forest Policy and Economics* 7(1): 53–69.

- Cashore, B., Auld, G., Newsom, D. (2004) Governing through Markets. Forest Certification and the Emergence of Non-State Authority. Yale University Press. London.
- Cashore, B., Gale, F., Meidinger, E., Newsom, D (Eds.), (2006) Confronting Sustainability: Forest Certification in Developing and Transitioning Countries. New Haven, CT: Yale School of Forestry and Environmental Studies Press.
- Cauley, H.A., Peters, C.M., Donovan, R.Z. and O'Connor, J.M. (2001) Forest Stewardship Council forest certification. *Conservation Biology* 15(2): 313–314.
- Cerutti, P.M., Tacconi, L., Nasi, R., Lescuyer, G. (2011) Legal vs. certified timber: Preliminary impacts of forest certification in Cameroon. *Forest Policy and Economics* 13(3): 184–190.
- CFPS (2002) Estonian yearbook of forests 2001. Centre of Forest Protection and Silviculture. Tartu.
- Chen, J., Innes, J.L., Tikina, A. (2010) Private cost-benefits of voluntary forest product certification. *International Forestry Review* 12(1): 1–12.
- Clark, M.R. and Kozar, J.S. (2011) Comparing Sustainable Forest Management Certifications Standards: A Meta-analysis. *Ecology and Society* 16(1): 3.
- Cote, M.A. (1999) Possible impact of forest product certification on the worldwide forest environment. *Forestry Chronicle* 75(2): 208–212.
- Counsell, S. and Loraas, K.T. (2002) Trading in Credibility – The myth and reality of the Forest Stewardship Council. Rainforest Foundation UK.
- Crow, S. and Danks, C. (2010) Why Certify? Motivations, Outcomes and the Importance of Facilitating Organizations in Certification of Community-Based Forestry Initiatives. *Small-Scale forestry* 9(2): 195–211.
- Cubbage, F., Diaz, D., Yapura, P., Dube, F. (2010) Impacts of forest management certification in Argentina and Chile. *Forest Policy and Economics* 12(7): 497–504.
- Cubbage, F., Harou, P., Sills, E. (2007) Policy Instruments to enhance multi-functional forest management. *Forest Policy and Economics* 9(7): 833–851.
- Dietz, T., Ostrom, E., Stern, P.C. (2003) The Struggle to Govern the Commons. *Science* 302(5652): 1907–1912.
- Dingwerth, K. (2008) North-South parity in global governance: the affirmative procedures of the Forest Stewardship Council. *Global Governance* 14(1): 53–71.
- Ebeling, J. and Yasue, M. (2009) The effectiveness of market-based conservation in the tropics: Forest certification in Ecuador and Bolivia. *Journal of Environmental Management* 90(2): 1145–1153.
- EC (2003) Communication from the Commission to the Council and the European Parliament. Forest Law Enforcement, Governance and Trade (FLEGT). Proposal for an EU Action Plan. Brussels, 21.05.2003. COM (2003) 251 final. Commission of the European Communities. Brussels.
- Eesti Päävaleht (2004) RMK kehtestas raierahu (RMK established silent felling season). *Eesti Päävaleht* (Estonian daily newspaper) 06.04.2004.
- EFDP (2002) Estonian Forestry Development Programme. Estonian Ministry of Environment. Tallinn. Available at <http://www.envir.ee/metsandus/arengukava/metsa-omanikule.html>, last accessed 9 November, 2004.
- EFSC (2001) Metsade inventeerimine statistilise valikmeetodiga 2001. aastal. Riigihankelepingu nr.2–19–20/727 Aruanne. (Forest Inventory with Statistical Selection Method in 2001, report of Public procurement contract nr. 2-19-20/722). Estonian Forest Survey Centre.
- EFSC (2003) Eesti Metsad 2002 Metsavarude hinnang statistilisel valikmeetodil (Estonian Forests 2002. Forest Inventory with Statistical Selection Method). Estonian Forest Survey Centre. Tartu.

