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Social, ecological and economic impacts of forest certification: case study of FSC certified
Estonian State Forest Management Center

MSc Thesis
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Introduction

Despite decades of policy efforts, increasing loss and degradation of the world's forests still remains one of the main challenges the international environmental community faces today (Sierra 2001; Pearce et al. 2003; Gerwin 2002). Evidence of widespread destructive logging and growth of illegal activities in the forest sector have also created concerns among importers and consumers (Brack et al. 2002). Intergovernmental processes for forest protection have not been successful in achieving their goals and there has been a growing recognition among NGO-s that regulatory approaches are insufficient to stop destructive logging and forest loss (Joint statement 2004). A need for a different, market based approach became increasingly clear and in late eighties the concept of forest certification emerged. In 1993, allegedly largely as a result of government's failure in the Rio 1992 conference to produce a binding global forest instrument (Gulbrandsen 2004; Auld and Bull 2003), the first international certification scheme, Forest Stewardship Council (FSC), was established.

FSC certification rapidly gained momentum and during the past decade of its existence the area of FSC certified forests has grown exponentially, reaching over 53 million ha as of April 2005 (FSC 2005). 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 recently 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 improvement of social, ecological and economic aspects of forest management practices during the post-Rio period (Putz and Romero 2001). Finally, the functional mechanism of forest certification has been nominated arguably the most advanced case of nonstate-driven rule making dynamics globally in environmental field (Cashore 2002).

Concurrently with the increase in FSC certified forest area and growing number of certificates, certification has become a business with intense competition between certifiers and growing financial turnover. The increasing commercial nature and high cost of certification has raised questions among industry, NGO-s and scientists about the actual benefits of certification (Siry et al. 2005; Carrere and Lohmann 2003). Although several macrolevel studies regarding the global role and impacts of certification are available (Cashore et al. 2002), on-the-ground benefits and practical changes in management have rarely been studied. Drawing parallels from ISO 9000 study (Wayhan et al. 2002) one might ask: is the fast increase of certified forest area really driven by actual benefits accrued to the participating operations, or is it merely a rush for certification by few top-ranking forestry operations out of fear that missing the certification boat might place them at a competitive disadvantage? Do others, whose certification has been initiated by environmental groups and supported by donor aid, really see the benefits or are they merely enjoying the free ride? While thorough research on the development and dynamics of certification exists, the question of its actual usefulness from forest managers and stakeholder's viewpoint has often been overlooked. Despite extensive review of the literature, the author could not find any scientific case study focusing on a single certified operation to shed light on the questions posed above.

The purpose of this paper is to evaluate impacts of forest certification using a case study of Estonian State Forest Management Center (RMK). To achieve this purpose, forest management practices were evaluated on randomly chosen clearfelling sites harvested before and after certification. Since the field survey is first quantitative analyses on certification impacts on global scale according to author's knowledge, it also aims to present a model that can be developed further for more extensive empirical research.

Since certification plays an important role in the attitude and practices of forest management organization, opinion of RMK specialists and foresters was also studied regarding impacts and benefits of certification. For this purpose a multiple choice questionnaire was used solely among RMK own staff to get overview of internal organization perception. Practical work of forest certification has revealed that major changes in the vision and management goals of forest management organizations have resulted from certification. This is especially true in the state forests of former Soviet

Union countries, where organizations are large and impacts of transition period with long duration.

To verify results and gain additional information about certification impacts interviews with external stakeholders were conducted. Interviewees included stakeholders from timber industry, environmentalists, state sector and private forestry.

The theoretical part of this thesis is based mostly on existing scientific papers, although some NGO and governmental publications have also been consulted. Since the author has been working for three years as a forest management auditor, his own knowledge and experience has been drawn upon where appropriate. Majority of the second part of this thesis was published in a certification review by Yale School of Forestry and has been written together with PhD Rein Ahas, who is senior researcher at Tartu University, Institute of Geography and also the supervisor of this thesis. Furthermore, the research phase of the interviews and the writing of interview results were conducted jointly with Dr. Ahas.

The author would like to express gratitude firstly to Rein Ahas for his inspirational cooperation and advice. The contribution of all RMK employees and individuals who participated in the survey and interviews is gratefully acknowledged. Finally, the author is thankful to his family and especially to his wife who assisted during field visits.

1 Theoretical background

1.1 Forest certification overview

Labeling of wood products can be tracked in Europe back to 1637, when a French royal decree stipulated cabinet makers' guild members to mark their products with a stamp, indicating the high quality of the cabinet (Pradere 1989 in Elliott and Schlaepfer 2001). From the pragmatic viewpoint the eco-labels used on certified forest products are also marks of quality. However, instead of representing the inherent quality of the product itself, they indicate the high quality of forest management, providing the consumer with value added information about the history and origin of the timber in the product (Elliott and Schlaepfer 2001).

1.1.1 Policy transformation and privatization of forest governance




Developing appropriate policy instruments for addressing forest destruction is a challenging task for policy makers. Governments have historically used two main types of policy instruments. Hard laws such as export restrictions and logging bans try to directly enforce desired goals; secondly market based incentives such as tax-subsidies are used (Kooten et al. 2004). In all these cases however, presence of some form of state involvement has been pre-requisite for application of a policy instrument. According to wide range of contemporary scientists, the underlying change in forest policy has been introduced by emergence of non-state, market driven governance structures. (Cashore 2002; Cashore et al. 2004; Kooten et al. 2004; Khanna 2001; Segerson and Miceli 1998). Presently the most comprehensive and well-developed sample of such non-state policy instrument is forest management certification (Cashore 2002).

Another option is to classify forest certification from the perspective of policy driving powers. Two traditional types of policy implementation approaches have been observed (Cloke and Little 1990). The situation where principles of policy are formulated at higher

levels of government can be called top-down approach. In such cases government formulates the policy approach, develops the enforcement mechanism and implements it with full power. Alternative situation where populace jointly elaborates and agrees the need for and forms of policy can be called bottom-up approach. In such a case the policy is implemented by cooperative agreements or local rule. The first approach works as long as population is in general agreement with the policy principles or the government is powerful enough to enforce its agenda, but it is difficult to implement in areas with large private forest ownership. The second approach tends to get very complicated in large, sophisticated societies since the “interest of the participants in the policy process is not weighted by their direct investment in, dependency on and knowledge of the forest” (Naka et al. 2000).

Considering this division, certification can be classified as a third approach, driven neither by top-down approach of strong central governmental powers, nor by the bottom-up directions of local or civilian powers but rather by the commercial power of stakeholders and markets. In this case the policy is structured by various organizations with wide scale of interests and market acceptance has the role of enforcement mechanism rather than regulatory compliance. This classification has been shown in Table 1.

Table 1. Principal schemes of policy driving powers

	 Top-down approach	 Bottom-up approach	 Certification
Who develops	Central government	Local/regional government	All (non-state) stakeholders
Who enforces	Central government	Local/regional government or using mutual agreements	Markets

Increasing emergence of policy instruments where policy-making authority is shared or exclusively attained to non-state organized interest groups in combination with increasing use of market-oriented tools has been appropriately called “privatization of governance” by some scientists (Cutler et al. 1999; Cashore 2002). This new concept expressively reveals probably the most important characteristic of non-state market-driven (NSMD) functional

systems: absence of governmental decision-making authority. This is most evident in FSC certification system, where governments are expressly forbidden from being members or voting in decision-making processes (Cashore 2002). Cashore (2002) has identified four major pre-conditions that must be fulfilled for a NSMD governance system to function effectively as described in Table 2.

Table 2. Major conditions for functional NSMD governance systems

Role of the markets	Products regulated by NSMD are demanded by purchasers further down in the supply chain
Role of the state	No state requirements to adhere to the rules; no state-enforcement of compliance
Role of stakeholders	Rules are formulated and authority is granted through evaluative process where all interested stakeholder groups are participating on equal basis
Enforcement	Compliance to the rules must be externally verified to provide credible claims to all stakeholders

Source: adapted from Cashore 2002

Relying on these conditions it becomes apparent that in case government involvement appears in the form of legal requirements to comply with the agreed rules, the NSMD system ceases to function. In this case the logic of market support no longer explains why the parties who are certifying themselves are complying with the rules. The proposals to enforce governmental regulations that would compel companies to certify themselves or forbid purchase of non-certified products can hence pose a threat to the functioning of certification and should thus be avoided. This is relevant subject considering recent proposals by some EU politicians to enforce state regulations that would allow only purchase or importing of certified timber products in EU (FERN 2003).

1.1.2 The philosophy behind forest certification

Certification was originally designed to allow consumers to select timber products originating from sustainably managed forests or in another words link the good forest managers and consumers seeking to support them. The idea was built up on the assumption that similar or identical products will be valued differently by consumers if additional information is provided about the history of the product. In the case of certification such additional information claims that the timber used for manufacturing the products originates from economically viable forest management operations that are respecting the

rights of local community and acting in a socially and environmentally responsible manner.

To enable to differentiate such products on the market, the first practical goal of forest certification is to identify “good” forest managers. The tool for achieving this goal is forest management (FM) certification. During FM certification process independent auditors evaluate the performance of forest manager against set criteria of good forestry and eventually conclude whether the activity corresponds to the criteria or not.

Second task of certification is to ensure that information about good forest management and those practicing it shall reach the final marketplace, where consumers can make their purchase choice. The tool used for this is chain of custody (CoC) certification, during which independent auditor checks that company selling certified products can prove the origin of raw material used for production as coming from certified forest. Only FM and CoC certification in combination enable consumers to make a responsible purchase choice. Using the tools of FM and CoC certification, certification has created a system for rewarding good managers and companies by paying a price premium or applying preferential purchase behavior. Rewards can also be given less directly, for example by increased public recognition.

Due to such reward system the revolutionary change that forest certification should introduce, is complete change of consumer markets role in forest protection. Growing demand of markets for wood and paper products has been considered the main reason for forest loss and destruction. The perpetual “appetite” of markets is often seen as “root of evil” in forestry context by environmentalists. The certification system enables markets to gain a different role since the reward system enables markets to contribute to sustainable forest management instead of being the main pushing factor for destruction of forests. As Kiker and Putz (1997) have put it, direct market-driven financial incentives have turned the “bases of the problem” of markets into “basis of the solution”.

The whole idea of certification was initially based on assumed willingness of responsible end consumers to pay a price premium for environmental friendly goods. However growing number of research has revealed that the price of certified timber as well as final

products is very seldom higher or only insignificantly higher at best (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 campaign is being driven by large corporate retail chains that are using certification as part of their “green marketing”, or in some cases also “greenwashing”, strategies (Rametsteiner and Simula 2003). These retail and wholesaler corporations are motivated to prefer certified products either because they simply want competitive edge or they are being targeted by environmental NGO campaigns. Corporate wholesalers and retail chains are also arguably the only agents in global marketplace who actually have the power to motivate primary and secondary processors to certify (Morris and Dunne 2004). This shift towards corporate driven certification is increasingly being discussed also among scientific community (Cashore 2002; Cashore et al. 2003). In fact increasing number of scientific research has admitted that forest certification system does not need to include any role of end consumer, as long as there is demand for certified products somewhere along the supply chain (Cashore 2002).

1.1.3 FSC: emergence, structure and certification process

The Forestry Stewardship Council was founded in 1993 by environmental community, concerned about destruction of world’s forests, arguably as a joint response to the impotence of intergovernmental efforts to create an effective global policy tool for forest conservation (Gulbrandsen 2004). The goal of FSC, formulated by founding members, is to support environmentally appropriate, socially beneficial, and economically viable management of the world’s forests. This is achieved through creating an international labeling scheme for forest products, which provides a credible guarantee that the product comes from a well-managed forest. Another reason for creation of global certification scheme with wide stakeholder support and credible and transparent certification process was the multitude of first and second party¹ environmental claims. For example a study published by WWF, one of the founders of FSC system, revealed that out of more than 600

¹ First party claims refer to claims made by companies about their own products or services, second party claims refer to claims made about company products or services by other parties having direct interest in the company (partners, other affiliates of the same corporation etc.) Third party claims (such as FSC on-product claims) are approved by independent parties.

companies claiming that their products are from sustainably managed forests, only three were able or willing to support their claims (Read 1991).

Structure

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 chamber and affiliation can be chosen freely 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. 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 single most credible forest certification system on the market by NGO-s as well as many other stakeholders (Ozinga 2004) (see section 1.1.4 for more comparison details). The range and balance of stakeholder groups represented during the process of defining good management (standard setting) is crucial for credibility of the standard.

Evaluation criteria

Assessment of forest management practices has to be related to certain performance indicators if any claims about level of forest management are to be made. The functional system of forest certification is built upon evaluation of candidate's level of forest management against a set of criteria. Criteria of good forestry are useful since they provide means to measure assess and demonstrate progress towards sustainable forestry. Implementation of evaluation criteria is widely seen as the most effective way forward towards better forest management nowadays (Lawes et al. 1999).

FSC defines good forestry through its global Principles and Criteria (FSC P&C), often referred to as the FSC standard. FSC standard consists of 10 principles which are further defined by total of 56 criteria (FSC 2004b)¹. FSC standard represents a wide scope of

¹ FSC standard and other FSC policy documents are publicly available on FSC homepage (www.fsc.org). There has been some criticism among scientists over the fact that FSC is proposing their own principles and criteria instead of using a set

forest management related aspects including legal compliance; social responsibility regarding local community, stakeholders, contractors and employees; gaining profit from wide variety of the forest services; environmental impact and ecosystem protection; forest management plan; monitoring of the changes in forest ecosystem aspects and impacts of forestry activities etc. The order of standard principles is not prioritized but rather it encourages a holistic approach to forest management evaluation.

Since FSC P&C has been defined by globally representative stakeholder groups, it is meant to serve as a basis for evaluating good forestry in all regions and forest ecosystems. Due to this the P&C are somewhat general and do not include sufficient level of detail to effectively guide certification activities on-the-ground (Cauley et al. 2001). Therefore FSC standard is actually meant to be further refined on national or regional level. FSC expects local stakeholders to elaborate indicators for each criterion in accordance with national environmental, social and economic context. Since indicators provide measurable scale for evaluation and determine the exact nature of each criteria, this process of localizing FSC general standard is critical for actual implementation of the standard in practice. To maintain credibility and ensure high level of certification everywhere, FSC has to approve the national or regional standard before it can be officially used for FSC certification. To enable coordination, FSC communicates through national FSC working groups, who are responsible for the standard setting procedure in each region. Similarly to the FSC membership, national working groups are also open for all stakeholders and a balance must be achieved between social, environmental and economic chamber. A set of requirements and procedures defined by FSC has to be followed by national working groups in regional standard development. Once the regional standard is ready and officially approved by FSC, all certification bodies operating in this region are obligated to use the regional standard certification. In regions where there is no national standard yet available, or where this work is in process, the certification bodies may use interim standards developed by themselves according to the rules similar for developing national standards.

developed through intergovernmental process (Brand 1997), however others have claimed that this independence has been key to the success of FSC (Gulbrandsen 2004).

Certification process

To maintain independence, FSC itself does not conduct certification. Instead FSC accredits certification bodies (CB) by which they receive the right to carry out FSC certification and issue certificates. For gaining accreditation the CB-s have to prepare a profound certification system and procedures. The quality of certification services offered by CB-s is regularly checked by FSC during accreditation audits. As of October 2004 there were 14 CB-s accredited by FSC (FSC 2004c).

During FSC certification an accredited certification body evaluates the performance of candidate forest management operation against local or interim FSC standard. In case the practices are found to be generally in compliance with the standard, a written assurance (certificate) is given to the FMO that the quality of forest management practiced conforms to the FSC requirements.

Table 3. FSC compliance evaluation methodology (sample of single criteria)*

Principle 2. TENURE AND USE RIGHTS AND RESPONSIBILITIES Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.			
Criteria	Indicators	Auditor findings	Conclusion (score)
2.1 Clear evidence of long-term forest use rights to the land (e.g. land title, customary rights, or lease agreements) shall be demonstrated.	2.1.1 Property borders are marked or otherwise clearly delineated (e.g. follow natural boundaries).	Forest property is bordered with roads in all cases, thus the borders are clearly distinguishable. Signs stating the owner and contact information have been posted on all road junctions.	High level of compliance (score 5)
	2.1.2 Forest manager possesses legal document providing his legal right of ownership or management right.	The forest property was purchased in 1995. Original purchase documentation as well as recent confirmation from land property department was reviewed by auditors. Interviews with neighbors confirmed that ownership is undisputed and respected by others.	

*The criterion and indicators in this sample are from the Draft SmartWood Baltic Interim Standards.

The length and design of FCS certification depends largely on candidate organization however in all cases interviews with employees and responsible staff, field visits and documentation review are required. All sources of information are used to formulate

certification findings for each criteria and indicator. The findings describe candidate operations practices in reference to the aspect of forest management handled by the criteria and defined by indicators. Based on the findings gathered for each indicator, a conclusion is made by auditors' whether or not the candidate operation is in compliance with the criteria under review. To help gain an overall view and quantify results of the performance, scores are used by some certifiers; however it is not required by FSC. Based on the evaluation results of each criterion, a conclusion is made about level of compliance with the principle in general. Certification decision is based upon compliance review of the findings and conclusions of all criteria and principles. Table 3 presents a fictive sample of the evaluation process of single criteria.

After field work the audit team compiles audit report where the findings as well as other relevant background information is included. In the report the audit team also gives a recommendation about the certification decision (whether or not to issue the certificate). The audit report is reviewed by the client to ensure clarity of the report and correct any mistakes resulting from miscommunication between auditor and the client. After client review the report is reviewed by independent peer reviewers to further ensure independent evaluation, upon which a certification decision is made by CB. FSC certificates are issued for a period of five years, after which a new certification assessment is required.

Most certification systems, as well as FSC, also require regular monitoring of the forest management level in certified operations. This is done by audits, systematically carried out after certain period of time. In FSC system the minimum allowed frequency of audits is one audit per year. During the audits continuous compliance with the standard principles is evaluated however the general evaluation is more superficial than during initial certification. Important tools of certification audits that enable continuous improvement of forest management are conditions and corrective action requests (CAR)¹. While similar in nature, the first ones are issued during initial assessment and the latter during annual audits. Conditions and CAR-s are raised if a non-compliance with certain aspect of the

¹ The corrective measures may be named differently in other certification systems and sometimes also in FSC system. Sometimes CAR-s are used also during initial certification, or other terms such as non-conformance etc. can be used. Despite of the name the purpose of all these corrective measures is the same: to draw candidates' attention to areas where activity does not correspond to the standard and ensure that the problems are solved within a certain timeframe.

standard is identified, but the non-compliance is not significant enough to prevent certification. They usually indicate what needs to be done by the FMO to solve the non-compliance and give a timeframe during which the non-compliance has to be addressed. In practice verification of the compliance with conditions and CAR-s is usually the most important and time-consuming part of annual audits.

Chain of custody certification

As described in 1.1.2, FM certification is combined with CoC certification to create a fully functional certification system. CoC certification provides a mechanism to distinguish the products originating from certified forests on the marketplace. The general aim of CoC certification is to ensure that companies can trace the source of its timber to an FSC certified forest. All timber companies who are purchasing certified timber and want to sell their products as certified need to have chain of custody certificate. For a final product to be eligible for carrying FSC logo, all the companies who have taken ownership over the product or the timber used for manufacturing of the product in the chain of its movement from forest to the retail market (except retailers), have to have valid CoC certificate. Although CoC certification has become more complicated with new rules and schemes introduced by FSC frequently (FSC 2004a; FSC 2004d), detailed coverage of CoC requirements is outside the scope of this paper. Readers interested in CoC certification can find extensive materials on FSC homepage.

1.1.4 FSC among other ecological certification schemes

All ecological certification schemes can be divided in two broad groups: performance based systems and process based systems (Cashore 2002; Haener and Luckert 1998). The fundamental difference between these two certification systems is the target against which compliance is checked by the auditors. While the ultimate goal of both systems is to help client improve their management level, the way they aim to achieve this is different.

In process based systems the evaluation criteria defines certain processes and control measures for improvement of the management quality that have to be in place. In such case the certifiers task is to evaluate if the processes have been designed and implemented that enable to strive towards achieving certain goals (the goals or the performance level to

achieve can be usually determined by the candidate itself). Process based certification is fundamentally based upon the principle of continuous improvement, thus if certain goals and targets have been achieved, the company should set new, more “advanced” target levels to strive for.

In performance based systems a minimum level of required performance or degree of quality has been set by the evaluation criteria. In such cases the certifier’s task is to evaluate compliance of candidate’s ongoing activities and practices to the determined level. The ultimate conclusion is whether or not the management is in compliance to the level that has been determined (Haener and Luckert 1998). Pragmatically said in the performance-based certification the criteria defines what has to be done while the process-based certification criteria say how it should be done.

A downside of performance based certification systems is lack of recognition of continuous improvement as compared to process-oriented systems. Since the performance level is set equal to everybody the options for certifying managers with lower level of forest management are limited, even if the companies are making significant steps of improvement and moving in “the right direction”. Although interpretation of the standard offers some flexibility to certifiers on this aspect, it has been noted that this deficiency is one of the reasons why certification has not been very successful in tropics (Atyi and Simula 2002).

Since Estonian State Forest Management Center (RMK), the case study operation of this research, has been certified according to FSC and ISO 14001 systems, a short comparison of them follows.

FSC certification belongs to the performance based group of certification systems since FSC standard sets certain minimum performance level for forest management (Gullison 2003). ISO 14000 is process-oriented system which requires companies to identify their environmental aspects, set goals and quantitative targets for reducing negative impacts and subsequently implement procedures to achieve the goals and targets (Haener and Luckert 1998; Gulbrandsen 2003). While FSC standard is specifically designed for forest management, the ISO 14001 standard can be adopted by anybody operating in almost any

domain. Since both certification systems aim for same goal in forestry context, they complement each other and can be applied together. This has also found practical implementation by RMK, as described in section 2.3. RMK was the first organization in the world to have an integrated ISO14001¹ and FSC certification assessment.

Today FSC is not the only performance based certification system targeted exclusively on forest management and several alternatives have developed. It is widely acknowledged that all of the competing certification schemes (except CSA perhaps) were developed by timber industry in response to FSC certification. Reasons are disputable however NGO experts seem to agree that the level of forest management defined in FSC standard seemed to be too high for large forest managers to comply with (Ozinga 2004). This explains why stakeholders and especially environmental community considers FSC system to be the only credible certification system available. Furthermore, most scientific research comparing various schemes seems to conclude that competing schemes are guided and dominated by timber business groups and other stakeholders such as NGO-s and civil rights groups are seen merely as advisors or consultants in the process of standard-setting (Cashore 2002).

Programme for the Endorsement of Forest Certification Schemes (PEFC), Sustainable Forestry Initiative (SFI) and Canadian Certification Initiative (CSI) are perhaps the most well-known forest certification schemes besides FSC (Ozinga 2004). Although coverage of other certification systems are outside the scope of this paper, it can be expected that impacts of FSC certification are most relevant in terms of practical improvements, since FSC has set the highest requirements in it's standard. Secondly according to presently available knowledge it is most likely to establish itself on long-term bases (Cashore et al. 2003). A selection of the advantages of FSC system over competing schemes is provided below (Gullison 2003; Ozinga 2004; Cashore 2002):

- FSC is the only certification system with global geographical coverage;
- FSC has certified more forests in tropics than any other certification initiative²;
- FSC has the greatest general support from environmental and social NGO-s;

¹ The ISO 14000 certification system is based on several standards developed by International Standardization Organisation. Of these ISO 14001 standard defines the requirements for certification while other standards in the same series (e.g. ISO 14004, ISO 14050, 14061, 14020) provide additional guidance for developing and auditing the system.

² It should be noted that within FSC system only 10% of all certified areas are located in tropics, hence FSC itself has also been criticized for small coverage of tropical forests.

- FSC has greatest commitment to transparency and is thus most suitable for external evaluation and analyze;
- FSC has most advanced, democratic and transparent decision making system based on wide and balanced range of stakeholders from many geographical regions;
- FSC standard is most rigorous with respect to biodiversity conservation;
- FSC is most credible forest certification system, since it is the only system that has not been established by timber industry groups.

1.2 Literature review on impacts of forest certification

Forest certification has been deemed one of the most controversial topics in modern forest policy discussions by scientists (Elliott and Schlaepfer 2001a) and public institutions (FAO 1997). Forest certification systems have its supporters, sceptics and opponents; hence every anecdotal and even analytical effort to evaluate benefits of forest certification will be likely confronted with arguments. Existing research is somewhat controversial and almost all of the impact studies describe potential role of certification on a global or regional scale. In few cases countries and also groups of forest management operations have been under review as described below.

The single most comprehensive research of forest certification impacts was initiated by Yale Program of Forest Certification. During the project various scientists and practitioners from developing countries as well as countries in social and political transition, such as the post-Soviet republics of Estonia and Latvia, were asked to prepare thorough case studies about the process and results of forest certification. Case studies from 16 countries were produced, mostly by local authors, and the results were introduced to the scientific community during a symposium held in June 2004. Each case study covers a wide scope of certification-related topics, such as country-specific background factors, emergence of certification, and reaction of various stakeholders and also impacts of certification. Most of the authors relied on interviews and questionnaires as well as their personal experience gained from involvement in certification process to distinguish impacts of forest certification in the case study country. The case studies describe mainly impacts of the whole certification process development, including standard setting and other initial steps, rather than impacts on a single FMO level (Jakubowicz 2005). In several cases however

the authors draw examples from single certification cases (Tysiachniouk 2005) or in countries where only few certifications have been issued rely exclusively on these few single FMO cases (Njovu 2005; Ahas et al. 2005). The case studies will be published by Yale School of Forestry and Environmental Studies in 2005. Although general in nature, the collection is useful overview of major certification impacts on developing and transitional countries.

No quantitative estimates of certification impacts on specific FMO have been undertaken according to author's knowledge. In addition to lack of reliable data due to subjective methods used, there is also general lack of any kind of research on the impacts of certification on local scale (Naka et al. 2000). There are multitude of reasons that have possibly prevented generation of adequate knowledge base about actual effects of forest certification, some of which are listed in the table below.

Table 4. Potential obstacles of research on certification impacts

Aspect	Explanation
Measurement problems	Generalization of results is difficult considering diversity of forest owners as well as social, economic and ecological conditions in various regions. Debate about usage of quantitative and qualitative approaches and sphere of applicability.
Data problems	Necessary data often sensitive. On-the-ground effects difficult to measure without access to financial records and other sensitive data. Companies often unwilling to share information since certification is sensitive topic in connection with market advantages.
Methodological problems	Wide interests and complexity of aspects to evaluate result in methodologically complex task. Too narrow approach can be deemed simplistic while comprehensive approach makes it difficult to get accurate results and can become unwieldy.
Political problems	"Any policy change is political by definition and results in redistribution of power, resources and influence. As a consequence, those with a financial or political interest are concerned with protecting their status by controlling the nature and domain of the evaluation. Political differences can add to controversies an emotional content so newsworthy that it can neutralize the value of scientific findings." (Naka et al 2000)
High cost	Costs to obtain accurate results are often high.

Source: adapted from Naka et al. 2000

Furthermore lack of research on certification can be noticed in certain geographical regions. Research on effectiveness of forest certification to solve the global problems of forest degradation and loss of biodiversity has mainly focused on tropical forests (Merry

and Carter 1997; Gullison 2003). The author is not aware of any independent studies focusing exclusively on boreal or temperate region. The probable reason for this imbalance is the fact that most of the global forestry problems are more significant in tropics. At the same time certification has been least successful in tropics, probably due to lower level of existing forest management and higher costs of certification. Studies in boreal region should be important for advocates of certification since, apart from donors, the certification system largely relies on certification fees of large forest owners in boreal and temperate regions. As of December 2004, ca 85% of FSC certified forests according to area were located in temperate or boreal region (UNEP et al. 2004), while the certification in tropics has mostly been paid by donors (Atyi and Simula 2002).

Finally the existing research on global and regional effects of forest certification tends to focus on the whole chain of certification, including movement of timber products through the production chain and chain of custody certification (Morris and Dunne 2004). This is of course essential, to lend insight to the functional mechanism of whole certification business, however practical impacts of forest certification are probably more interesting from forest owner's standpoint.

There is somewhat more research regarding impacts and effects of ISO 9000 (Quazi et al. 2002; Rao et al. 1997) and ISO 14000 (Jiang and Bansal 2003) certification, since these schemes are not limited to forestry and thus data is more widely available. Also quantitative methodologies for assessing impacts in some other sectors than forestry are easier to develop (Naka et al. 2000). Other research focus on reasons why companies choose certification (Cashore et al 2003) and whether or not the candidate expects to receive direct financial benefits from the process (Kooten et al. 2004).

1.2.1 Methods used by other authors

The types of research available on impacts of certification are mainly limited to the following methods (including ISO certification):

- interviews and expert opinions (Tan and Sia 2001; Jiang and Bansal 2003; Morris and Dunne 2004);

- written questionnaires (Quazi et al. 2002; Morris and Dunne 2004; Acharya and Ray 2000; Agus and Abdullah 2000; Terziovski et al. 1997);
- evaluation of the corrective actions that certifiers have issued (Thornber 1999; Gullison 2003).

A review of potential impacts of forest certification based on certification conditions issued to 27 companies has been prepared by Gullison (2003). The conditions have been grouped in logical categories and data about frequency of raising the conditions in each group is available. However the review is not covering the full scope of certification as only those conditions that are relevant from biodiversity conservation view have been considered. Nevertheless study of the direct requirements that have been issued to companies as a result of certification is a promising approach for evaluating impacts for specific FMO-s. For more accurate results, the actions taken by the FMO to meet the conditions would need to be evaluated also. This can be done by using the certification reports from later audits and recertification. Systematic review of the conditions raised and FMO responses implemented, based on consecutive certification reports from the same FMO is suggested by author as a useful case study tool for evaluating impacts.

Mrosek (2001) has offered a methodology, to evaluate the level of forest management from a multiple forest use perspective using specially designed criteria and indicators. The method compares a desired state with the existing state of forest management in a single forest management unit. In Mrosek's study the desired state is natural forest, characteristic to the region of the study area and existing state is the managed forest in the study area. Based on the desired state of forests Mrosek formulated a set of 8 criteria and 24 indicators, against which the existing state of forests was compared. Performance was measured in five point ordinal scale for each indicator. The results showed level of target achievements for each criterion, which in turn enabled to formulate action plans to improve areas with lower scores. The methodology used by certifiers is similar; however there were more specific target levels identified in Mrosek's study. Also the desired state was defined in a more tangible manner, helping to make more unbiased evaluations. To apply this method for evaluation of certification impacts, the criteria should be reformulated. In Mrosek's study the natural forest was the ultimately desired state, however the ideal forest according to FSC standard is not solely aimed towards natural forest ecosystem but

includes wide range of social and economic aspects. Wide scope of standard also makes it more difficult to define the desired state at a similar precision.

A method that could be successfully adopted for analyzing certification impacts was used by Côté and Bouthillier (2002) in evaluation of public involvement effects in the forest management process. Five main objectives for public involvement were initially formulated and subsequent study focused on determining the achievement level of these objectives. In order to evaluate this rationally, a set of 19 criteria was formulated. Three scenarios were then developed for each criterion, describing three different situations respectively with poor, medium and good performance in the light of relevant criteria. During the first test, stakeholders were asked to choose the scenario that best represents the situation before public participation initiatives were initiated by the organization. During second test (18 months later) the same respondents were asked again to choose the scenario closest to reality from the same options. Results revealed that respondents generally perceived better achievement of the main goals after the test period. Although this method seems similar to the previously described methodology, it has few significant advantages. Forest certification is very controversial and good or sustainable forest management is by far not perceived by all stakeholders alike, thus research based on opinion of respondents is likely to suffer from high degree of subjectivity. The methodology significantly helps to systematize observations. Scenarios significantly reduce the risk of biased results and are useful in situations where complexity and uncertainty are high (Wollenberg et al. 2000). Additionally comparison of respondents perception of the scenarios during two different times enable to quantify the changes and impacts better than trying to observe the continuous process of change throughout a time span. Unfortunately this advantage itself also sets certain limitations to the use of this method, since results need to be obtained during two different times. Since processes in forestry are slow just as people's perceptions are slow to change, the time difference in case of certification evaluation should be at least a year. In Côté and Bouthillier's study the time lag was 18 months, however the authors admit that it might have been too short to represent results accurately. Nevertheless it seems to be useful tool, if time constraints are not an issue. For example applying the performance scenario based method before and after a five year period of FSC certification could produce interesting results about effects of certification.

A few other methods have been implemented for evaluating the potential benefits of forest certification, however they mainly aim to aid in the decision situation of whether or not to go for certification and are thus not usable for measuring actual impacts of certification. Kurttila et al. (2000) used a combination of SWOT analyses (tool for analyzing internal and external environments in order to attain a systematic approach and support for a decision situation; acronym stands for Strengths, Weaknesses, Opportunities and Threats) and AHP (Analytic Hierarchy Process) implementation to quantify potential benefits as well as threats of choosing to go for forest certification. Although this exact approach can not be used for evaluating change in forest management over time, it is useful for gaining information about peoples or companies perceptions of the potential benefits of certification at a specific time.

1.2.2 Existing research results

As mentioned earlier existing research focuses mainly on potential impacts of forest certification on management and protection of forests on the global or macro-regional level. Due to complex nature of global forest policy issues and regional differences, the evidence on any impacts is rarely conclusive. Overview of the main types of impacts discussed in literature is nevertheless helpful in envisaging the possible trends and setting the background for determining more specific impacts on local or FMO level.

For clarity purposes the impacts have been divided into sections, describing respectively economic, ecological and social impacts of certification, although these aspects of forest management are internally integrated in practice. There are few crosscutting observations that shall be shortly discussed below. Firstly there is very little evidence that certification has had harmful effect on any aspect of forest management. Elliot and Schlaepfer (2001) have described a situation in Sweden where FSC forest certification of large industrial forest management organizations allegedly put some private forest owners in disadvantaged position in the marketplace. However since the idea of certification is to create a market advantage for certified forest managers this claim should not be viewed as the shortcoming of certification. A more frequent claim is that certification has not brought along any positive changes, since no management revisions have been necessary due to existing level of forest management (Kiekens 1998). In such cases certification only serves

as external confirmation to the already existing good forest management practices and not as a system that improves the management level itself.

According to the latest overview about certification impacts from 16 country studies (Cashore et al. forthcoming 2005), the most common overall positive effect of certification is seen in the way certification has changed peoples way of thinking about sustainable forest management and initiated discussions between FMO-s and stakeholders. While data regarding economic benefits and costs as well as opinions about the merit of certification to protect biodiversity and ecosystems are somewhat controversial, almost all case studies reveal that certification has enabled meaningful communication between forest owners, local communities and other stakeholders to start (Ahas et al. forthcoming 2005; Quevedo forthcoming 2005).

Environmental impacts

Gullison (2003) has differentiated between three main ways how forest certification could theoretically help to conserve forest ecosystems and biodiversity:

1. improve forest management in existing forests and thus help to maintain and enhance ecological values;
2. provide incentives to manage forests on sustainable basis rather than clear the forest areas for non-forestry land uses and thus help to reduce loss of forest area and hence also loss of ecological values of forests;
3. reduce logging pressure on existing high conservation value forests (HCVF) by offering the consumers a choice to prefer products originating from forests with lower ecological values.

Upon review of all three types of potential impacts Gullison concludes that presently there is evidence to support only the first hypothesis, since incentives offered by certification are insufficient to prevent deforestation and the volume of certified forest products on the global market is insignificant to reduce logging pressure on HCVF.

Advocates of FSC certification have always hoped that FSC helps to reduce forest loss in tropical areas where conversion of forest land to more profitable non-forest land use types, such as agriculture, is widespread. Theoretically this should be achieved by increasing the market value of tropical timber through ecolabeling which reduces motivation to clearcut

forests for alternative land use. Unfortunately such hopes appear to have been too optimistic. Several authors have proved through reasoning as well as description of practical cases that the incentives provided by certification to manage forests on sustainable basis in tropical regions are far too small to compete with the financial advantages that some non-forest land uses such as agriculture, offer (Laschefski and Freris 2001; Rice et al. 1997; Pearce et al. 1999). Furthermore liquidation logging, or “cut and run” approach as some NGO-s have called it, is by definition always more profitable in short-term than continuous sustainable forest management (Howard et al. 1996). Further it should be noted that in tropical regions economic and policy situation is usually unstable and frequent changes in forest policy make continuous forest management risky. Thus many investors are more likely to opt for short term profits which give reason to conclude that forest certification is not a viable conservation strategy to counter deforestation tropics (Gullison 2003).

Ability of certification to help conserve biodiversity is probably the most debated aspect of FM certification (Bennett 2000; Cauley et al. 2001; Ghazoul 2001; Gullison 2003; Jenkins et al. 2004; Putz and Romeo 2001). From global perspective an important consideration is the geographical division of certified forests. Presently ca. 85% of FSC certified forests are located in boreal and temperate forest zone and the forest certified in tropics are mainly industrial plantations (UNEP-WCMC 2004). Thus it is evident that the biologically most diverse and also most threatened old-growth tropical forests receive only small benefits from certification. Due to this many authors have concluded that certification has not had significant impact on forest destruction in tropics, where the problem is most significant (Atyi and Simula 2002; Gullison 2003).

Although certification has been inefficient in halting forest destruction in tropics, sufficient research and anecdotal evidence exists to claim that the conservation of biodiversity values has been improved in tropical as well as temperate and boreal forests after introduction of certification. Cognitive reasoning (Jenkins 2004) as well as research based on certification conditions issued by certifiers (Thornber 1999; Gullison 2003) indicates significant improvements in biodiversity conservation, although no empirical studies exist to confirm that.

Economic impacts

The bulk of scientific research divides economic benefits as well as costs of forest certification into two major groups as indicated in Table 5 (Bass et al. 2001; Merry and Carter 1997). As the net economic impacts of certification result in the balance of these four factors, the following sections discuss each of these components based on existing research and authors reasoning.

Table 5. Economic implications matrix of FM certification

Benefits	Costs
Direct benefits Higher income from price premium that buyers might pay for certified timber and products.	Direct costs Certifier costs (time, salary, travel, accommodation etc.); certification fees Consultant costs *
Indirect benefits Advantages in marketplace: maintenance of existing markets due to certified status and improved access to new markets. Gained reputation, morale and status among competitors.	Indirect costs Investment costs to bring forest management up to standard requirements and maintain the required level of forest management (training, purchase of health and safety equipment, purchase of machinery, costs for additional studies, preparation of more thorough forest management plan etc.).

*Consultant costs can be classified both as direct or indirect costs depending on whether the classification is based on direct measurability or purpose of the costs
Source: partly adapted from Gullison 2003; Bass et al. 2001; Merry and Carter 1997.

Generally there seems to be common understanding among scientist, which is also backed by some case study research (Morris and Dunne 2004; Baharuddin and Simula 1994), that in most cases FSC certification does not provide, or at best provides very small, price premium for the timber. Even in few cases where a price premium has been paid, it appears that this has been driven more by shortage of certified supply rather than a conscious willingness on the part of the consumer to pay for the sustainability of the management system (Rametsteiner 2002). Sequestering the last option is important since the premium is “artificial” in such a case and is expected to disappear as the supply of certified material increases. Gulbrandsen (2003) has described a Norwegian case where forest owners were paid significantly higher price for certified roundwood, however such cases are rare. Since there is scarce evidence that owners of FM certificates receive price premiums for the roundwood, direct incentives to acquire forest certification are low in areas where

sufficient market exists for non certified timber, (Siry et al. 2005; Quevedo forthcoming 2005).

On the other hand there is a fair base of evidence that certification helps to maintain existing markets and enter new markets more easily (Atyi and Simula 2002; Gullison 2003; Raunetsalo et al. 2002; Sedjo and Swallow 2002). Naka et al. (2000) has claimed that products leaving local wood lots with proper labeling may be able to pass market barriers with greater ease because of increased confidence of governments and other entities in communal forest practices. Effect of certification on production chains and market access of FSC certified companies has been also studied by Morris and Dunne (2004). Based on interview findings and case study results they concluded that although certification generally does not result in higher price paid for timber, it can offer market benefits by opening certain doors to certified companies or preventing certain doors from closing.