- EGM (2002) Illegal forestry in Estonia- study report. Estonian Green Movement. Tartu. 32 p. Available at www.roheline.ee/forest/illegal_logging_estonia.doc, last accessed 17 January, 2005.
- Erametsaliit (2011) <http://www.eramets.ee/pressiteated?op=body&&art=1725>, last accessed 31.12.2011.
- Espach, R. (2006) When is sustainable forestry sustainable? The Forest Stewardship Council in Argentina and Brazil. *Global Environmental Politics* 6(2): 55–84.
- EU (2010) Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010, laying down the obligations of operators who place timber and timber products on the market.
- FAO (2010) Global Forest Resource Assessment 2010 – Main report. Food and Agriculture Organization of the United Nations. Rome.
- FDP (1997) Eesti Riiklik Metsapoliitika (Estonian National Forest Policy).
- Feilberg, P. (2004). Interview with CEO of NEPCon, the regional certification partner of FSC accredited Certification Body SmartWood.
- FLEG (2001) Forest Law Enforcement and Governance East Asia ministerial conference Bali Indonesia 11 – 13 September 2001 Ministerial Declaration. World Bank Group.
- Forest Act (1998). RT I 2002, 61, 375. Available at <https://www.riigiteataja.ee>, last accessed 17 January, 2005.
- Fraser, E.D.G., Dougill, A.J., Mabee, W.W., Reed, M., McAlpine, P. (2006) Bottom up and top down: Analysis of participatory processes for sustainability indicator identification as a pathway to community empowerment and sustainable environmental management. *Journal of Environmental Management* 78(2): 114–127.
- Freer-Smith, P. and Jean-Michel, C. (2008) The Sustainable management and Protection of Forests: Analysis of the Current Position Globally. *AMBIO: A Journal of the Human Environment* 37(4): 254–262.
- FSC (2002) FSC International Standard – FSC Principles and Criteria For Forest Stewardship FSC-STD-01-001 V1-0. Forest Stewardship Council.
- FSC (2008) FSC Standard FSC-STD-01-003 V1-0 SLIMF Eligibility Criteria. Forest Stewardship Council.
- FSC (2009) Data on the certified forest area received from FSC based on personal communication. Forest Stewardship Council.
- FSC (2011) www.fsc.org, last visited 28.08.2011
- G8 (2002) G8 Action Programme on Forests: Final Report 2002. Canada.
- Garrelts, H. and Flitner, M. (2011) Governance issues in the Ecosystem Approach: what lessons from the Forest Stewardship Council? *European Journal of Forest Research* 130(3): 395–405.
- Gerwing, J.J. (2002) Degradation of forests through logging and fire in the eastern Brazilian Amazon. *Forest Ecology and Management* 157(1–3): 131–141.
- Gomez-Zamalloa, M.G., Caparros, A., Ayanz, A.S. (2011) 15 years of Forest Certification in the European Union. Are we doing things right? *Forest Systems* 20(1): 81–94.
- Greenpeace (2010) Holding the line with FSC (reloaded 2010). Available at <http://www.greenpeace.org/international/Global/international/publications/forests/>, last accessed 31. March 2012.
- Guertin, C. (2003) Illegal logging and illegal activities in the forestry sector: overview and possible issues for the UNECE timber committee and FAO European forestry commission. A paper presented as basis of an expert presentation at the UNECE Timber Committee Market Discussions on 7–8 October 2003, Geneva, Switzerland.
- Gulbrandsen, L.H. (2008) Accountability Arrangements in Non-State Standards Organizations: Instrumental Design and Imitation. *Organization* 15(4): 563–583.

- Gulbrandsen, L.H. (2010) Transnational Environmental Governance. The Emergence and Effects of the Certification of Forests and Fisheries. Edward Elgar Publishing. Massachusetts, USA.
- Gullison, R.E. (2003) Does forest certification conserve biodiversity? *Oryx* 37(2): 153–165.
- Hardin, G. (1968) The Tragedy of the Commons. *Science* 162(3859): 1243–1248.