An extra virtue is the unique power of ecolabeling to provide market access to forest products among environmentally sensitive consumer groups and regions (Raunetsalo et al. 2002). It can be presumed that eco-labeling is particularly important for easier penetration of potential market barriers for timber originating from countries with allegedly high share of illegal logging and illegal forest practices. Unfortunately there are practical restraints that hinder utilisation of the full potential of this aspect of forest certification. Environmentally sensitive markets still exist to a significant degree only in Western Europe and North America (Bass et al. 2001) while the number of producers that are able or choose to access these markets is relatively small on global scale. According to Gullison (2003) only 6-8% of global timber production enters international trade and the majority of this is between countries in the same region. While Asia accounts for 70% of tropical wood imports there is virtually no demand for certified timber on Asian market. Certified production in Japan constitutes only 0,2% of the total production volume, while Japan is one of the largest importers of tropical timber (Gullison 2003). Finally only 14% of Amazonian timber production is exported, while the remainder is mainly sold in southern Brazil, which demonstrates little or no concern about the origin of timber (Smeraldi and Verissimo 1999).

The costs of certification are even more difficult to summarize, since clearly a serious lack of overview data prevails about costs of forest certification in different regions and under different certification schemes (Merry and Carter 1997). Even public reliable data about direct costs of certification is scarce, not to mention indirect costs, regarding which any scientific estimation are lacking as to the knowledge of the author. Direct costs can be expressed mainly in three ways: actual monetary aggregate that has been paid for certification service of certain FMO; certification cost per area (e.g. \$/ha/year) and finally certification cost per volume of timber harvested (e.g. \$/cbm). The first option is not representative for general conclusions since price is very dependant on the FMO and availability of certifiers in the region. Prices per area and volume are more indicative since they represent the costs dependent on size and management intensity of FMO-s. Area-based calculations are interesting mostly for forest owners and are also used by some certification bodies and standard setting organizations for determining price of certification¹. Since turnover and profit are directly related to volume processed, estimations per cbm are likely to be most interesting for timber industry and larger forest owners with intensive management.

Gullison (2003) has estimated that the FM certification cost per cbm varies from \$0.02-0.03 for some large companies in USA and Poland, up to \$4 per cbm for small forest owners in Latin America. Plantations certification in South Africa is estimated to cost about \$0,19 per cbm while other tropical producers have claimed costs of \$0.26-\$1.10 per cbm. Another study from early nineties gives an area based range of initial certification cost of \$0.3-\$1 per hectare in tropical countries, provided that local (cheaper) certifiers are used (Elliot and Cabarle 1994). These figures clearly reveal the fact that certification is more expensive in tropical areas. While financial wealth is generally lower in tropics, the need for certification and conservation of forests arguably higher. This is partly due to the fact that since most certification bodies are located in developed countries, the service costs are higher due to extended time and transportation costs. Furthermore the smaller size of candidate operation increases relative price per cbm and ha. The problem that certification is less accessible to small forest owners, has been addressed by FSC with

¹ FSC for example calculates the accreditation fee (charged annually for each active FM certificate) based on area of certified forest (FSC 2004)

developing of a group certification scheme where one certificate is issued for a group of FMO-s who can share the cost of certification (FSC 1998).

Research on indirect costs of certification is haunted by methodological difficulties. Since investments are made for general good of the company development it is very difficult to filter out the investments that were exclusively required for certification. It is however clear that indirect costs of certification are tied to existing quality of forest management prior to certification (Gullison 2003). Apparently the lower the forest management quality, the higher are costs to bring it up to the requirements of internationally recognized perception of good forestry. Tropical producers are once again in disadvantaged situation here since it is commonly known that the general state of forest management in tropics is inferior to the one in temperate regions (Atyi and Simula 2002). For example an Amazonian logging company has claimed that its logging costs under certification are 30% higher than by using traditional practices (Gullison 2003) and there is a general sentiment that improvements to management required by FSC are beyond financially viable level for the average tropical concessionaire (Wibowo 2000).

Social impacts

Naka et al. (2000) has distinguished eight main stakeholder groups who should be considered when discussing social impacts and has described their potential role in the success or failure of certification as presented in Table 6. Out of these stakeholder groups only the governments (Rametsteiner 2002a) and forest owners and industry's (Murray and Abt 2001) involvement in certification has been analyzed to some extent. This is unfortunate since recent research reveals that social impacts are arguably more significant than those introduced in the area of environmental protection by forest certification (Cashore et al. forthcoming 2005).

Direct social impact is probably scientifically the least studied area of forest certification. Relying partly on the review given by Bass et al. (2001), Atyi and Simula (2002) have identified the following major social impacts in their overview of forest certification in tropics based on review of several certification cases:

- higher efforts by the FMO to provide steady employment for local people;

- establishment of health and safety standard higher than those specified in legislation or in place earlier;
- less limitations and better opportunities for workers to organize; formulation of stronger trade unions;
- increased involvement of local communities in the process of forest management due to higher transparency of forest management process and decision-making;
- better internal organization and structuring of local community groups in order to negotiate more effectively with the FMO.

Table 6. Stakeholders and their relation to forest certification

Stakeholder group	Relation to forest certification and typical response
governments (at all administrative levels)	sensitive to any processes that may supersede existing power and responsibilities certification offers alternative to governmental policy regulations, thus often encountered with resistance or suspicion alternatively some governments have chosen to get involved in the process of defining national C&I
forestry administration units	same as previous
research and educational institutions	tend to be most comfortable with traditional and well known policy constructs; in many cases resistant to change unless the new system has distinct advantages
private forest owners	difficult to generalize since agenda of owners and context varies greatly; forest property usually seen as part of owner's wealth; main motivation usually to preserve and grow equity of forest ownership; any process that promise to affect this will likely be explored or challenged
forest industry	interested in preserving and enhancing the investments in forest land and facilities; any policy change that affects the competitiveness of timber industry will be challenged
NGO-s	goals of NGO-s vary from very specific aspects of forest management to generally better forestry; response to any policy change will depend on how the policy matches with the agenda and goals of the NGO
media	usually not knowledgeable about details and nuances of resource management; tends to focus on surface events and dangerous or unfortunate events; attention to certification so far limited and momentary
general public	plethora of information available nowadays thus certification is difficult to notice among other issues; attention depends on how the issue affects everyday life and well-being; general reaction to certification difficult to predict

Source: adapted from Naka et al. 2000

Recent country studies from the Yale Forest Certification Programme collection as described early in section 1.2, provide sufficient evidence to conclude that improvement or initiation of communication between forest managers and stakeholder groups is the most evident social result of certification (Cashore et al. forthcoming 2005; Côté and Bouthillier 2002; Bass et. al 2001). Increased communication and transparency as well as broadened way of thinking and attitude towards forest management are keywords marking the path of certification in most cases. Decrease of social conflicts between local communities, stakeholders and timber companies (Quevedo forthcoming 2005), increased communication and participation in decision-making process by neighboring landowners and local stakeholders (Ham forthcoming 2005), creation and emergence of novel mechanisms for public participation (Tysiachniouk forthcoming 2005) and improved ability of to enter into meaningful discussion and achieve mutual understanding between different forest sector interest group (Actinš and Schwartz forthcoming 2005) all seem to be inherent results of certification in many cases.

Another major distinct social benefit of certification in all developing and transitional countries equally, is increase social security as well as health and safety conditions of forest workers, as seen in majority of the 16 country studies in above mentioned sources. Presence of health and safety equipment is easy to verify during certification and respective requirements in the standard are clearly expressed. For example significant improvement in all following areas have been described in a single country study as a direct result of FSC certification: signing labor contracts with forest workers giving them higher payment and other social benefits with virtually no contracts signed as compared to earlier situation; drastic improvement of logging camp conditions; introduction of life insurance for forest workers; introduction of first aid kits from virtually no first aid available during pre-certification times; major improvements in availability and usage of elementary safety equipments such as hardhats, safety clothes and boots etc. (Carrera et al. forthcoming 2005). Similar improvements were noticed in many other case studies. Also in countries, where forest management was on relatively high level already before certification, improvement of social conditions has also been one of the most important results of certification apart from improved communication and change in attitude (Actinš and Schwartz forthcoming 2005).

The extent of forest certification's positive impact for indigenous people has been questioned due to geographical division and ownership of certified areas. According to Laschefski and Freris (2001) 96 percent of certified forest area is owned by industrial or governmental forest owners and only about three percent of the certified area accounts for communal groups and non-industrial users. This can be explained by the previously mentioned hypothesis that high-end forestry operations with more financial capabilities are more likely to choose certification unless certification is financed by donor aid.

Although existing overviews clearly suggest that certification has improved working conditions, safety standards and increased stakeholder involvement and communications, empirical case study research is still scarce and case studies with solid methodology are still needed to explore the social impacts further.

2 Forests and forest certification in Estonia

Estonia is a small country with the total area of little over 4.5 mil. ha and a population of 1.4 mil. people (SOE 2004). Roughly half of the country is covered with forests, almost half of which are owned by state (see Table 7). Management of state-owned forest is conducted by state-owned profit-earning company State Forest Management Center (RMK). RMK is the case study subject of present study and holds a valid FSC forest management certificate, covering all of the forests managed by state. Total area included under the certificate is 1,063 mil. ha (FSC 2005). Post-Soviet land and forest policy reforms have played important role in shaping Estonian forestry and creating the gap between management practices of state forests and private forests. Understanding of some key features of the policy process and emergence of forest certification initiative in Estonia sheds light on why certification has influenced forest management the way it has been described in present study results. This chapter describes the background factors and development of forestry sector into certification of state forests.

Table 7. Division of Estonian forest area by ownership

	Total forest area	Commercial forest	Forests with additional 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 also the owner of such areas.

Sources: EFSC 2003, Land Board 2004

2.1 Political framework

According to the claims of local NGO-s as well as large part of society, the Estonian forest policy has been unsuccessful in reforming the forestry sector efficiently and the policy approaches used have resulted in unsustainable and often illegal logging of large share of Estonian forests (EGM 2003; Ahas 2003). Since Estonia regained independence in 1991,

neo-liberal, right-wing parties involved in development of forest policy reforms, have advocated for liberal forest regulations that would support economic growth during hard times in rural areas. This political stance has led to a loss of regulations and generated major forestry problems, such as unplanned forest management, extensive spread of illegal forestry, and unsustainable over-logging (Ahas 2003). The legislation established during post-Soviet era has unfortunately paid little attention to environmental and natural resource issues also according to claims of social and environmental scientists (Tallinn Pedagogical University 2003). Neither of the political parties who have been most active in the Ministry of Environment (responsible for development of the forestry sector), have provided the kind of public leadership that would most effectively care for the forest and environment (Kultuur ja Elu 2004).

A number of changes occurred in the forestry sector after Estonia regained independence in 1991. During the same year a programme of land and property restitution began. The Land Reform Act (1991) determined that all previous owners during the former Estonian Republic (1918-1940) and their offsprings would get their property back, which was forcefully taken away from them during Soviet time. This included also land property and thus forest areas. By 2004, 36% of forest land was privatized, 38% was state owned and 26% had still unclear ownership (see Table 7). The last category of forests became known as “nobody’s forests”; in reality nobody has made restitution claims for these lands or the legal ownership is under discussion. These forests are often on poorer land or in regions where many people were deported to Siberia and died. Lands with no owners are still main playgrounds for illegal forestry. A majority of forest thefts are committed on these lands, and a lot of tax frauds and money-laundering schemes begin and end there (Ahas 2003).

Most of the people to whom forest lands were returned lived in urban setting or had left the region. They had no connection with the forest and lacked the skills and willingness to manage it. Others did live near their historical farmlands, but with no markets for agricultural products the early nineties were a time of social chaos in rural areas. Both the urban and rural groups of people began felling timber to survive and ever since the volume of felled timber and people’s needs have kept growing. Only about a quarter of forest owners tried to preserve their forest and make long-term management plans (Ahas 2003).

Another problem brought along with unconditional land reform besides ignorance of forest owners is the extreme fragmentation of forest ownership (see Figure 1). Forests smaller than 10 ha compose 43% of the private forest area and 80% of the properties registered by the Land Board (Yearbook 2001). The fact that average forest size is very small makes relative certification cost (price per hectare) high for private forest owners (Feilberg 2004). Furthermore, continuous forest management is not possible or feasible on such small areas. These are most probably also some of the main reasons why forest certification has not been achieved among most private forest owners (Feilberg 2004).

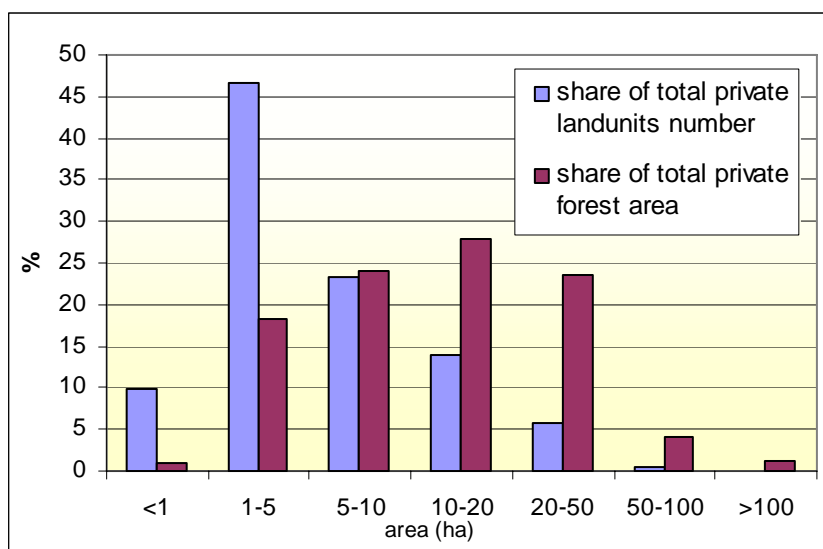


Figure 1. Division of private forest land according to area
Source: Yearbook 2001

Almost concurrently with the land reform, a forest policy reform was initiated which resulted in chaos and period of uncontrolled forestry (Ahas et al. 2002). The establishment and rapid increase of private forest property in nineties brought along the swift growth of the timber industry. At the same time the Soviet structure for forestry administration was no longer functional and the government and state forestry department could no longer control forestry effectively (Ahas 2003). As a result the harvesting rates, illegal logging, and timber-related tax fraud increased uncontrollably during the mid nineties (Figure 2) (Hain 2003). The need for fundamental changes in forestry administration and policy became ever more apparent with growing number of claims of bad forestry and decrease of the international reputation of Estonian forest management. To solve these problems, the Ministry of Environment, with support from the Finnish government, launched a Forestry

Development Programme (FDP) in 1995. This effort later resulted in the parliamentary approval of the Estonian National Forest Policy on June 11, 1997 (FDP 1997; Kallas 2002). The FDP recognizes the importance of sustainable forest management and also sets development of forest certification as one of Estonia's goals. This was one of the three initial factors that helped FSC-based certification to emerge in Estonia (see section 2.2 for more details) (Tonisson 2000).

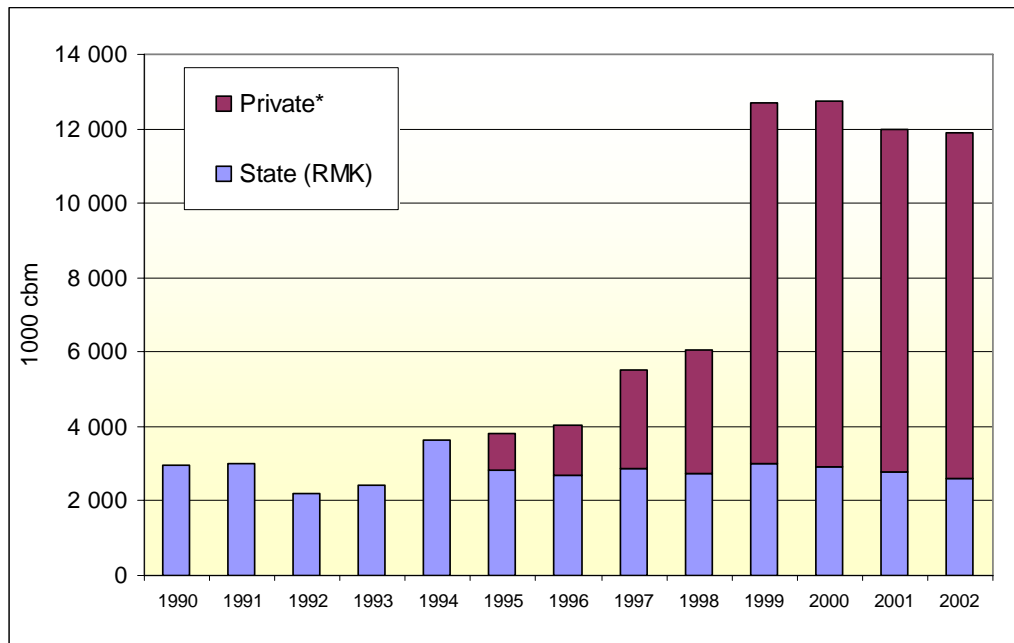


Figure 2. Annual felling volumes in Estonia during 1990-2002

*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

Ahas (2003) has identified the following shortcomings in conduction of the forest policy and land reform:

- Restitution and privatization started without analysis of public interests and needs.
- Land reform did not put preconditions on owners and this left forests and society unprotected.
- New owners were not made to follow forest management plans.
- Forest legislation reforms were carried out at the same time as land reform, resulting in chaos.
- Consultants from Finnish Development Aid did not act in the Estonian public interest.

- Politicians chose ultra-liberal forestry reforms, making the forest management system voluntary and non-transparent.
- Non-transparent forestry created a feeling of impunity by forest owners. Officials lacked key information. This led to illegal forestry.
- Most of the control institutions were destroyed during reforms.

Approval of the Forest Policy led to the 1998 Forest Act, which fundamentally restructured public forestry administration (Kallas 2002) and ultimately also enabled forest certification to become a reality in Estonia. On one hand the era of totally uncontrolled forestry began with endorsement of new Forest Act in 1998 (EGM 2004). Forest management plans and logging licenses were no longer required, leading to further dramatic increase in felling volumes. Many sources indicate that since late nineties, forest logging has exceeded annual growth (Ahas 1999; Ahas 2003; Ahas and Hain 2003). On the other hand based on the prescription in the Forest Act, the State Forest Management Center (RMK) was established in 1999 who is presently the holder of the FSC forest management certificate of Estonian state forests. Both policy documents clearly state that the normative functions of state forests should be separated from their practical management (FDP 1997; Forest Act 1998), resulting in the establishment of RMK. RMK was the first (and so far only) government-owned profit-making institution in Estonia. Thus RMK took on practical forest management and profit-making, while the forestry department within the Ministry of Environment retained control over policy-making, supervision, and law enforcement. Since 2000 the Ministry of Environment's forestry department has had a limited structure (with less than 10 employees) and limited power. Its support for forest certification had more direct and indirect impact during the period of 1998-2000, when intensive changes in the political and institutional forestry context were led by the ministry of Environment and support for achieving forest certification was directly written into the Forest Development Plan.

Considering the criticism towards private forest management in Estonia and the fact that RMK is holder of two most recognized environmental certificates (FSC and ISO 14001, it is fair to state that a great gap between management of private and state forests exists in Estonia. Unfortunately this difference has not always been clearly stated in the criticism of stakeholders expressing their general concerned about over logging and forest destruction

in Estonia. Due to this the international reputation of Estonian forestry practices has decreased and attracted lot of negative attention from international NGO-s as well as officials of EU and other international alliances. Perhaps the need to redeem the good reputation of Estonian state forest management and prove it's compliance to the high level of international requirements was the most important impetus for certification of RMK.

2.2 Emergence of FSC certification in Estonia

Analyses of existing materials and expert interviews indicate that the emergence and development of forest certification in Estonia were supported by following key actors and events:

- active support of international environmental NGOs and their partners in Estonia for the initiative and process of certification;
- desire for application of alternative policy instruments by the creators of national forest policy (Tonisson 2000);
- dissatisfaction amongst national environmental NGOs about prevailing liberal forest policy, and their consequent search for non-state market mechanisms;
- ongoing certification discussions in neighboring countries (Oja 2001);
- at a lesser extent emerging markets and demands for FSC products.

The idea for forest certification emerged in 1995 as the Estonian Green Movement–FoE (ERL) began studying and promoting FSC certification (Oja 2002). NGOs first began meetings to discuss certification issues in 1996 and 1997. ERL cooperated closely with the Taiga Rescue Network (TRN), which had been active in FSC certification issues when TRN's coordinator Karin Lindahl was on the FSC Board. From 1997 on, another major environmental NGO, the Estonian Fund for Nature (ELF) became involved as well, as did other NGOs. In 1998, ERL became the first Estonian member of FSC International, widening its contacts and credibility. Several years later ELF and Ahto Oja, as an individual member, also joined FSC.

One of the indirect causes of NGOs' support for the FSC was the Ministry of Environment's stiff, undemocratic approach to forest policy development (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 1996-1997, and made the Ministry of Environment less eager to cooperate with them. Isolation from the Ministry caused NGOs to concentrate on developing independent regulations, including FSC certification. Such case of forest governance privatization where voluntary organizations start gaining policy-making authority due to governmental failures has repeatedly been described as the unique functional mechanism of forest certification also by scientists (Cashore 2002). International donors and environmental NGOs have supported their efforts with both ideas and funds. In fact Estonia's environmental NGOs have been funded primarily by foreign donors throughout the past dozen years. Only in 2004 did the Estonian government approve financing for an NGO-led project promoting FSC certification.

The controversial Estonian Forestry Development Program in 1997 did not bring the hoped solutions to forestry problems and instead caused uncontrolled logging and more instances of illegal forestry and related tax fraud. Due to increasing pressure by stakeholders some officials also started looking for alternatives to the existing policy tools. The Forestry Department at the Ministry of Environment started studying certification issues in 1998. In 1998 and 1999 the State Forestry Department financed studies on certification principles and analyses of the draft Estonian Sustainable Forestry Standard. In the following years both direct and indirect support grew among active officials who were looking for new policies and alternatives to traditional forest policy.

National Working Group on Forest Certification (NWGFC)

NWGFC was formed in November 1998 by thirty interested organizations and individuals whose main goal was to create an Estonian sustainable forestry standard (Tonisson 2000). Forestry background environmentalist Mr. Ahto Oja from the Stockholm Environment Institute Tallinn branch was appointed as coordinator. ENGO-s played the main role in initial gathering of interested parties and information exchange. It was mainly Estonian Green Movement who suggested Mr. Ahto Oja as a coordinator and no objections were raised by any parties. In spring 1999, the working group decided to take FSC principles and criteria as the basis for their work. Many forestry experts took part in these discussions. A representative of the Danish FSC working group, Peter Feilberg, served as a

foreign consultant, assessing the certification standard. In December 1999, the group approved a draft sustainable forestry standard; in the following year it discussed, tested, and modified this draft.

The Estonian NWGFC was originally oriented towards the FSC standard and certification system because of active environmental NGOs and the momentum behind the FSC globally. In 2000, the idea of Pan-European Forest Certification (PEFC) was introduced to NWGFC by some working group members and Finnish consultants. The working group spent much of that year debating the principles and strategies of FSC versus those of PEFC. These discussions remained fairly hypothetical, since no one in the working group had practical experiences with FSC or PEFC. Eventually these discussions led to a split between the members of NWGFC. FSC was supported primarily by NGOs and RMK, and PEFC by industries and forest scientists. Despite of these arguments NWGFC's sustainable forestry standard was approved in December 2000 by 23 organizations and individuals. At this time, it was also decided that the NWGFC standard would remain as a basis, while both FSC and PEFC could be developed further.

Estonian FSC working group

Although NWGFC was established in 1998 primarily to develop FSC system in Estonia, the specialized FSC working group was not launched until October 2000 by 11 organizations and individuals. In September 2001 FSC International presented provisional conditions for accepting the national working group. Because of other sensitive themes in forestry (new regulations, illegal logging) the progress of the FSC working group in 2001-2003 was very slow, and the provisional conditions were not met. Furthermore lack of motivation and lack of strong coordination hindered the activities of the FSC working group and slowed overall progress. In 2004 the activity level of the working group rose and the conditions were met. In May 2004 official confirmation was received from FSC headquarters that the Estonian National Working group had been approved and the contract formulation had been initiated.

As of May 2004 the FSC working group has 17 members in 3 chambers. In its discussions a typical FSC system of environmental, economic and social chamber is used. For voting a share of votes between chambers is monitored; however as mentioned, the voting has only

been used in rare cases when consensus has not been achieved. Voting by chambers has been used in cases of elections, approval of reports and a few organizational issues.

Standards

In the first stage of the certification discussions the FSC principles and criteria were taken as basis for Estonian national working group on forest certification (NWGFC) standard (Oja 2001). NWGFC developed the standard over several years with very intensive discussions. Main discussion themes were: the requirements for forest management plan, the concept of spring truce, forest amelioration, introduced exotic species, fertilizers and pesticides/herbicides (Oja 2002; Tonisson 2000). Question of non-clear-cut forestry was raised by some environmental NGOs; however, the discussions were not successful because even “green foresters” did not want to discuss it. Due to traditions in forestry teaching, Estonian forestry school is still very much in support of clear-cut management and does not see possibilities for alternative logging techniques.

Once the NWGFC standard was approved in December 2000, the FSC working group started to develop its own standard, while the PEFC working group was not active for several years. Recent work with national FSC standard has been much easier because very intensive and principal discussions were already held in the NWGFC working group. Discussions were also milder because part of main opposition did not join the FSC working group. Although as of November 2004 the national draft FSC standard is about to be sent to FSC for endorsement, it still needs final polishing which is ongoing during working group meetings and discussions.

For the first FSC forest management certification in Estonia (certification of private forest owner Lembit Laks), SmartWood’s general guidelines were used initially. The standard used for evaluation during certification of RMK is discussed in section 2.3. Since the national FSC standard has not yet received final endorsement from FSC headquarters, SmartWood’s Interim Forest Management Standards for the Baltic Region is used for FSC FM certification in Estonia presently.

Forestry problems

The national working group on forest certification (NWGFC) as well as FSC working group have been attempting to address the key problems of forestry in Estonia. Most problems have been caused by neo-liberal forest policy, discussed earlier in this chapter and by the period of post-Soviet transition. Political, legal and economic reforms, as well as ownership and land reform issues that began once Estonia regained its independence in 1991, have directly influenced the state of forests. Certification has been seen as a solution mostly by ENGO-s and by those managing their forests in sustainable manner. Environmental NGOs also wanted to ensure better oversight and transparency in the forestry sector. For producers, the need to acquire chain of custody certification has been driven primarily by specific requirements of foreign clients for the purchase of certified products (Tonisson 2004). Thus for CoC customers certification has been merely a means for securing continuous export of certain products to European markets with high environmental consumer awareness (UK and other Western-European countries).

Much attention was put to the requirements of the forest management plan in the certification standard. Such an approach was in line with the need to replace too soft state legislation and to fight illegal forestry. At the same time attempt was made to increase the importance of nature conservation in forest management plans and to stop extensive amelioration works in the forests (Oja 2001). Special attention was given also to spring truce concept. The idea of this is seasonal harmonization of forest management. Such an approach was orchestrated by environmental NGOs and lead largely by the Estonian Ornithological Society. The aim of the restriction was to protect forest fauna during nesting period and soils in the fragile spring season (Hain 2002; RMK 2003). Spring truce is a strategy that emerged as a counterbalance to industrial (Scandinavian) forestry. In traditional and farming societies nobody has the time or need to log forest during spring, as the soil is fragile, wood is soft and it is time for agricultural work. Environmental NGOs proposed making a break in forest management works for the period of April to July. This proposal which was met with strong resistance among forest companies, was the primary topic of discussion within the NWGFC for many months. The spring truce concept was successfully applied by RMK during FSC certification (Lillemets 2004). The first draft of the springtime felling strategy was prepared by RMK in November 2001, barely a month before the FSC certification audit was conducted. The main aim of the strategy was to

almost halt felling activities in state forests during the sensitive spring season. A revised strategy was prepared in February 2002 and discussed publicly with stakeholders (Hain 2002). A test implementation of the strategy took place in the same year, and in 2003 the strategy was officially implemented for the first time. Although by 2004 the practice had been accepted among state forest institutions and most stakeholders, it still creates negative feedback from timber industries (EMTL 2003). Estonian ENGO-s supported the application of the spring truce strategy in RMK by sending out several press releases and by nominating RMK as a holder of the most environmental-friendly activity in 2003 (EKO 2004).

Another topic that caused active discussions in the NWGFC working group was the drainage of forests. During Soviet time an extensive drainage network has been established in the forest, and almost all humid or wet forest areas have been affected by drainage. To preserve the ecologically valuable wetlands and wet forest site types, environmentalists had the viewpoint that too much drainage have already been done in Estonian forests, and that no drainage systems should be allowed to be established in certified forests. Many older foresters, who had been involved in the work of drainage system development during Soviet time could not adapt to this approach and disagreed, claiming drainage as an essential part of forest management activities (Oja 2001). In years of Soviet control the amelioration was a nation-wide political priority, and since those times lots of specialists are involved in amelioration (Schults 2004). Many experts say that in Estonia forest drainage is hardly economic, because of the country's low relief, the long growing cycle of trees, and the active population of beavers damming and choking drainage systems and can only be carried out if subsidized (Marvet 2004). Ecologists and environmentalist argue that amelioration is affecting our forest ecology and biodiversity and is bad for ecosystems in natural water bodies (Kuuba 2004; Laanetu 2004).

The main and most extensive problem of Estonian forestry - illegal logging and illegal forestry (Ahas and Hain 2003; Ahas et al. 2002) - has remained largely unsolved with certification. Illegal activities are mainly taking place in private forests (Hain 2003), where certification has not been successful. According to interviews with private forest owners, the implementation of certification would require too many changes and would place large restrictions on the existing liberty of forest management decisions (ELF 2002). For

example, the existence of management plans and the payment of taxes is an elementary prerequisite for forest certification, while in private forests illegal activities and tax deception are widespread and management plans are used only in very rare cases (Hain 2003). Illegal forestry (except small-scale forest theft and theft of assortments from intermediate storage areas) is not considered a problem in the FSC certified state forest, since the organization has control over resources and certification has made the forest management practices and decisions transparent.

2.3 Certification process in Estonian State Forest Management Center

State Forest Management Center (RMK) was officially established on 1 of January 1999 as a result of the Forest Act endorsed in 1998, which determined the need to separate practical forest management from regulative and endorsement functions. Before that the state forests were managed by regional forest enterprises. Since forest destruction in private forests was expanding and wide criticism about Estonian forestry in general was spreading among domestic as well as international community, the new organization was facing the challenge of restoring good reputation of state forest management. The best way to do that was independent verification from internationally recognized experts and certification was the obvious mechanism to use (RMK 2002).

The pursuit of independent approval of high environmental standards in RMK was initiated almost instantly after the organization was formally established. According to the environmental policy developed in 1999, one of the main goals during the period of 1999-2000 was development and implementation of environmental management system (EMS) according to the ISO 14001 principles. According to the environmental manager of RMK year 1999 was the year of planning, establishment and prevention of possible mistakes of EMS (RMK 2001). The idea to pursue also FSC certification emerged during late 1999 and 2000 as a combination of several factors. RMK-s participation in the NWGFC and contribution to the Estonian Sustainable Forestry Standard was undoubtedly one of the main factors that draw RMK's attention to the possibility of gaining international approval of the good forest management in RMK-s forests. Secondly local ENGO-s, particularly Estonian Fund for Nature and Estonian Green Movement, were suggesting RMK to have

their management certified according to the FSC standard. The director general of RMK, at that time Andres Onemar, and the whole board, were supportive towards the idea of joint FSC - ISO 14001 certification, since it was perceived by RMK that FSC certificate will grant additional recognition of the good level of forest management of Estonian State forests to publicity, all trade partners and other forest managers in neighboring countries (Lillemets 2004).

By 2001 RMK had reached the point where their environmental management system was ready for independent verification according to the ISO 14 001 requirements. When a joint proposal was received from BVQI and SmartWood early 2001 it was unanimously decided to go for both certificates (Lillemets 2004). In April 2001 the certification contract was signed with Bureau Veritas Quality International for ISO 14001 certification and with NEPCon for FSC certification (RMK 2002). Pre-assessment was done in June 2001 and final assessment in December 2001. FSC certification audit was carried out by NEPCon, who is the regional representative of the FSC accredited certification body SmartWood in Eastern Europe, Russia and Scandinavia. Table 8 gives an overview of the events directly related to certification.

Table 8. Key events of FSC and ISO 14001 certification in RMK

Time	Event
December 2000	After two years of intensive discussions and RMK-s participation in the working group, the National Sustainable Forestry Standard is agreed upon and signed.
2001	Joint certification proposal from BVQI and NEPCon is received by RMK
April 2001	RMK signs certification contracts with BVQI and NEPCon
June 2001	Integrated pre-assessment of ISO 14001 and FSC FM certification is carried out jointly by BVQI and NEPCon in RMK
December 2001	Integrated main certification assessment of ISO 14001 and FSC FM certification is carried out jointly by BVQI and NEPCon in RMK
31 January 2002	ISO 14001 certificate is issued to RMK
1 February 2002	FSC sustainable forestry management certificate is issued to RMK
March 2002	FSC and ISO 14001 certificates are handed over to RMK on a special ceremony.

FSC standards used for certification

The FSC evaluation criteria of RMK have changed since RMK was certified and the following section provides a short overview of this process. Before RMK's certification NEPCon, the organization that carried out FSC certification in RMK, was using SmartWood general guidelines for FSC evaluations in Eastern-Europe, which were based on FSC P&C and developed by SmartWood headquarters in USA. During negotiations with RMK, it emerged, that it was the desire of RMK to base the certification on Estonian National Sustainable Forestry standard (ESMS). Since ESMS was not approved by FSC, it was not possible to use this as is for FSC certification. Instead NEPCon was required by SW to review the standard according to FSC general principles and criteria and SmartWood general criteria to produce a standard consistent with FSC rules. As a result a new standard was produced by NEPCon which was formulated based on the ESMS with few modifications and additional points to make the standard more easily auditable (Feilberg 2004). This modified version of ESMS was used during initial assessment and regular audits until late 2003. During the FSC surveillance audit in August 2003 a representative from FSC accreditation business unit (ABU) participated on the audit to evaluate the quality of SmartWood certification system and work of auditors. As a result of this SmartWood was ordered not to use the modified version of ESMS for FSC certification since some principles and criteria were different from FSC P&C. As a result the SmartWood Interim Forest Management Standard for the Baltic Region has been used for forest management certification in Estonia and other Baltic countries (Feilberg 2004). The first audit in RMK according to the new standard was conducted in February 2004. It should be noted that since SmartWood generic guidelines were partly used to compile both of the standards, the standards are not substantially different in their performance requirements. The comparative study of the standards undertaken by NEPCon early 2004 concluded that the Baltic Interim standard is not stricter in any significant way than the modification of ESMS, although it lacks some detail as compared to the modified version of ESMS regarding forest regeneration and forest management plan (Tõnisson 2004). In any way none of the standards are inferior to FSC general P&C.

Finally the fact that certification assessment in RMK was carried out jointly by two certification bodies and evaluation was given against two set of environmental criteria with certain extent of integration between ISO and FSC teams, deserves a special attention for

several reasons. According to authors knowledge it is the first case globally where evaluation of FSC and ISO 14001 compliance has been conducted simultaneously in the same candidate operation. During the certification assessment the teams met regularly to exchange information that could be relevant for evaluating compliance. Furthermore division of tasks was agreed upon to a certain degree and some findings for both systems were collected by other team (Feilberg 2004).

From candidates perspective there were many advantages that integration of the evaluation brought along. In addition to the pragmatical fact that time and resources were spared due to hosting one integrated assessment instead of two separate ones, real benefits have been perceived by RMK own workers in terms of evaluation results as well as RMK-s preparation for the assessment (RMK 2002; RMK 2003). While FSC is focused on practical management of forests, ISO 14001 complements it by helping to administer the whole organization efficiently (RMK 2002). It has been mainly due to the development of EMS that procedures for guiding activities and clear administrative structure has been developed, while FSC certification has been the main external tool to check implementation of many of these procedures on the ground. Thus in a way the integrated preparation for certification naturally led to integrated certification, which in turn has resulted in integrated and holistic assessment results, providing RMK with suggestions to improve the whole organization from executive work in head office down to everyday management of forests in the local districts.

Due to this integration the surveillance audits in RMK are carried out twice a year after every six months, instead of annual evaluation as used in FSC certification system worldwide. This is the case because of ISO requirements which determine that an operation with the size of RMK needs to be visited after every six months. To maintain the cooperation between evaluation teams and provide convenient service for RMK, a decision was made from NEPCon's side to comply with the bi-annual frequency of audits. Thus the FSC audits have been done together with ISO team throughout the whole time while RMK has been certified.

3 Methodology

3.1 General approach

Since the research aim is to evaluate actual impacts of certification, both external and internal evaluation was used. On one hand organization staff experiences changes most directly and has lots of useful background information for accurate evaluation. Furthermore there is a serious gap in the research on certification impacts as perceived by the certificate owner himself. On the other hand it is known that external parties can observe aspects which are difficult to notice from within the organization. Combination of both methods and comparison of results should thus provide most accurate results. Certainly a risk of intentional over-evaluation by RMK staff is present as described in 3.5 however all effort was made by author to favor sincere results as perceived by respondents.

For internal evaluation a thorough questionnaire with multiple choice answers was used and RMK staff was asked to fill in the questionnaire in the internet. To learn opinion of external stakeholders, several interviews were conducted with stakeholders of various nature. Some RMK employees were interviewed as well to gain background information mainly for sections 2.2 and 2.3 in particular of present paper. The certification process in RMK and reasons for choosing FSC certification were discussed with RMK staff during interviews. Exact methods for both research options applied are described in section 3.2 below.

Additionally to the questionnaire and interviews, an empirical study on RMK harvesting sites was conducted. Selected indicators were measured on 30 clearcut sites harvested in 1999 (before certification) and on 30 clearcut sites harvested in 2004 (three years after certification). Since the indicators measured were based on FSC requirements, differences between 1999 and 2004 sites are considered to be mainly a result of FSC certification. The field study provides totally objective and quantitative results and is first empirical study on

impact of forest certification according to author's knowledge. It should be noted however that the indicators cover only a small part of the scope of FSC standard (see section 3.5).

As described above a combination of three methods was used for evaluation of certification impacts. In all cases the evaluation was based on underlying pool of evaluation criteria. The questionnaire included every criterion, while for interviews and field study suitable criteria were selected. Furthermore for field study measurable indicators were developed based on the selected evaluation criteria. Figure 3 below illustrates the overall approach applied.

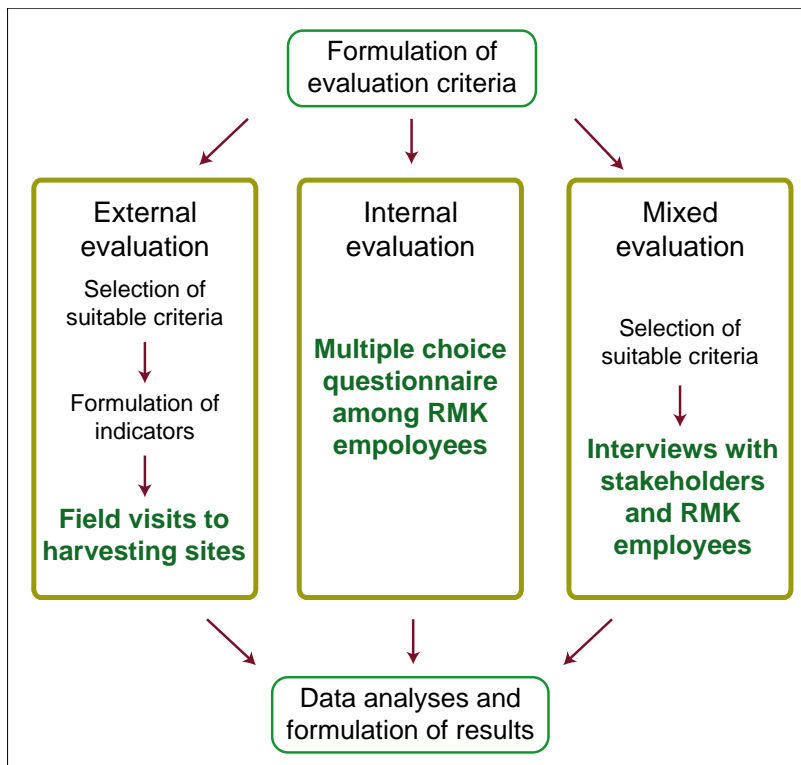


Figure 3. Overview of the methodological sequence used.