- Hartter, J. and Ryan, S.J. (2010) Top-down or bottom-up? Decentralization, natural resource management, and usufruct rights in the forests and wetlands of western Uganda. *Land Use Policy* 27(3): 815–826.
- Holmes, L. (2009) Crime, organised crime and corruption in post-communist Europe and the CIS. *Communist and Post-Communist Studies* 42(2): 265–287.
- Holt-Jensen, A. (2010) Transition from state socialism to market economy: The case of Estonia. *Norwegian Journal of Geography* 64(3): 127–128.
- Holt-Jensen, A. and Raagmaa, G. (2010) Restitution of agricultural land in Estonia: Consequences for landscape development and production. *Norwegian Journal of Geography* 64(3): 129–141.
- Howard, P.H. and Allen, P. (2010) Beyond Organic and Fair Trade? An Analysis of Ecolabel Preferences in the United States. *Rural Sociology* 75(2): 244–269.
- Ilisson, A. (2002) Maksuamet jälil suurel maksupettuste võrgul (Tax board tracking down a large network of tax fraud). *Äripäev* 10.07.2002. Tallinn.
- Jenkins, M., Scherr, S.J., Inbar, M. (2004) Markets for biodiversity services – Potential roles and challenges. *Environment* 46(6): 33–42.
- Johansson, J. and Lidestav, G. (2011) Can voluntary standards regulate forestry? — Assessing the environmental impacts of forest certification in Sweden. *Forest Policy and Economics* 13(3): 191–198.
- Kaar, T. (2003) Email communication with the Harjumaa State Environmental Inspectorate director.
- Kallas, A. (2002) Public forest policy making in post-Communist Estonia. *Forest Policy and Economics* 4(4): 323–332.
- Keskitalo, E.C.H., Sandström, C., Tysiachniouk, M., Johansson, J. (2009) Local Consequences of Applying International Norms: Differences in the Application of Forest Certification in Northern Sweden, Northern Finland, and Northwest Russia. *Ecology and Society* 14(2): 1.
- Keskkonnaministeerium (2004) Eesti metsaraiest on ebaseaduslik 1% (1% of the forest felling in Estonia is illegal). Press release 22. October 2004.
- Kiisholts, U. (2004) Metsaomaniku muremõtted (worried thoughts of forest owner). *Eesti Mets* 2(2004).
- Klooster, D. (2010) Standardizing sustainable development? The Forest Stewardship Council's plantation policy review process as neoliberal environmental governance. *Geoforum* 41(1): 117–129.
- Kuemerle, T., Chaskovskyy, O., Knorn, J., Radeloff, V.C., Kruhlov, I., Keeton, W.S., Hostert, P. (2009) Forest cover change and illegal logging in the Ukrainian Carpathians in the transition period from 1988 to 2007. *Remote sensing of Environment* 113(6): 1194–1207.
- Kultuur ja Elu (2004) Tsaarivalitsus keskkonnaministeeriumis (Czar's regime in the Ministry of Environment). *Kultuur ja Elu* 1: 39–41.
- Lidestav, G. and Lejon, S.B. (2011) Certification as an Instrument for Improved Forest Management within Small-scale Forestry. *Small-Scale forestry* 10(4): 401–418.
- Land Board (2004) Raw data submitted upon request.
- Lillemets, O. (2004) Interview with the Environment Manager of Estonian State Forest Management Centre.

- Lockwood, M. and Davidson, J. (2010) Environmental governance and the hybrid regime of Australian natural resource management. *Geoforum* 41(3): 388–398.
- Lovell, C., Mandondo, A., Moriarty, P. (2002) The question of scale in integrated natural resource management. *Conservation Ecology* 5(2): 25.
- Lõhmus, A. (2011a) Aspen-inhabiting Aphyllophoroid fungi in a managed forest landscape in Estonia. *Scandinavian Journal of Forest Research* 26(3): 212–220.
- Lõhmus, A. (2011b) Silviculture as a disturbance regime: the effects of clear-cutting, planting and thinning on polypore communities in mixed forests. *Journal of forest research* 16(3): 194–202.