Selection of initial evaluation criteria was undertaken mainly to identify areas directly related to certification, thus initial criteria became main tool for segregation of certification impacts from other trends. Unanimous evaluation criteria also provided a common base for impact evaluation and aided in developing further indicators for field study. To ensure direct relation with FSC requirements, the criteria was developed mainly based on SmartWood Interim Forest Management Standards for the Baltic Region (herein as SW standard) (SmartWood 2004). This standard is also used for evaluation of RMK-s

performance during audits. The public summaries of RMK certification assessment and audit reports were used as additional guidance during formulation of evaluation criteria. Some of the criteria in SW standard for which the certifiers reports indicated highest level of compliance already before certification, were omitted to decrease the length and complexity of the evaluation criteria.

One may ask why not the SW standard itself was used for evaluation. This is indeed the original and actual criteria that certification is based upon. As a response, the following considerations led to development of adjusted evaluation criteria:

- SW standard is a complex document and there is high probability that some practical forest managers would misinterpret the actual meaning of some criteria;
- SW standard, similarly to the FSC general standard, includes many criteria which are directly or partly overlapping and thus add unnecessary length;
- Based on audit reports it is clear that some criteria was already perfectly met before certification thus the author did not consider it relevant to add these criteria in the evaluation;
- It is likely that using the exact structure of standard in the questionnaire would have increased the subjectivity of those respondents strongly disagreeing with the standard philosophy.

All results were recorded digitally (except some interviews). SPSS (ver 13.0) and MS Excel (ver 2003) were used to analyze and visualize results. More detailed explanation of each method used and respective analyses conducted is given in following sections 5.1.3.2 and 5.1.3.4.

3.2 Interview methods

The interviews were based on open ended questions which were pre-formulated based on main evaluation criteria. The purpose of the questions was mainly to guide respondents attention towards areas that certification could possibly have influenced. Respondents were also asked to express their opinion regarding any other aspects not included in the questions. Hence the scope of interviews was not limited as far as respondents considered the topics relevant in the area of certification impacts. Initially the interview questions

were formulated in written and sent to 28 individuals, representing different stakeholders in January 2004. The respondents were subjectively selected based upon author's evaluation of who has most information about practical implementations and impacts of certification. 11 completed questionnaires were received back by February 2004. Interview form is given in Appendix I.

Since the response level was considered too low for representative opinion and important stakeholder opinions were missing, additional interviews during personal meetings or by phone were carried out in February and March 2004. Following 11 people were additionally interviewed to fill in main gaps: Jaanus Aun, board member of the Private Forest Centre; Peter Feilberg, CEO of NEPCon Estonia; Kristjan Tõnisson, managing director of NEPCon Estonia; Rainer Kuuba, coordinator of the Estonian FSC working group; Ahto Oja, project coordinator of the Estonian Institute of Sustainable Development (SEIT); Kalle Põld, director of Private Forest Center and representative of the Estonian PEFC working group; Andres Talijärv, managing director of the Estonian Forest Industries Association (EMTL); Toomas Trapido, director of Estonian Fund for Nature; representatives of three timber industry companies.

Since certification background of RMK is also presented in this paper, some RMK management employees were contacted and interviewed as well to collect background information mainly for sections 2.2 and 2.3 in particular, of present paper. The RMK employees interviewed were: Ulvar Kaubi, marketing manager; Tanel Renser, forestry department environmental manager; Olev Lillemets, general environmental and quality manager.

3.3 Questionnaire methods

The questionnaire was aimed exclusively on evaluation of certification impacts as perceived internally by the certified organization. Unlike in other methods, the full scope of evaluation criteria (as described in 3.1 above) was used in the questionnaire. This resulted in a list of 94 different aspects that certification could have potentially influenced. The aspects were grouped into 23 categories, which were then grouped further into six main focus areas. Such classification of the aspects was performed, to enable more

efficient analyze of certification impacts sectorwise. The questionnaire form is presented in Annex III.

The respondents were asked to express their opinion regarding impact of FSC certification for each aspect in the questionnaire. To obtain systematic and comparable results, the answering options were limited to a five point Likert scale indicating perception from strongly positive to strongly negative impact as detailed in Table 9.

Table 9. Questionnaire response options and respective numeric values used for data analysis

Response option*	value in database
has surely improved / increased	2
has rather improved / increased	1
has had no impact	0
has rather worsened / decreased	-1
has surely worsened / decreased	-2

*Whether the word “improved/worsened” or “increased/decreased” was used, depended on the specific group of aspects (see Appendix II for questionnaire form)

To optimize the response process and later data collection the questionnaire was posted on internet where it could be filled in and submitted online. All answers were recorded in SQL database using numeric values as indicated in Table 9. In the SQL database each aspect was given a unique number to the numeric answer values to specific aspect.

To gain accurate results, RMK employees from various units were included in the sample. Table 10 shows the sample size and structure. Respondents included top management from central office, regional managers and foresters, who are conducting daily forest management operations. All inclusive sample was used for chief foresters, head foresters and foresters, while selection of head office workers was based on authors own judgment considering who might have more information about certification impacts due to their work duties. To increase the response level, author requested help from RMK head office staff and thus the request to fill in questionnaire was sent out by RMK forest management director. The questionnaire was open for answers during the period of 29.11.2004 until 17.12.2004. During this period 111 answers were received, out of 425 potential respondents. Although the total response level is quite low, Table 9 reveals that the response was high among most respondent groups except foresters.

Table 10. Questionnaire respondents structure and response level

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

For analysis the results were exported from SQL database to statistical analyses programme SPSS (ver 13.0), where frequencies of different answers were calculated for each aspect. To compare certification impacts on single aspects, the frequency of strongly positive (2) and positive (1) answer for each aspect was added. 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.

To use the positive answer frequency index as described in section above, all answers indicating positive change should have been recorded as positive numbers in the response database. Initially this was not the case since some aspects in the questionnaire were formed so that an answer resulting in -1 or -2 in the responses database would actually mean improvement of forest management quality. An example is following aspect: “usage of fertilizers in the forest”. From sustainable forest management point of view positive responses would be either “has surely decreased” or “has rather decreased”, thus the values -1 and -2 actually mean positive change. To normalize the response data, response values of such aspects were converted using following formula $[A=B^{-1}]$, where A and B are original and converted value respectively. This conversion was applied to 14 aspects out of total 94 (24, 29, 51-53, 67, 69-71, 77, 85-87, 92). This conversion allowed assuming during analyses that positive response values in the new database always indicated positive impacts of forest certification.

The results were analyzed for each aspect and also sectorwise. For sectorwise the average frequency index of positive answers for a group of aspects was calculated. As stated earlier, the aspects in the questionnaire were grouped into six main focus areas and 23 thematic categories. Average frequency index of positive answers for each category and

focus area was compared and categories with highest average frequency index of positive answers identified.

Finally the results were analyzed according to different groups of respondents. Four main respondent groups were distinguished, based on the work location and years of experience:

- employees working in the central head office or regional head office;
- employees working in forest districts;
- employees who have been working in Estonian state forest management system more than 20 years¹;
- employees who have been working in Estonian state forest management system less than 20 years.

The division of respondents into above mentioned groups is given in Table 11.

Table 11. Division of respondents between response groups

Location	Experience
<i>center</i> 12 (10,8%)	<i>exp<20</i> 78 (70,3%)
<i>districts</i> 99 (89,2%)	<i>exp>20</i> 33 (29,7%)
Total 111 (100%)	Total 111 (100%)

3.4 Field study methods

During field study, selected indicators were measured on clearfelling sites harvested in 1999 and 2004, to obtain objective, empirical results on certification impacts. Changes in clearfelling practices as compared to pre-certification time, provides data about impacts of certification on the most operational level.

In the first phase the variables to be measured in the forest had to be selected. To do this, suitable criteria were selected from the initial set of evaluation criteria and subsequently measurable indicators were defined. The following conditions were posted on the field study indicators:

¹ RMK as a formal institution was formed in 1999, however employment in state forest management agency (regardless of the official name or institutional design, was considered important for the purpose of division.

- the indicator should be evaluable on each completed clearfelling site regardless of forest or site type;
- the indicator should be evaluable onsite without additional information such as felling documents, comments of forester etc.

As a result of these conditions only 9 indicators were finally selected for field evaluation, since in many cases performance is dependent on forest type, subject to various special cases or not uniquely usable for some other reason. A field evaluation form including the selected indicators and metadata about visited site was developed and applied in the field. Appendix III shows the field evaluation form used.

The sites to be visited were selected as next step. Since aim of the survey was to compare data from harvesting sites from pre- and post-certification time, felling sites from 1999 and 2004 were selected. For pre-certification time, the year 1999 was selected since in 2000 implementation of FSC requirements was already initiated in RMK and field practices in later years might have already been influenced by FSC requirements. For post-certification period, the most recent year was selected to cover the largest scale of impacts. In 2004 almost three years had passed from the time of certification. It is clear that in forestry context implementation of certification requirements is not happening at once. Incorporation of changes on all structural levels takes time especially in a large state organization, such as RMK. Visiting sites harvested during earlier years after certification would have likely resulted in observation of more modest impacts.

For specific felling sites to be visited, the forest districts were first selected. As mentioned earlier, RMK is divided into 5 administrative regions and 66 forest districts. RMK has strong central office and work in forest districts is conducted according to the guidelines and procedures developed and issued by head office. Based on the assumption that general forestry practices are similar within whole RMK, the author decided to limit selection of forest districts to South-Eastern administrative region for logistical reasons. Three forest districts were randomly selected from South-Eastern region to be visited and total list of finished clearfellings in 1999 and 2004 was obtained from all districts. 10 felling sites were randomly selected from both lists in each district and thus a total selection of 30 felling sites from 1999 and 30 felling sites from 2004 was compiled. For random selection the

RANDBETWEEN function in Microsoft Excel was used. Forest districts that were visited during the field study are shown on Figure 4.

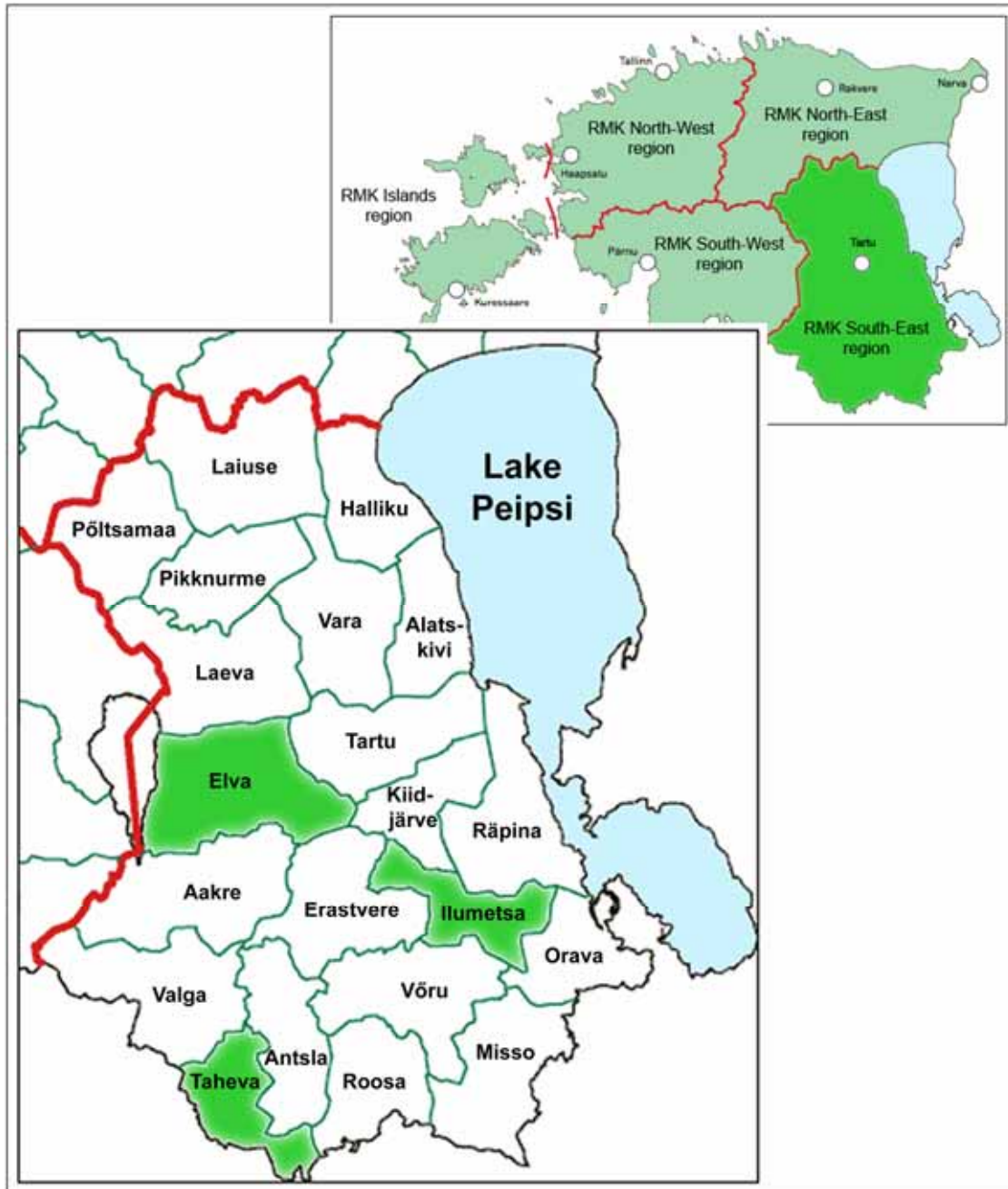


Figure 4. Result of random selection of field survey forest districts in South-East region (selected forest districts shown with green shading)
(original graphics taken from RMK homepage www.rm.ee)

Using the field evaluation form (Appendix III) selected indicators were measured and registered on all 60 clearfelling sites. Field visits were conducted in November 2004, since

this is usually the latest time in Estonia without snow cover. Latter would severely complicate field observations, especially regarding soil damage and lying deadwood. During the field visits following methodology was used for evaluation of indicators:

1. Number of live biodiversity trees was visually counted on the felling site. Only the trees with height of more than 20 meters were counted as biodiversity trees. In case buffer zones or groups of undergrowth were left on the site, those trees were not counted as biodiversity trees.
2. Dead snags (standing dead trees and parts of stem) were counted on the site. Only stems with height of more than two meters and thickness of more than 10 cm-s were counted as snags.
3. Amount of deadwood was measured in total length of trunks and number of trunks. Roundwood lying on the ground and more than 25 cm in diameter was considered as deadwood.
4. Soil damage was measured as length of the machinery trails in cases where the trail was deeper than 25 cm from the normal ground level. If wheels on both sides of machinery had inflicted parallel damage, the length was considered as one. Soil damage within the felling site as well as on the extraction road until the closest intermediate log storage inside the forest was considered.

3.5 Methodical limitations

A complex task such as evaluating wide scope of certification impacts in a large corporate forest management organization inevitably creates methodological problems regardless of the approach chosen. Probably the most significant issue is separation of FSC certification impacts from other factors influencing performance. There are quantities of factors that have influenced RMK forest management. Restructuring of the state forest administrative system, major repetitious changes in state forest policy, ISO 14000 certification, destructive and illegal logging in private forests and introduction of state-wide forest protection area networks are just few samples of such issues. Using another similar test case for comparison, where no FSC certification has occurred, could be applied, however an operation similar enough to fit for comparison was not found by author. The post-Soviet transition period narrows the selection and FSC state forest

certification of both other Baltic states limits options further. Comparison of two similar test cases in Baltic region could be an option for smaller private forest owners though.

Secondly it should be noticed that since the questionnaire was used among RMK own staff, the evaluation is vulnerable to deliberate overestimation of impacts and other intentional misinformation. This risk is however difficult to avoid if an internal evaluation of organization is sought. An effort was made to avoid the probability of such cases by explaining the background and purpose of the study and asking all staff to express solely their own true opinion (see Appendix II).

Finally some field survey indicators could have been misjudged since registration of aspects such as soil damage, mechanical damage to residual trees and traces of garbage are more easily observed on fresh harvesting sites. Also the field survey indicators cover only small part of certification standard. By using additional materials from the forest management operation such as soil and forest maps, harvest inventory lists, internal monitoring forms etc. the scope of indicators could be significantly expanded. Depending on the materials used, this could however introduce subjectivity from organization's side. A more extensive balanced set of indicators could be developed for further similar research.

4 Results

4.1 Opinion of external stakeholders

This section describes the main observations and views of interviewed stakeholders. Since the scope of interviews was not confined to specific aspects, wide variety of ideas emerged. To summarize the main cross-cutting impacts, most prominent observations are shown in Table 12.

Table 12. Main impacts of certification in RMK according to interviewed stakeholders.

<i>Positive observations</i> <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 NGO-s 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
<i>Negative observations</i> <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

4.1.1 General observations and division of power

Increase of general environmental awareness and changes in attitude towards close to nature forest management was overall result observed by respondents. Interviews revealed a general increase in the number of RMK staff interested in certification issues as a result

of continuous auditing and changes implemented in RMK. Results also show that certification has caused changes in the very thinking and attitude of people in RMK and also in Estonian forestry sector in general.

However the understanding of certification and its impacts also differs a lot. As result of questioning and interviews three major groups of stakeholders can be distinguished, having clearly different understanding. The first group consists of environmentalists and people involved in the work of the national sustainable forestry standard. This group values the essence of certification and is assessing its outcome as positive. The second group is made of typical forestry entrepreneurs and many state foresters who have a skeptical attitude towards certification and its effects. Often this group thinks of certification also as of an unnecessary additional obligation which does not result in significant benefits. Such stakeholders claim that certification causes decreased volume of available timber and increases bureaucratic paperwork. A third, rather isolated group is private forest owners, who generally do not have direct link and interest with certification.

A general observation made by most respondents was that FSC certification of all state forests has helped to improve the reputation of RMK among several local and international interest groups. RMK is more than before considered to be a good forest owner and manager. RMK presently also has the general support of environmental NGOs and the reputation of the whole Estonian forest sector has risen. Certification has also made RMK's management more transparent and clear. During certification many management processes were changed and new ones initiated. At the same time, some NGO and company representatives noticed that the information flow from RMK has been formalized now, and only certain staff members have permission to talk with the public or journalists.

According to interviews environmental NGOs have gained more power through certification process as they have gained more opportunities to spread their environmental message and to directly monitor activities in the forestry sector (Trapido 2004). Many ideas of the environmentalists (such as biodiversity trees, protected areas, spring truce, landscape ecology in management plans) have made it into the daily practice of RMK through certification. However, NGOs are still rather weak and have been thus unable to fully utilize their potential during audits at RMK. Another group that has received more

rights and influence through certification are forestry workers and contractors. Still it appears that the trade unions and local organizations have not realized the full range of their possibilities during the certification process.

4.1.2 Social impacts

Certification of RMK has changed training, security and health care of its staff. RMK had to reorganize its measures for labor security and health care and start monitoring their implementation. Quite strict policies were established; as such issues were neglected in Estonia earlier due to prevailing liberalism. Regardless of the activities and measures for protection of workers' health, such expenditures are often still seen by contracting companies as useless and an unnecessary demand.

Many entrepreneurs and forestry officials claim that access to timber resource has been limited because of certification, and that felling volumes are decreasing. They also argue that it increases unemployment in the countryside and people without special training lose the possibility to work for RMK. Forest industries and officials also claim that the spring truce increases unemployment. On the other hand, the share of illegal forestry decreased, as RMK can now cooperate only with legal entities. Less timber from state owned forests can enter illegal market and when more taxes are collected peoples' social security increases.

Only very few respondents did recall positive influence of certification to the local inhabitants and businesses. Local groups and individuals were not active during certification discussions, as they are isolated, and because of everyday work they can not participate in meetings. There are still serious communication problems between national initiatives in Tallinn and local interests. Still surveys of public opinion show that people dealing with tourism and catering of forest berries and mushrooms are worried about decreasing forest coverage. Tourism entrepreneurs do not like big clearcuts 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. In such areas with fertile soils the forest is more valuable and therefore there is a pressure to use it more intensively. Tourism and catering of forest berries and mushrooms are however

one of the very few and seasonally variable sources of income in Estonian poorest remote regions.

4.1.3 Economic impacts

Economic impacts of certification in RMK were one of the most controversial topics. Although respondents generally considered that certification has changed market options for those manufacturing companies whose clients demanded FSC certification, economic impact on RMK activities was almost always unclear. Certification entails additional costs, which were highlighted by all forest officials, owners and producers contacted for the purpose of this study. The exact value of such additional expenses is not known or is proprietary information. Costs are not easy to estimate, as they involve both the direct costs as well as the costs of training, safety, technique and environment. Respondents highlighted increased costs of staff as salaries started to be linked with qualifications.

Skeptical forest managers cannot see any direct benefit of FSC certification, since in Estonian markets only secondary products can be sold for a price premium (interviews) at best. Many entrepreneurs, forest owners and officials claimed that even without certification, the demand for forest products is strong in Estonia and it is easy to sell any forest products. This skeptical group thinks that less timber is allowed to be felled in sustainably managed and certified forests, and that total felling volumes will start to decrease as a result, leading to lower incomes. Such people also claim that once logging decreases in certified forests, this loss will be balanced by higher logging rates in other (private) forests.

4.1.4 Environmental impacts

The most direct benefits of FSC certification have been observed in the field of environment. 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.

Majority of the respondents stressed that the senior management became much more environmentally educated and aware in RMK. Extensive trainings and educational

campaigns were held, and numerous manuals composed. This in turn has changed behavior in everyday forest management and has resulted in more close-to-nature forest management practices (more deadwood, snags etc in the forests).

Logging rules and methods that were virtually absent previously have been renewed and environmental factors are now being more thoroughly considered according to interview results. 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 (Trapido 2004; Feilberg 2004). In addition to strict guidelines, the broader framework for good forest management was worked out and has been followed quite well. RMK started to draft measures for taking the specifics of landscapes into account while managing the forests. However, despite pressure from environmentalists during certification, the share of clearcut-free management in RMK has not risen. Interviews also revealed that Estonian foresters and forestry scientists still often cannot accept non-clearcut forestry as a serious alternative.

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. Earlier only environmental agencies exposed such data and plans.
- Methodology for preservation of biological diversity has been created and is implemented. Conservation of key biotopes, interesting natural sights, dead wood and biodiversity trees is being implemented, although such an approach was strange for older foresters. A problem mentioned by stakeholders was related to dead wood and biodiversity trees because some local residents are collecting firewood from left over material and do not understand why it is not allowed.
- Many discussions have emerged from the implementation of the spring truce concept in RMK. Prior to certification RMK established special strategy for forest management during spring and summer. RMK has voluntarily cancelled most of forest works for the period of April 15 to June 30 to minimize disturbing of

breeding animals and birds. At 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. Thus the spring truce is among the very few examples of activities caused by certification that have broad public support, appearing as headlines in prominent newspapers (Eesti Päevaleht 2004; Schank 2004).

- Certain success has been achieved in stopping establishment of new amelioration networks in forests (Kuuba 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 exotic species. From another perspective, our questioning revealed that some forest officials are dissatisfied with this development, as they are sure that chemicals help to save trees from pests and the planting of exotic species has a long tradition in Estonia.

Among positive impacts, several concerns were also notified. Skeptical forest officials indicated that lots of resistance and misunderstanding is caused by the call to leave dead and biodiversity trees in the forest, as it is seen as a waste of resources as well as esthetically 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. Many people are quite critical of the spring truce. The period is considered to be too long and the entire approach of a ban is thought to be too radical.

Finally a very small group of radical 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. Others argue further that certification of RMK and more strict control over logging activities has lead to over-logging of private forests. In the overall context of responses such opinions were marginal however.

4.2 *RMK internal perception of impacts*

This chapter describes the results of internal evaluation of RMK employees on impacts of certification using multiple choice questionnaire. Since the questionnaire was quite detailed including almost 100 aspects, several types of analyses were applied. Present chapter is divided into three sections: firstly the answers are analyzed between general areas of impact; secondly an analysis of single aspects is provided and finally differences between answers of various respondent groups are described. As indicated in section 3.2, frequency index of positive answers was mainly used as a basis for the analysis. For more detailed information regarding the response values used and conversions applied see section 3.2.

4.2.1 Sectorwise results

To gain general insight to the questionnaire results, the answers are presented according to main response areas in this section. Sectorwise analyze enables to realize general response of RMK staff towards certification and highlight broader areas where certification has had most and least impact. As explained in 3.3 the aspects were grouped in six main areas (Public relations; Employees and work environment; Economic relations; Information and monitoring; Forest management and environment; Documentation) and further divided into 23 subgroups. Aspects included in each group are given in Appendix II.

As indicated on Figure 5, generally higher positive impact has been observed in the areas of employee awareness and work environment as well as regarding information and monitoring. The chart clearly demonstrates less positive impacts regarding documentation system and economic performance of RMK. Impact evaluations vary greatly among sub-categories of environmental considerations during forest management, however exceptionally high improvements have been observed regarding prevention and minimization of environmental risks.

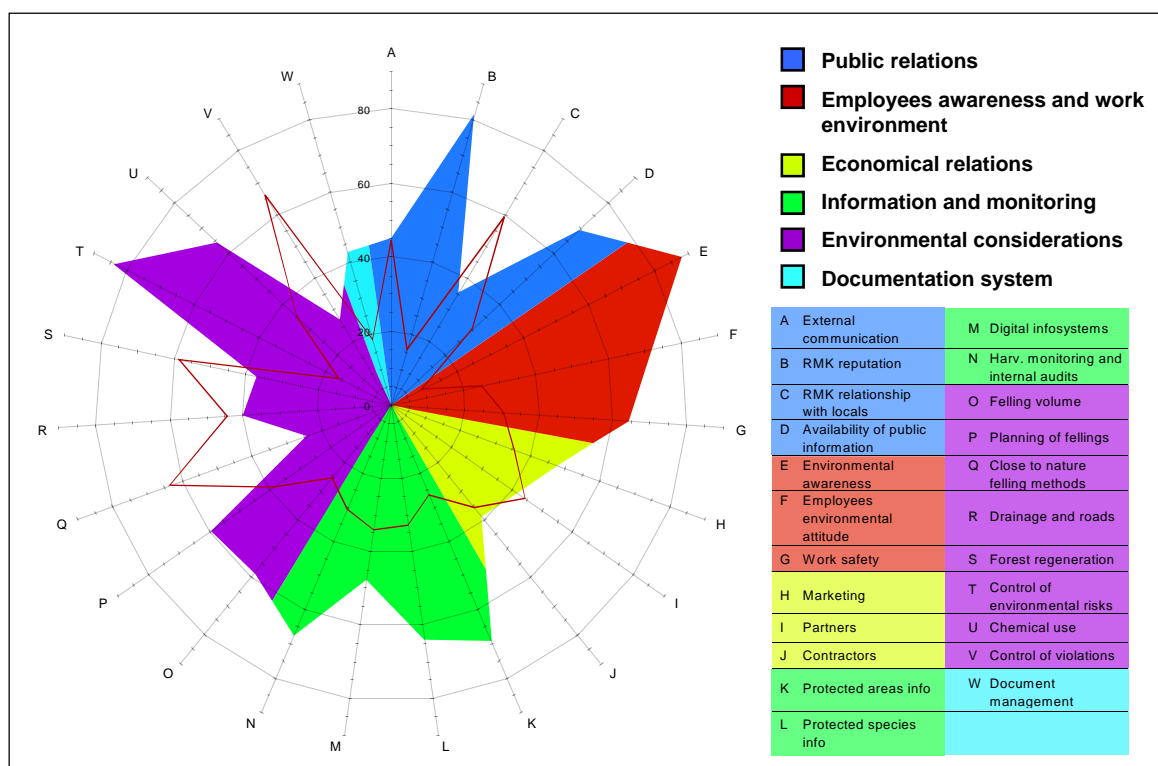


Figure 5. Average percent of positive answers for questionnaire sub-categories (dark red line indicates average percent of answers stating “no impact”)

See Appendix II for details contents and meaning of each sub-category)

Figure 5 also shows percent of neutral answers indicating that certification has had no impact in the relevant area (represented with red line). In sub-category E exceptionally low share of neutral answers combined with very high share of positive answers is seen, which clearly demonstrates significant improvements that certification has introduced in the general environmental awareness of RMK staff and contractors. High share of neutral answers as well as relatively low share of positive answers, especially in sub-category Q, suggests that certification has not increased usage of close to nature felling methods or more nature-friendly forest regeneration methods. According to the figure, certification has also had significant positive impact on RMK public relations with clear exception in the relationship with local population where 60% of the respondents have indicated “no impact”.

4.2.2 Results of single aspects analyses

To reveal the most positive impacts of certification and utilize the full potential of the high detail level of the questionnaire, the results were further analyzed for each single aspect.

As stated earlier, the main criteria for distinguishing most positive impacts was highest frequency index of positive answers. Share of answers indicating no impact as well as combined share of negative impact answers is also given to evaluate reliability of the answers and distinguish areas with least impact or even negative impact respectively.

Table 13 and Table 14 highlight results for most positive and negative aspects respectively. In both tables column B indicates share of neutral answers. Review of the tables shows that high degree of concord exists among respondents regarding positive impacts. At the same time we can see high share of neutral answers regarding negative aspects (except aspect 92). This shows that significant differences in opinion exist regarding possible negative impacts of certification among various respondents. Such differences among response groups are further analyzed in following section.

Table 13. Aspects which received largest percent of positive answers

	Q nr*	Aspect	A*	B*
1	19	Environmental awareness among contractors	95,5	0,0
2	8	RMK reputation on international level	92,8	0,0
3	17	Environmental awareness among RMK employees	92,8	0,0
4	59	Extent of leaving biodiversity trees on felling sites	92,8	0,0
5	80	Presence of equipment for prevention and alleviation of environmental damage in forest machinery	91,0	0,0
6	5	RMK reputation among Estonian environmentalists and ENGO-s	90,1	1,8
7	20	Common understanding among RMK staff regarding significance of biological diversity elements (snags deadwood etc.)	90,1	4,5
8	6	RMK reputation among Estonian media and public community	88,3	1,8
9	27	Presence of safety equipment among contractors	88,3	0,9
10	81	Presence of equipment for prevention and alleviation of environmental damage among RMK forest workers	87,4	0,0
11	82	Presence of equipment for prevention and alleviation of environmental damage among contractors	86,5	0,0
12	28	Presence of safety equipment in forest machinery	85,6	0,9
13	7	RMK reputation among RMK partners	84,7	1,8
14	79	Acknowledgement and assessment of environmental risks prior and during forest operations	84,7	0,0
15	53	(Decreased) felling volume during spring season [†]	82,0	6,3
16	25	Decreased cases when felling worker is working alone in forest	79,3	0,0

17	60	Extent of leaving deadwood	79,3	0,9
18	84	Prevention and minimization of soil damage	79,3	3,6
19	14	Increased quality and amount of information on RMK homepage	78,4	0,0
20	15	Availability of new written informational material regarding RMK activities	78,4	0,0

*Q nr – Number of the aspect in the questionnaire (as shown in Appendix II)

A – Percentage of answers indicating “positive” or “definitely positive” impact for aspect

B - Percentage of answers indicating “negative” or “definitely negative” impact for aspect

† - Aspects for which answer values were multiplied by -1 (see section 3.2 for more explanations)

Table 14. Aspects which received largest percent of negative answers

	Q nr*	Aspect	A*	B*
1	92	(Increased) volume of irrelevant and not necessary documentation [†]	93,7	4,5
2	34	Share of roundwood sold to local people and industry	51,4	43,2
3	38	Number of contractors	47,7	36,9
4	36	Number of partners	27,9	53,2
5	93	General structure and usability of documentation system	57,7	15,3

*Q nr – Number of the aspect in the questionnaire (as shown in Appendix II)

A – Percentage of answers indicating “decreased” or “definitely decreased” impact for aspect

B - Percentage of answers indicating neutral impact (“has had no impact”)

† - Aspects for which answer values were multiplied by -1 (see section 3.2 for more explanations)

As explained earlier, majority of aspects in the questionnaire were selected from the FSC standard used during RMK audits. Considering public opinion of many stakeholders, areas within FSC standard have emerged, which are expected to play significant role in implementation of sustainable forestry in state forest (as in any other FSC certified forests). Environmental stakeholders have 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 is ongoing, and many see much higher potential for non-clearcut forestry in state forests, than today. More strict preference for mixed stands and better utilisation of non timber forest products are some more examples of areas where large possibilities for improvement exist according to environmental stakeholders. Table 15 summarizes some of such aspects of special interest, indicating share of positive and negative as well as neutral answers.

Table 15. Results for various other aspects usually considered important by main stakeholder groups for certification in Estonia

	Q nr*	Aspect	Pos*	Neutr*	Neg*
1	78	Pursuing regeneration with mixed species within single compartment	26,1	67,6	6,3
2	11	Recognition and preservation of popular places for mushroom and berry picking	31,5	66,7	1,8
3	35	Marketing share of non-timber forest products	24,3	64,0	11,7
4	68	Share of selective fellings	27,9	64,0	8,1
5	1	RMK communication with local people	22,5	63,1	14,4
6	55	Development of mixed stands during thinning	36,0	61,3	2,7
7	56	Increasing share of noble hardwoods	31,5	60,4	8,1
8	73	Usage of natural regeneration	40,5	56,8	2,7
9	12	Involvement of locals in RMK activities and increased interest in their opinion	34,2	55,0	10,8
10	67	Share of clearfellings [†]	27,0	55,0	18,0
11	62	Development of uneven aged stands	47,7	51,4	0,9
12	61	Development of stands with multiple canopy layers	48,6	50,5	0,9
13	66	Informing of neighboring landowners about planned fellings	46,8	50,5	2,7
14	34	Share of roundwood sold to local people and industry	5,4	43,2	51,4
15	43	Availability and quality of information regarding protected species locations	61,3	36,0	2,7
16	52	(Decreased) General felling volume in RMK [†]	45,9	35,1	18,9
17	31	RMK total turnover	61,3	29,7	9,0
18	30	Financial profit of RMK	61,3	18,9	19,8

*Q nr – Number of the aspect in the questionnaire (as shown in Appendix II)

Pos. - Percentage of answers indicating “positive/increased” or “definitely positive/increased ” impact for aspect

Neutr. - Percentage of answers indicating “no impact”

Neg. - Percentage of answers indicating “decreased/negative” or “definitely decreased/negative” impact for aspect

[†] - Aspects for which answer values were multiplied by -1 (see section 3.2 for more explanations)

4.2.3 Comparison of response groups

As described in section 3.2, the respondents were divided into groups according to their work location in RMK organizational structure and length of work experience. Analyses according to differences between responses of these groups are given below. A groupwise analysis was mainly conducted to test the following hypothesis:

1. Long-time forestry employees are more skeptical towards certification and thus have not observed as many positive benefits, since the new close to nature approaches are more difficult to approve and adopt for people with practical forestry background from Soviet-time forestry.

2. Management (employees of central office and regional head offices) is more optimistic regarding effects of certification than district staff, who is conducting practical management in forest and is continuously facing new additional requirements and rules from the central office employees.

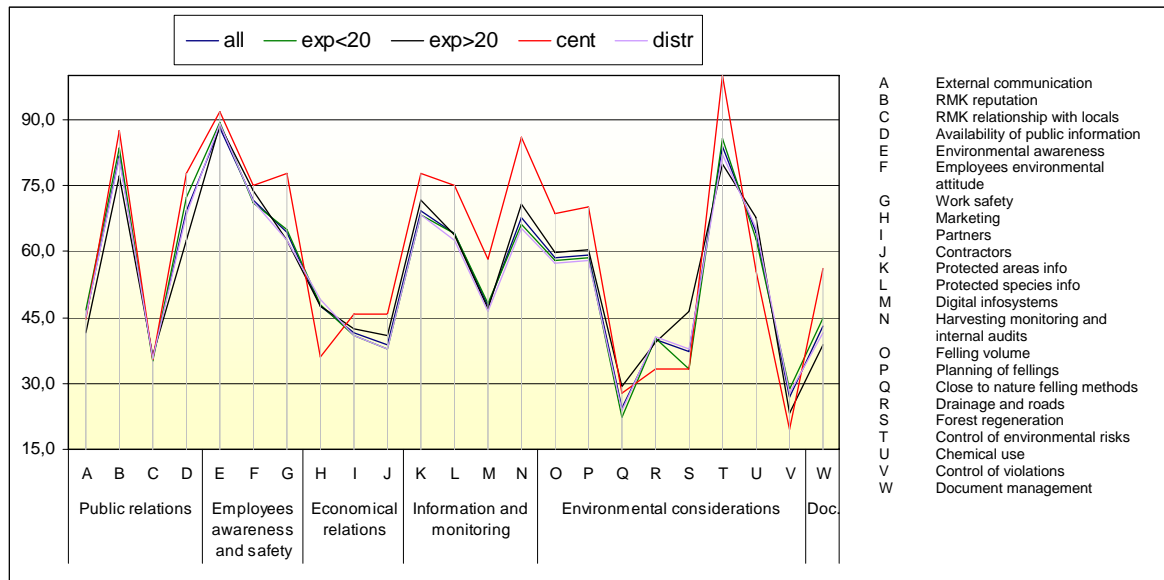


Figure 6. Frequency of positive answers according to respondent groups.

Figure 6 shows share of positive answers among different response groups as a line graph to communicate general relationship trend between responses of different groups. The figure reveals a strong correlation between the opinion of response groups. No strong disagreement in any of the areas can be observed, which is also an indication of reliable results of the questionnaire in general. Based on this general overview no support for the first hypothesis is gained since there are no noticeable differences between employee responses according to their working time in state forest management system. Although all respondent groups strongly follow the same general trend sectorwise, clearly the most distinguishable among others is the trendline of head office and regional office employees (indicated with red line on Figure 6). More positive opinion seems to be expressed by management regarding aspects related to information use and monitoring, work safety and also some environmental considerations.

Figure 7 shows differences among response groups as a column chart, to enables evaluation of absolute differences between groups sectorwise instead of general correlation

(note that the value axis scale has been adjusted to better emphasize differences). Once more there is no reliable discrepancy between groups with different time of work experience. The positive effects of certification in the area of public relations and documentation system are not recognized quite as much as on average by long time employees though. The higher evaluation of positive impacts by management is revealed very clearly though in the areas of employee awareness and safety, information use and monitoring and especially in the area of documentation system.