- Lõhmus, A. and Kraut, A. (2010) Stand structure of hemiboreal old-growth forests: Characteristic features, variation among site types, and a comparison with FSC-certified mature stands in Estonia. *Forest Ecology and Management* 260(1): 155–165.
- Maamets, L. (2000) Türi valla erametsades toimunud raiete analüüs (analyses of felling activities in Türi municipality). *Eesti Mets* 1(2000): 3–10.
- Maamets, L. and Aruoja, I. (1998) Mis on toimunud Paljusi valla erametsades (what has happened in the private forests of Pajusi municipality). *Eesti Mets* 10(1998): 14–15.
- Maamets, L., Aljaste, A., Täpsi, A., Luhamäe, P. (2000) Ülevaade Ida-Virumaa metsadest, metsamajanduse hetkeseisust ja metsakasutuse analüüs Tudulinna ja Vaivara valla näitel (Overview of East-Virumaa forests, forest management situation and forest resource use analyses on the example of Tudu and Vaivara state). OÜ Eesti Metsakorralduskeskus.
- Masters, M., Tikina, A., Larson, B. (2010) Forest certification audit results as potential changes in forest management in Canada. *The Forestry Chronicle* 86(4): 455–460.
- McDermott, C.L. and Cashore, B. (2008) Assessing USGBC's forest certification policy options: a summary report prepared by the Yale Program on Forest Policy and Governance. New Haven, CT: Yale Program on Forest Policy and Governance.
- McDermott, C.L., Noah, E., Cashore, B. (2008) Differences that “matter”? A framework for comparing environmental certification standards and government policies. *Journal of Environmental Policy and Planning* 10(1):47–70.
- MCPFE (2003) Vienna living forest summit declaration: European forests common benefits, shared responsibilities. Ministerial Conference on the Protection of Forests in Europe. Vienna.
- Merlo, M. and Briaies, E.R. (2000) Public goods and externalities linked to Mediterranean forests: economic nature and policy. *Land Use Policy* 17(3): 197–208.
- Merry, F.D. and Carter, D.R. (1997) Certified wood markets in the US: implications for tropical deforestation. *Forest Ecology and Management* 92(1–3): 221–228.
- Mongabay 2008. An interview with Simon Counsell, Director of Rainforest Foundation UK.
- Morris, M. and Dunne, N. (2004) Driving environmental certification: its impact on the furniture and timber products value chain in South Africa. *Geoforum* 35(2): 251–266.
- Müller, M., dos Santos, V.G., Seuring, S. (2009) The Contribution of Environmental and Social Standards Towards Ensuring Legitimacy in Supply Chain Governance. *Journal of Business Ethics* 89(4): 509–523.
- Murphy, J.T. and Lawhon, M. (2011) Market intermediaries and rural people in Bolivia's forest products sector: Are trusting partnerships possible? *Singapore Journal of Tropical Geography* 32(2): 203–219.
- Nebel, G., Quevedo, L., Jacobsen, J.B., Helles, F. (2005) Development and economic significance of forest certification: the case of FSC in Bolivia. *Forest Policy and Economics* 7(2): 175–186.

- Newsom, D. and Hewitt, D. (2005) The Global Impact of SmartWood Certification. New York: TREES Program, Rainforest Alliance.
- Newsom, D., Bahm, V., Cashore, B. (2006) Does forest certification matter? An analysis of operation-level changes required during the SmartWood certification process in the United States. *Forest Policy and Economics* 9(3): 197–208.
- Oja, A. (2001) Certification as communication between certificate holder and consumer. Plenary presentation on the International Conference on Forest Certification in the Baltic Sea Region, Baltic Agenda 21 Forestry Sector FO6 Working Group, 15–17 November 2001, National Library, Tallinn, Estonia.
- Ostrom, E. (2010) Beyond Markets and States: Polycentric Governance of Complex Economic Systems. *American Economic Review* 100(3): 641–672.
- Overdevest, C. and Rickenbach, M.G. (2006) Forest certification and institutional governance: An empirical study of forest stewardship council certificate holders in the United States. *Forest Policy and Economics* 9(1): 93–102.