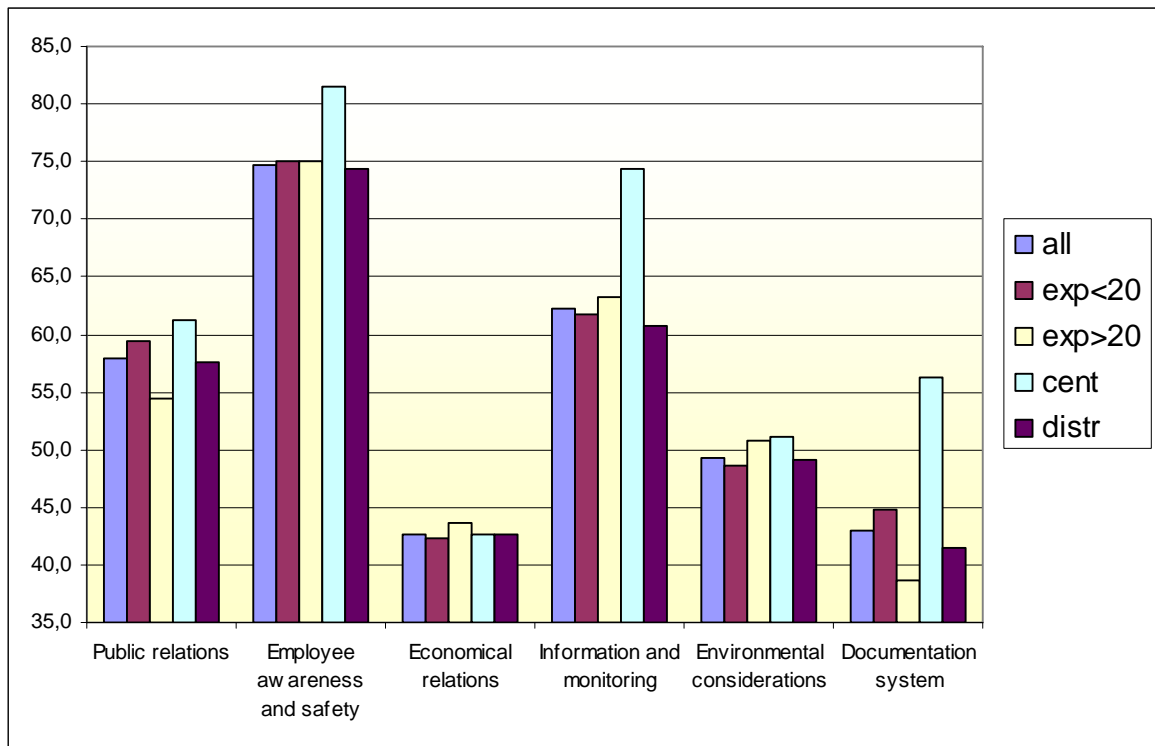


Figure 7. Average frequency of positive responses in each main sector according to response groups

A more detailed level analysis of differences among respondent groups is given on Figure 8, where differences in share of positive responses have been indicated according to sub-categories. The most obvious outcome on almost all graphs is again the generally higher opinion of central office and regional main offices staff regarding positive impacts of certification. The largest difference between central office staff and other respondents is regarding increased work safety. Considering that it is district staff who actually visits ongoing work in forest, the less positive observations of district staff should be considered more accurate. Among other aspects, higher evaluation from central staff can also be

observed regarding monitoring of harvesting activities and control of environmental risks during forest management operations. For the latter all (100%) central staff indicated positive answer for all of the six aspects included in this sub-category, which is quite remarkable.

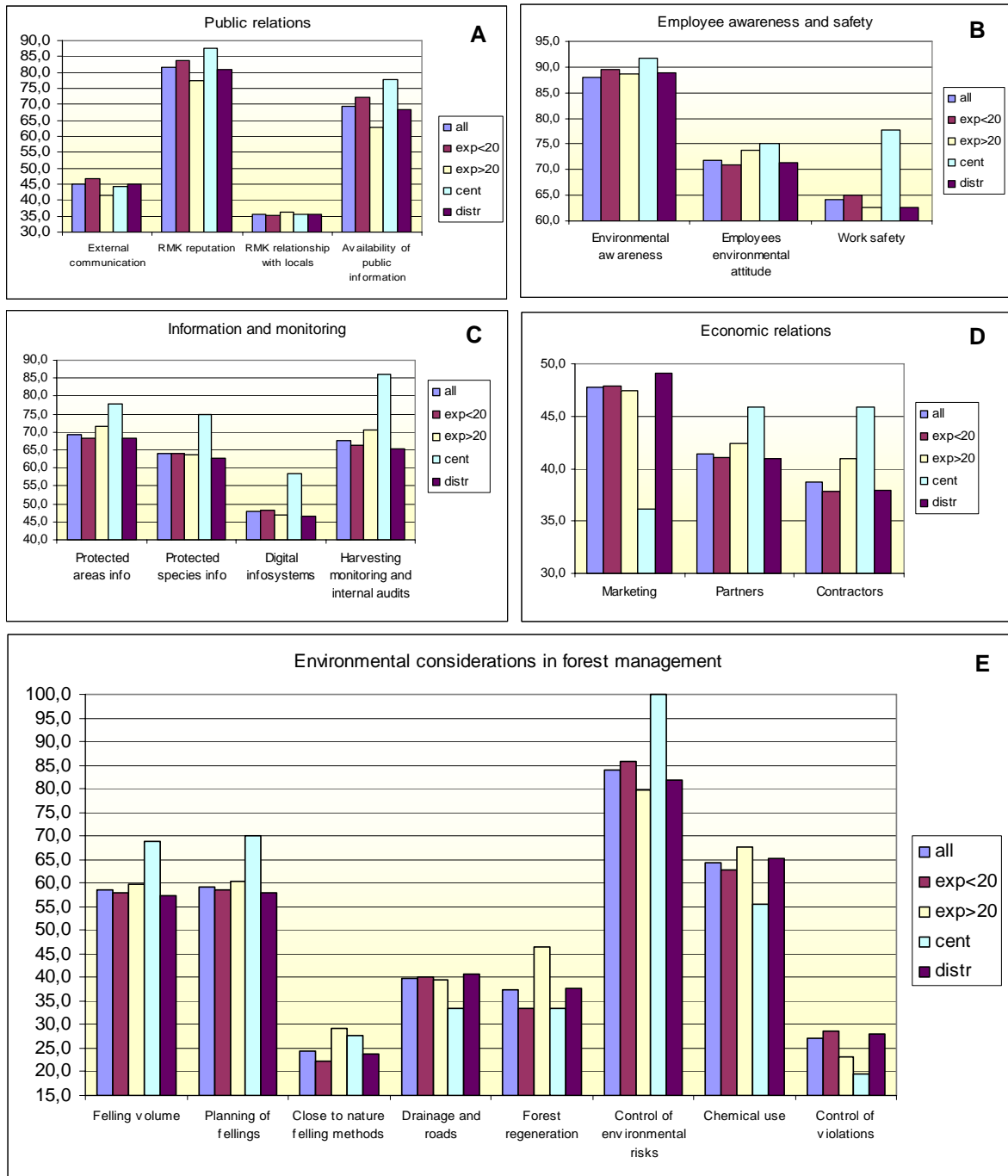


Figure 8. Average frequency of positive responses in selected categories according to response groups

On the opposite side, the exceptionally low opinion of central staff in the area of marketing should be pointed out. The aspects included in marketing sub-category include mostly indicators regarding financial performance of RMK (see Appendix II). While district staff conducts practical everyday forest management activities and is most probably more aware of situation in the forest, it is logical to assume that management is better aware of the financial performance of RMK as an organization in general. Hence it is probable that the slightly negative or at the best neutral impact of certification regarding financial performance is reliable and district staff has overly elevated estimation regarding financial impacts of certification.

Regarding differences between employees with different length of experience, no significant differences can be observed, with two exceptions perhaps. On the environmental considerations graph it is revealed that the opinion of staff with work experience over 20 years is slightly higher regarding utilization of close to nature felling and forest regeneration methods than of their younger colleagues.

Finally, a selection of aspects with most significant differences between response groups is presented in Table 16. Total percent of positive and neutral answers is given in the last columns of the table for additional information. Generally there are no large discrepancies, although the table confirms once more that more significant differences exist between opinion of central office and district staff than between response groups with different work experience. The largest absolute difference can also be noted between central and district staff, regarding informing neighboring landowners about planned fellings. While all central and regional office workers think that this aspect has improved due to certification, more than half of district staff has seen no changes due to certification in this area.

Among other aspects management has observed increased share of noble hardwoods, while district staff is far more skeptical regarding this. Although high share of “no impact” answers (60,4 %) indicates that evaluation of this aspect is not very reliable. Another major finding (also clearly distinguishable on Figure 6 and Figure 8), is that central office is more critical about financial improvements than district staff. This is clearly revealed in aspects 30 and 32. Most of the district staff considers that certification has increased the sales price

of roundwood and also the general financial profit of RMK. At the same time management staff in main offices has mainly observed negative impact regarding general financial profit (50% of management indicated negative or strongly negative impact) and no impact regarding roundwood sales prices (41,7% of management indicated neutral impact).

Table 16. Aspects with largest difference in percent of positive answers between response groups

Q nr.*	Aspect		Pos.*	Neutr.*
	<i>Better opinion among central head office and regional offices staff</i>	A*		
66	Informing of neighboring landowners about planned fellings	59,6	46,8	50,5
56	Share of noble hardwoods	39,4	31,5	60,4
24	Amount and severity of work accidents [†]	35,4	35,1	54,1
29	Cases when felling worker is working alone in forest [†]	35,1	27,0	62,2
39	Share of more environmentally aware and/or legally obedient contractors	33,1	62,2	34,2
	<i>Better opinion among district staff</i>	A*		
72	General quality of forest resources	-32,3	28,8	55,0
30	Financial profit of RMK	-31,3	61,3	18,9
32	Sales price of roundwood	-31,1	69,4	28,8
75	Considering natural variances within single felling compartment during regeneration	-25,5	47,7	49,5
3	Involvement of publicity in decision-making	-24,2	55,0	42,3
	<i>Better opinion among staff with over 20 years of work experience</i>	B*		
77	Cultivation of exotic species in forest [†]	-24,4	49,5	43,2
73	Usage of natural regeneration	-19,9	40,5	56,8
74	Usage of natural regeneration in combination with planting	-17,2	33,3	64,0
68	Share of selective fellings	-16,3	27,9	64,0
78	Pursuing regeneration with mixed species within single compartment	-14,6	26,1	67,6
	<i>Better opinion among staff with less than 20 years of work experience</i>	B*		
16	Public access to the summary information of forest management plans	21,3	51,4	46,8
88	Prevention and minimization of forest littering	18,5	34,2	53,2
94	Access to relevant documentation	17,5	48,6	27,0
25	Presence of warning signs near felling works	13,6	79,3	17,1
4	RMK reputation among private forest owners	12,1	63,1	33,3

[†] - Aspects for which answer values were multiplied by -1 (see section 3.2 for more explanations)

*Q nr – Number of the aspect in the questionnaire (as shown in Appendix II)

A and B indicate the difference between percent of positive answers for selected aspect and were calculated according to the equation below.

$A = (c1 + c2) - (d1 + d2)$ and $B = (e1 + e2) - (E1 + E2)$, where

c indicates answers by central office and regional office staff

d indicates answers by district staff

e indicates answers of staff with less than 20 years work experience in state forest management system

E indicates answers of staff with more than 20 years work experience in state forest management system

1 and 2 indicate answers with “positive” and “definitely positive” impact respectively

No reliable differences appear between employees with different work experience. Perhaps attention should be given to the fact that older staff sees more significant improvements regarding decreased use of exotic species in forest. This may be explained by the fact that they have seen the strong decrease in usage of exotic species which took place already before certification, while younger staff has seen less impact, since exclusion of any alien species from regeneration is considered normal by most foresters anyway nowadays.

4.3 *Changes evaluated in harvesting sites*

To evaluate the effects of forest certification on practical forest management, results of 9 indicators from clear-cut sites of 1999 and 2004 were compared. Figure 9 shows the mean values of constant variables for both years and standard errors for each variable. 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 (Table 17 and Figure 9). 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, while the soil damage from 1999 might have been often left unnoticed.

To estimate statistical significance of the differences observed between harvesting sites, independent samples T Test with 95% confidence intervals was applied. As seen in Table 17, the significance level for all variables, except soil damage, is below 0,05 thus indicating a statistically reliable difference between the means of variables of 1999 and 2004.

Table 17. T Test results for field survey variables for years 1999 and 2004

Variable	t	df	Sig.
Live biodiversity trees (pc/ha)	4,339	58,000	,000
Dead biodiversity trees (pc/ha)*	3,256	33,661	,003
Lying deadwood (m/ha)*	2,554	30,161	,016
Lying deadwood (pc/ha)*	2,502	30,653	,018
Soil damage (m/ha)	,390	58,000	,698

*Equal variances not assumed.

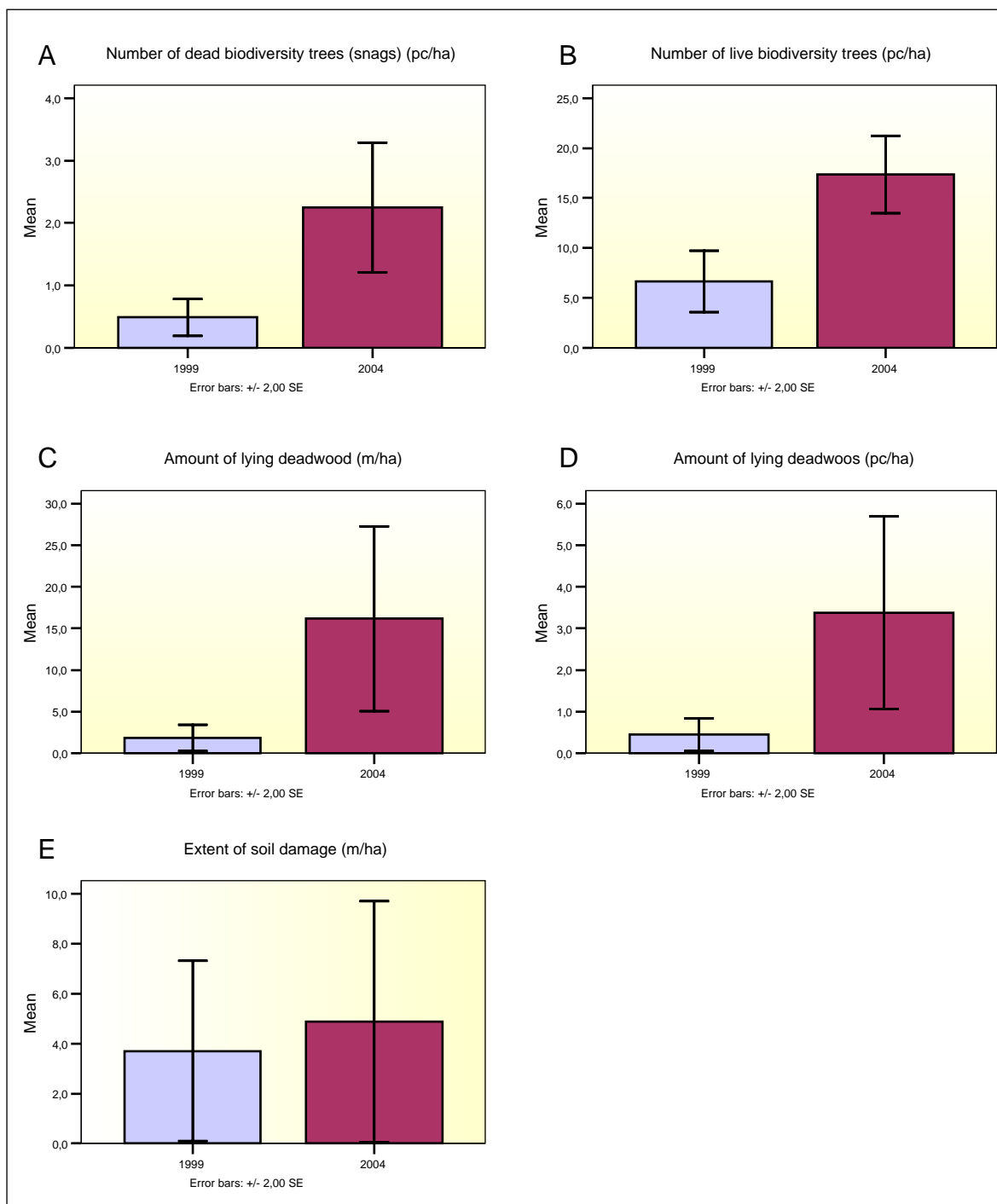


Figure 9. Mean values of constant variables measured on sites harvested in 1999 and 2004 (n=30 for both years)

The improvement of biological considerations in relation to FSC standard is further assured by comparing the actual means of measured variables as well observing the maximum values. Table 18 shows the mean and maximum values of standing biodiversity trees and amount of deadwood for both years under observation. As seen, there has been

clear increase in the maximum values of all variables. Furthermore we can observe that RMK has generally established compliance with FSC requirements regarding the amount of biodiversity trees on harvesting sites. The SmartWood standard used for RMK evaluation specifies that at minimum 10 biodiversity trees per hectare should be left on each felling site. While in 1999 this requirement was fulfilled only in about quarter of the cases, only 2 cases were observed in 2004 when there was a violation of FSC standard (less than 10 biodiversity trees left per ha) (Table 18). While in 2004 only one case was observed when no biodiversity trees had been left on the clearcut site after felling, in 1999 such situation was much more common and in almost one third of the felling sites (9 cases) there were no biodiversity trees left at all.

Table 18. Comparison of selected variables between 1999 and 2004

	Standing biodiversity trees¹		Lying deadwood (pc/ha)		Lying deadwood (m/ha)	
	1999	2004	1999	2004	1999	2004
Mean value	7,1	19,6	0,4	3,4	1,8	16,2
Maximum value	30,0	43,3	4,4	35,0	16,1	165,0
Nr of cases below 10 pc/ha ²	17	2	-	-	-	-
Share of cases below 10 pc/ha ²	73,3	6,7	-	-	-	-

¹Since RMK counts both dead and living standing trees as biodiversity trees, the field measurement results for both types of biodiversity trees have been added together for the purpose of compiling this table.

²The SmartWood Interim Standard for Baltic Region which is the standard used for evaluating compliance of RMK with FSC requirements specifies that 10 biodiversity trees per hectare should be left on each felling site at minimum.

In addition to the aspects analyzed above, other indicators were recorded on each visited site on yes or no basis (see field evaluation form in Appendix III). The summary results are provided in Table 19 for each registered indicator. Since some aspects (e.g. buffer zones), were not applicable in all sites, the first column for both years indicates number of sites where the aspect was relevant and when it was thus evaluated. Second column indicates number of cases where the indicator was observed to be true. Third column indicates percent of true cases from relevant cases to enable better comparison of results between years. As seen in Table 19, 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 probably be made about other indicators, although it could be speculated that increased use of harvesters has resulted in 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 5 years old bark damage can be more easily left unnoticed. 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.

Table 19. Results of other aspects observed during field visits (explanation in text above)

	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.

In conclusion there has been a clear increase in the volume and amount of various biodiversity elements left in the forest during clearfelling. This is likely to increase suitable habitats for various species and help to increase or at minimum maintain the overall level of biodiversity in Estonian state forests. Further discussion of the field study results is found in section 5. Photos illustrating changes after certification was introduced and showing practical situation in the forest are given in appendix IV.

5 Discussion

Combination of internal and external evaluation with empirical field research has provided an interesting collection of partly overlapping results. Stakeholder interviews gave an overview of the most frequently observed aspects which certification has changed. The high correlation between various stakeholder observations suggests that interview results are reasonably accurate. A comprehensive questionnaire covering wide range of impacts gave an extensive picture of the advantages internally perceived by RMK as an organization. Although the empirical field study indicators cover only a fraction of the standard scope, such research is first known attempt to evaluate certification impacts on quantitative basis. This thesis shows that a development of more comprehensive set of indicators is a promising tool in the context of certification impact evaluation. The discussion chapter compares main results gained by various methods and elaborates on the possible factors leading to them.

Biodiversity considerations were covered by all applied methods and the results in this area can be considered most reliable. This is further confirmed by the high correlation of interview and questionnaire results with field study observations. Increase of biodiversity elements on clearfelling sites (residual trees, standing dead snags, deadwood etc.) after certification was mentioned by most external stakeholders and was also one of the most heavily supported aspects in the questionnaire. Field study results provided statistically significant difference in the amount of all biodiversity elements measured on clearcut sites. Although some RMK staff has indicated (personal communication) that maintenance of biodiversity elements in the forest has always been common practice, present study clearly shows a change in this regard. The role of applicable FSC standard is likely significant, since it includes specific quantitative thresholds regarding biodiversity trees left in the forest. Unfortunately, the volume of biodiversity trees is practically the only aspect in the Baltic standard with quantitative thresholds. Another biologically important result of field visits is the increase in maintaining buffer zones along open landscapes, which results in

better protection of ecotone biota. These field survey results were also confirmed in the questionnaire where almost 70% of the respondents indicated positive change in the maintenance of buffer zones. Improvements in biodiversity conservation is one of the most studies areas also by other authors, who have reached to similar conclusions (Jenkins et al. 2004). Better conservation of biodiversity elements and habitats for species and protection of ecological functions of forests have been identified as major benefits of certification by several authors (Thornber 1999; Gullison 2003).