- Ozinga, S. (2004) Footprints in the forest- Current practice and future challenges in forest certification. Forests and the European Union Resource Network (FERN). Utrecht.
- Ozturk, A., Turker, M.F., Pak, M. (2009) Economic valuation of externalities linked to Turkish forests. *African Journal of Agricultural Research* 4(11): 1251–1259.
- Pearce, D., Putz, F.E., Vancly, J.K. (2003) Sustainable forestry in the tropics: panacea or folly? *Forest Ecology and Management* 172(2–3): 229–247.
- PEFC (2011) <http://register.pefc.cz>, last accessed 31.12.2011.
- Putz, F.E. and Romero, C. (2001) Biologists and timber certification. *Conservation Biology* 15(2): 313–314.
- Rabikowska, M. (2009) The ghosts of the past: 20 years after the fall of communism in Europe. *Communist and Post-Communist Studies* 42(2): 165–179.
- Rainforest Alliance (2007). Forest Management 2007 Additional audit Report for: State Forest Management Centre (RMK). Available at <http://info.fsc.org/>, last accessed 1. April 2012.
- Rainforest Alliance (2010). Forest Management 2010 Annual audit Report for: State Forest Management Centre. Available at <http://info.fsc.org/>, last accessed 1. April 2012.
- Rametsteiner, E. and Simula, M. (2003). Forest certification – an instrument to promote sustainable forest management? *Journal of Environmental Management* 67(1): 87–98.
- Rickenbach, M. and Overdevest, C. (2006) More than Markets: Assessing Forest Stewardship Council (FSC) Certification as a Policy Tool. *Journal of Forestry* 104(3): 143–147.
- Riigikontroll (2007) Planning of logging in State Forest Management Centre. Riigikontroll. Available at <http://www.riigikontroll.ee/>, last accessed 1. April 2012.
- Riigikontroll (2010) Riigimetsa majandamise jätkusuutlikkus (the sustainability of state forest management). Riigikontroll. Available at <http://www.riigikontroll.ee/>, last accessed 1. April 2012.
- RMK (2002) RMK Yearbook 2001. Estonian State Forest management Centre. Available at <http://www.rmke.ee>, last accessed 12 November, 2004.
- RMK (2003) RMK Yearbook 2002. Estonian State Forest management Centre. Available at <http://www.rmke.ee>, last accessed 12 November, 2004.
- Rosenvald, R., Lõhmus, A., Kraut, A., Remm, L. (2011) Bird communities in hemiboreal old-growth forests: The roles of food supply, stand structure, and site type. *Forest Ecology and Management* 262(8): 1541–1550.
- Rusli, M. and Nabilah, H.S. (2009) Impacts of Forest Stewardship Council (FSC) certification on natural and Plantation forests. *The Malaysian Forester* 72(2): 49–57.

- Savchenko, A. (2002) Toward Capitalism or Away from Russia? Early Stage of Post-Soviet Economic Reforms in Belarus and the Baltics. *The American Journal of Economics and Sociology* 61(1): 233–257.
- Schank, E. (2004) Tagasilöök metsatööstuses (drawbacks in forestry). *Eesti Ekspress* (Estonian weekly newspaper) 22.01.2004.
- Schepers, D.H. (2010) Challenges to Legitimacy at the Forest Stewardship Council. *Journal of Business Ethics* 92(2): 279–290.
- Schults, J. (2004) Metsakraave ei tohi raisku lasta (forest ditches should not be wasted). *Eesti Loodus* 3(2004).
- Seuring, S. and Müller, M. (2008) From a literature review to a conceptual framework for sustainable supply chain management. *Journal of Cleaner Production* 16(15): 1699–1710.
- Siren, A.H. (2006) Natural resources in indigenous peoples' land in Amazonia: A tragedy of the commons? *International Journal of Sustainable Development and World Ecology* 13(5): 363–374.
- SmartWood (2002) Forest Management Public Summary for State Forest Management Centre. SmartWood, available at www.smartwood.org, last accessed 23 February, 2005.
- SmartWood (2006) Forest Management Public Summary for Rakvere Private Forest Owners Cooperative in Rakvere, Estonia, available at www.smartwood.org, last accessed 17 March 2007.
- Sodhi, N.S., Butler, R., Raven, P.H. (2011) Bottom-up Conservation. *Biotropica* 43(5): 521–523.
- Soon, E. (2001) Maksupettus metsaäris saab seadusandjalt löögi (tax fraud in forestry business to be stricken by lawmaking). *Äripäev* 11.01.2001. Tallinn.
- Stringer, C. (2006) Forest certification and changing global commodity chains. *Journal of Economic Geography* 6(5): 701–722.
- Thompson, I.D., Okabe, K., Tylanakis, J.M., Kumar, P., Brockerhoff, E.G., Schellhorn, N.A., Parrotta, J.A., Nasi, R. (2011) Forest Biodiversity and the Delivery of Ecosystem Goods and Services: Translating Science into Policy. *Bioscience* 61(12): 972–981.
- Tonisson, K. (2000) An Analysis of the Scientific Soundness and Economic Implications of FSC-based Forest Certification for Estonia. Master thesis. Environmental Change Institute. University of Oxford.
- Trapido (2004) Interview with managing director of Estonian Fund for Nature.
- Turaga, R.M.R., Howarth, R.B., Borsuk, M.E. (2010) Pro-environmental behavior Rational choice meets moral motivation. *Ecological Economics Reviews* 1185: 211–224.
- Tysiachniouk, M. (2006) Forest certification in Russia. In: Cashore, B., Gale, F., Meidinger, E., Newsom, D. (Eds.), *Confronting Sustainability: Forest Certification in Developing and Transitioning Countries*. Yale School of Forestry and Environmental Studies, New Haven, pp. 261–295.
- Valgepea, M. (2007) Säästva metsanduse seire infosüsteemi loomisluugu (the story of creating Sustainable Forest Inventory information system). *Eesti Mets* 2007(1): 44–47.
- Weiss, G., Ramcilovic-Suominen, S., Mavsar, R. (2011) Financing mechanisms for forest ecosystem services in Europe and their implications for forest governance. *Allgemeine Forst und Jagdzeitung* 182(5–6): 61–69.
- WWF (2010) WWF Position paper on forest certification. Available at <http://awsassets.panda.org/downloads>, last accessed 31. March 2012.
- Yearbook (2001) Aastaraamat Mets 2001. Centre of Forest Protection and Silviculture. Tartu 2002.
- Yearbook (2002) Aastaraamat Mets 2002. Centre of Forest Protection and Silviculture. Tartu 2004.

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Publications / Publikatsioonid

- Ahas, R. and **Hain, H.** (2003) Varimetsandust tuleb käsitleda laiemalt. *Eesti Mets* 3.
- Ahas, R., **Hain, H.**, and Mardiste, P. (2005) Social, economic and ecological effects of forest certification in Estonia. In *Confronting Sustainability: Forest Certification in Developing and Transitioning Countries*, edited by B. Cashore, F. Gale, E. Meidinger and D. Newsom. New Haven, CT: Yale School of Forestry and Environmental Studies Press.
- Hain, H.** (2006). FSC sertifikaadiga puidu kasutamine ehituses. *Publicationes Instituti Geographici Universitatis Tartuensis* 99: 74–81.
- Hain, H.** and Ahas, R. (2005) The structure and estimated extent of illegal forestry in Estonia. *International Forest Review* 7(2): 90–100.
- Hain, H.** and Ahas, R. (2008) Can forest certification improve forest management? Case Study of FSC certified Estonian State Forest Management Centre. *International Forest Review* 9(3): 759–770.
- Hain, H.** and Ahas, R. (2011) Impacts of FSC sustainable forestry certification in European forest management operations, In *Management of Natural Resources, Sustainable Development and Ecological Hazards III. Ravage of the Planet III*, edited by C.A. Brebbia and S.S. Zubir. Witpress, Southampton, UK. (148): 207–218.

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