One major positive environmental impact identified by respondents and interviewed stakeholders alike is the increased environmental awareness of RMK staff and contractors. Significant increase has been taking place also in prevention and minimization of environmental risks during forest operations. These improvements should perhaps be considered the most significant change that certification has brought along, since they both reflect a significant change in the way forestry is approached. According to many stakeholders, certification has made people think in a whole different way. New facets of forestry are considered during everyday management, which were earlier classified in the area of nature protection, not considered relevant in “serious” forestry issues. The changed thinking is probably not a result of specific standard indicators but rather the outcome of the certification process itself. Certification has brought along much discussion, be it discussions with auditors during assessments, internal meetings among management, or staff trainings. Permanent consideration with potential environmental impacts before, during and after each operation is one of the main goals of FSC standard and it is positive to see that this goal has been at least partly achieved in RMK. Such results are in close compliance with recent research published by Yale School of Forestry. Changed attitude of forest managers, increased awareness of employees and evolution of meaningful communication were identified as significant benefits of certification by many authors (Quevedo forthcoming 2005; Carrera et al. forthcoming 2005).

At the same time, the results also reveal several environmental areas where no significant improvement has occurred. Majority of the questionnaire respondents indicate that certification has had no impact on the very high share of clearcut forestry; a small impact on noble hardwood regeneration, practically nonexistent development of uneven aged stands or low level of natural regeneration usage. Lack of impact regarding most of these

aspects was also confirmed during interviews. Disappointment over continuing the extremely high share of clearcut fellings was most strongly expressed, especially by NGO representatives. All these aspects are included in the certification standard, and environmentalists have hoped that changes will be introduced. Opposition among RMK staff regarding some of the aspects (SmartWood 2002; interviews) and solid belief among many “old-school” foresters that clearcut forestry is the only viable option in Estonia, could be one of the reasons. Far more important in the certification context however is the fact that the applicable certification standard severely lacks unambiguous, clear requirements regarding these aspects (SmartWood 2004). Total lack of any specific thresholds, especially quantitative ones, makes it difficult for a certifier to raise conditions that could result in change. A review of the assessment and audit reports reveal that some of these aspects (e.g. share of noble hardwoods, development of mixed stands) have been unsuccessfully addressed by certification team, since the conditions raised require an “analysis of possibilities to increase...” rather than setting specific requirements (SmartWood 2002). Other aspects have been addressed only with recommendations since the standard is too vague to define direct non-compliance.

The results on social impacts vary greatly between evaluated aspects. Increased use of safety equipment and general improvement of the health care of forest workers is unanimously acknowledged as a major positive effect by RMK staff and external stakeholders. This has also been the finding of many researchers participating in preparation of the Yale collection of country studies (Carrera et al. forthcoming 2005; Cashore et al. forthcoming 2005). Establishment of higher health and safety standards due to certification has been observed also earlier by several authors (Bass et al. 2001; Atyi and Simula 2002).

At the same time, some interviewees expressed the opinion that higher demand for qualifications have resulted in an increase in unemployment in some rural areas. This is in accord with the fact that almost half of the respondents indicated that the number of contractors has decreased after certification (majority of the other half indicating no significant change). Results also strongly suggest that certification has not entailed any positive changes regarding benefits to local communities. Interviews as well as the questionnaire reveal that communication with local people has not improved and no

stronger preference of local timber industry can be observed after certification. This is contradicting with recent country studies as many authors have observed increased participation of local inhabitants in forest management decision-making process and increased benefits for local communities (Ham forthcoming 2005; Quevedo forthcoming 2005). Since no stakeholders have expressed major concerns in Estonia, it can be speculated that there are no major problems and lack of change could be a result of already high performance in this regard. On the other hand low motivation and lack of awareness of local communities to participate in certification process and voice their interests is more likely to be the reason behind lack of impacts. Although a more proactive consultation process could help to discover issues which are important for local inhabitants, it is clear that meaningful consultation with local people is more difficult than dialogue with organized stakeholder groups.

The lack of NTFP utilisation is an aspect which should be classified on the border of social and economic impacts. Although more effective and extensive utilisation of various NTFP-s has been a concern for NGO-s (Trapido 2004), the questionnaire indicates no change in this regard. The reason for this is likely to be found in the interpretation of standard requirements by the assessment team. A review of the assessment reports public summary indicates that utilisation of NTFP-s was considered to be on an acceptable level during initial certification and that no conditions were raised in this regard. Stakeholder concerns thus suggest that the standard used was not sufficiently adapted to local conditions in this regard and that higher demands regarding NTFP should have been specified in the standard.

Consideration should be given to the fact that almost all questionnaire respondents indicated a strong negative impact of certification with regard to documentation system. While positive changes in the availability and structure of information have been modest at best, certification has allegedly introduced many irrelevant and unnecessary documents, which are disturbing efficient forest management and also make it more difficult to find the necessary information. Since documentation was not discussed during interviews, the criticism regarding excessive documentation is represented by RMK employees only. On one hand it is generally known that in certification systems certain documents are required mainly to enable external verification of compliance by auditors and may not actually be

used by the FMO itself. More importantly, it is clear that implementation of many procedures and work instructions is rather a result of post-Soviet administrative and organizational reforms than of certification. With creation of RMK, just few years prior to certification, significant optimization of workforce and administrative structure was initiated. Implementation of more strictly documented management systems was inevitable step during this transition period from post-Soviet chaotic situation to effectively managed organization. Hence it is argued that majority of procedures and documents would have been introduced anyway as the forest management organization was moving towards more contemporary management regime. Finally the fact that ISO 14000 environmental management system has been implemented in RMK, which focuses strongly to the structure and usability of documentation system, should also be considered. Although an important aim of ISO certification is to optimize documentation management it has been known to introduce typically more documents than performance based systems.

The results of economic impacts vary greatly between aspects and also between response groups. The overall opinion regarding certification benefits for economic performance is low. It is interesting to see that central office staff, who are likely more knowledgeable about financial matters, have a significantly lower opinion regarding the impacts of certification on financial performance. Half of the management thinks that certification has had a negative impact on RMK financial profit and almost half of the staff thinks that it has had no impact on RMK turnover or the sales price of roundwood. At the same time, a majority of district staff sees improvements in all these areas and only a small minority thinks that there has been no impact. It is certainly reasonable to think that the central office staff is able to evaluate impacts in this area more accurately. Lack of direct economic benefits seems to be general conclusion as most authors who have studied these aspects have indicated insignificant economic benefits at best (Morris and Dunne 2004; Baharuddin and Simula 1994).

Apart from economic impacts however, the opinion of central office staff is significantly higher than that of district employees. The availability and usability of protected areas and species information, environmental awareness of contractors, and close-to-nature planning of fellings are all areas where central office people have indicated higher benefits (Figure 8 C, D and E). Especially remarkable are differences in the area of work safety, control of

environmental risks during forestry operations, and monitoring of harvesting activities, in regard to which the lower opinion of district staff who are conducting practical forest management is likely more accurate. Still it should be mentioned that a large majority of all respondents have indicated strong improvements in all these areas and there is consensus among respondents that certification has definitely played a positive role.

Observing further differences between central and district staff on single aspects level, the largest difference appears regarding informing adjacent landowners about planned fellings. While all central and regional office workers think that this aspect has improved due to certification, the majority of district staff has seen no changes due to certification in this area. Since informing of neighbors should be carried out by foresters who work in district offices, it is clear that the opinion of district staff should be considered more accurate in this case.

Observation of the different opinions between RMK internal response groups reveal that the opinion of staff who should be more knowledgeable about actual impacts is generally lower regarding respective areas. While management knows more about financial issues, they evaluate improvements in this area significantly lower than district staff. At the same time management sees much higher improvements in the areas of close to nature forest management practices, usability of information regarding protection values on the field, monitoring of contractor work during harvesting, control of environmental risks during forest management and work safety issues. It is clear that district staff, who is conducting everyday forest management and is actually spending time in the forest and supervising forestry activities, has a better overview about these aspects. This observation creates questions regarding possible causes of such overvaluation. Is it simply because promotion of certification has created a situation where employees tend to over-evaluate all impacts, unless they can see the actual situation due to their work duties? A possible reason is inefficient internal communication within RMK and misinterpretation of information communicated between different departments. Finally it gives room for speculation regarding intentional over-evaluation of certification impacts.

Regarding differences in opinion about work safety, it can be also speculated that somewhat higher opinion of management is caused by the better-than-average situation

regarding safety equipment during audits. Often FSC audits offer possibilities for management staff, who is usually located in head office, to visit forests and observe ongoing operations. Assuming that the situation during audits is better than usual, the management also gains a better opinion than district staff who sees the situation during everyday management. Furthermore, differences in opinions might be an indication of ineffective monitoring system of workers compliance with safety requirements or suggests that the monitoring results are not effectively communicated to central office staff. This speculation is partly supported by an FSC audit in late 2004 when a corrective action request regarding monitoring of contractors was raised by the audit team (SmartWood 2004).

Surprisingly, comparison of responses between long time employees (>20 years of experience in state forest management system) with their younger colleagues does not reveal major discrepancies. In fact the findings even contradict the initial hypothesis of the author, according to which long-time forestry employees are more skeptical towards novel approaches in forest management and thus certification in general. Results show that the opinion of staff with work experience over 20 years is slightly higher regarding utilization of close to nature felling and forest regeneration methods. It appears that people with a background from Soviet-time forestry have probably observed more radical changes than younger staff. Attributing these changes solely to certification is not justified though, since there has also been a general slight shift towards more close-to-nature forest management during the post-Soviet period.

Since the results gained with different methods were only partly overlapping, a comprehensive comparison of results was not possible. However, as the results and this discussion section has shown, the correlation between overlapping aspects within external and internal evaluation, as well as the field survey, is quite high. Although the opinion of RMK management is slightly higher in a few areas, the internal evaluation of certification impacts also reveals very high correlation between RMK response groups (Figure 6).

Comparison of the results with research from other countries reveals that main benefits of certification are similar even between tropical and boreal countries. Increased awareness and environmental considerations, meaningful discussion with stakeholders, higher safety

requirements and better social conditions for forest workers and finally more considerations with biological aspects during practical management have been introduced by certification almost anywhere. Results regarding higher involvement of local community are somewhat more contradicting and seem to be more significant in tropical countries.

The results have also shown that although significant improvements in many areas were observed, several aspects have also been left un-addressed during certification (Table 15). Focusing on the areas that certification has not influenced could be a useful possibility for certifiers as well as RMK staff to find further ways to improve forest management. Another important application of the results could be in preparation of national standards. As discussed earlier, the lack of specific thresholds and quantitative indicators in the standard is likely the main reason why certification has not had a significant role in some areas. The lack of specific indicators makes it more difficult for certifiers to record non-compliances and thus also to raise effective conditions and corrective action requests. Improvement on draft national standard with an emphasis on areas which certification has influenced most, is crucial for more effective use of certification in the future.

Conclusions

This research has evaluated the impacts of FSC forest certification implementation in Estonian state forests using three complementary methods. For external evaluation interviews with stakeholders were conducted, while internal perception of benefits by certified organization was surveyed using an extensive multiple choice questionnaire including 94 aspects. Finally, objective empirical results were gained, mainly regarding biodiversity conservation, by measuring indicators on 30 clearfelling sites in the certified forest before and after certification was introduced.

Results of the study indicate significant improvements in many areas, especially regarding increased environmental awareness and reputation. Significant improvements were also observed in preservation of biological elements on clearfelling sites, work safety and control of environmental risks during forest management operations. Unfortunately it appears that certification has not influenced many aspects related to close-to-nature forest management such as the share of non-clearcut methods and development of mixed uneven-aged stands. Certification has also not helped to increase consideration with local communities and has not introduced notable financial benefits. Finally, utilisation of non-timber forest products has been left unaddressed, although many stakeholders see room for improvement in this area. Negative impact was observed by RMK own staff regarding increased amount of allegedly redundant paperwork and documentation. Increase of procedures and other documents is however also a result of transformation process from post-Soviet chaos into an organized and well administered company.

Comparison of questionnaire answers among different RMK employees revealed two interesting trends. Firstly the opinion of management regarding positive impacts in some areas was somewhat higher. Secondly it appears that staff tends to over-evaluate aspects not directly related to their everyday work duties. The latter could result from ineffective internal communication, elevated opinion of certification as a tool or perceptual over-evaluation of impacts.

The results gained can be used effectively by several parties. Standard-setting bodies should implement more specific and quantitative indicators in areas where certification was expected to have an impact but has not introduced changes due to vague standard requirements. Certifiers should focus on the same areas more thoroughly during audits. Finally, other forest management organizations can learn from RMK experience and focus on potential problem areas as well as ensure effective internal communication about benefits and potential threats of certification.

The high correlation of results gained from different methods increases the credibility of the results. While the combination of various research methods proved to be efficient tool for evaluating a wide scope of impacts, further elaboration of various methodological options should be conducted for future research. The indicators used for field survey covered a small part of certification requirements and should be developed further for more comprehensive empirical research.

Although the current study has suggested that forest management certification has positive impacts, foremostly on some ecological and social aspects of forest management, many more case studies from various regions are still needed before trends can be identified. Single results from different regions are also difficult to compare, because impacts of certification are highly context-sensitive. As this research has shown, net effects depend upon many factors including but not limited to, existing level of forest management before certification, the standard used for evaluation, quality of certifiers and their perception of the standard criteria as well as general forest management background in the region.

To further the knowledge about value and benefits of certification, several exciting methods can be utilized. The development of performance scenarios for evaluation of certification impacts, similar to the research of Côté and Bouthillier (2002), would help to evaluate actual impacts over a longer period of time (e.g. five year period of the FSC certificate validity). Vast potential exists in the analysis of conditions and corrective actions raised by certifiers and the respective responses of the forest manager. Comparison of initial certification report with re-certification report for the same enterprise after a five year period helps to describe changes in forest management practice in detailed level, since findings for each certification criteria is included in the full report.

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Abbreviations

ABU	Accreditation Business Unit (department of FSC International)
CAR	Corrective Action Request ¹
CB	Certification body ²
CoC	Chain of custody certification
EMS	Environmental Management System ³
ENGO	Environmental non-governmental organizations
ESMS	Estonian National Sustainable Forestry Standard
ERL	Estonian Green Movement-FoE
FAO	Food and Agriculture Organisation of United Nations
FM	Forest management (certification)
FMO	Forest Management Operation ⁴
FMP	Forest management plan
FMU	Forest management unit
FSC	Forest Stewardship Council
HCVF	High conservation value forests
NGO	Non-governmental organization
NSMD	Non-State Market-Driven (Governance systems) ¹

¹ CAR-s are used in FSC certification system by certifiers to specify actions that must be taken by forest manager to achieve

Conformity with FSC standard requirements. CAR-s are formulated if non-compliances with FSC standard are discovered by certifier. ISO 14001 certifiers use non-conformance reports for similar purposes, although the CAR-s in FSC system tend to be more prescriptive, while non-conformance reports merely state the non-conformity with the standard and leave the action to be taken up to the client.

² In third party certification schemes (such as FSC and ISO) the CB-s are usually accredited by the standard setting organizations who checks their independence and ability to carry out certification professionally and according to certain procedures

³ ISO 14000 series of standards is the most well known and common system of environmental management system. The requirements for certification are described in the ISO 14001 standard.

⁴ Common abbreviation used for forest owners and managers, whether private or public, individual or organizations

NTFP	Non timber forest product (e.g. mushrooms, berries, wax, herbs etc.)
NWGFC	National Working Group on Forest Certification
P&C	Principles and Criteria ² (of FSC)
PEFC	Programme for the Endorsement of Forest Certification (formerly the Pan European Forest Certification scheme)
RMK	Estonian State Forest Management Center ³
SFM	Sustainable Forest Management

¹ Adapted from Cashore (2002)

² FSC global forest management standard consists of 10 Principles and 56 Criteria. Development of indicators for each criterion is a task left upon the regional and national FSC working groups to create a context-adopted version of FSC standard.

³ acronym stands for the organization name in Estonian: Riigimetsa Majandamise Keskus

Summary in Estonian

Magistritöö kokkuvõtte teemal „Metsasertifitseerimise sotsiaalsed, ökoloogilised ja majanduslikud mõjud FSC sertifikaati omava Eesti Riigimetsa Majandamise Keskuse näitel”

Käesoleva magistritöö eesmärk on hinnata sertifitseerimise mõju metsandusele Eesti Riigimetsa Majandamise Keskuse (RMK) näitel. FSC sertifitseeritud metsade pindala on kasvanud möödunud 15 aasta jooksul enam kui 50 milj. ha (FSC 2005) ning sertifitseerimist on kiidetud kui käesoleva aja kõige mõjuvamat vahendit metsade kaitseks (Putz and Romero 2001). Samas on üha enam äriliseks muutuv sertifitseerimine ja kasvavad metsamajandajate investeeringud pannud mitmeid huvigruppe kahtlema selle tegelikus efektiivsuses. Sertifitseerimise mõjude hindamine, eriti praktilise metsamajanduse ja metsaomaniku seisukohast, on käesoleval ajal praktiliselt uurimata valdkond kuigi huvi ja vajadus selleks on suur.

Töö koosneb viiest peamisest osast. Esimeses osas käsitletakse metsade sertifitseerimise poliitilist rolli ja dünaamikat ning peamisi trende globaaltasandil; samuti antakse ülevaade olemasolevatest mõju-uuringutest ning peamistest tulemustest. Töö teine osa annab ülevaate sertifitseerimise protsessist RMK-s ja selle seostest metsanduslike reformidega Nõukogudejärgses Eestis. Kolmandas osas käsitletakse käesoleva uurimuse aluseks olnud metoodikat ja kirjeldatakse detailselt iga kasutatud uurimismeetodi rakendamist. Töö kaks viimast osa sisaldavad vastavalt uurimuse tulemusi ja tulemuste arutelu.

Sertifitseerimise mõjude hindamiseks rakendati kolme erinevat meetodit, mis täiendasid teineteist ning ühtlasi võimaldasid näha nii RMK organisatsioonisest arvamust kui ka väliste huvigruppide hinnangut toimunud muutustele. RMK spetsialistide ning töötajate arvamust sertifitseerimise tulemuslikkuse ja mõjude kohta uuriti põhjaliku valikvastustega küsimustiku abil (vt. lisa III), milles paluti RMK töötajatel hinnata sertifitseerimise mõju 94 aspekti suhtes. Teise meetodina intervjueeriti enam kui 20 RMK-ga seotud huvigruppide esindajat. Intervjueeritavate hulgas oli puidu- ja metsatööstuse,

keskkonnakaitsjate, teadlaste, valitsusväliste organisatsioonide, erametsaomanike ja riiklike institutsioonide esindajaid. Kolmandaks hinnati praktilise metsamajanduse muutusi enne ja pärast sertifitseerimist raieitud RMK lageraielankidel, kus mõõdeti sertifitseerimise standardis käsitletud valitud indikaatoreid.

Töö tulemused näitavad, et sertifitseerimisel on olnud oluline roll metsamajandamise kvaliteedi parandamisel mitmes valdkonnas. Enim on sertifitseerimine tõstnud üldist keskkonnavalad teadlikkust nii RMK töötajate kui töövõtjate seas. Kõikide rakendatud meetodite tulemused näitavad üheselt, et kasvanud on bioloogilist mitmekesisust toetavate elementide säilitamine lageraietel ning paremini on hakatud maandama ja kontrollima keskkonnariske. Nii RMK töötajate kui väliste partnerite hinnang näitab üheselt, et oluliselt on paranenud turvavarustuse kasutamine metsatööl.

Samas ei ole sertifitseerimine vähendanud lageraiete osakaalu ega suurendanud erivanuselistega segapuistude arendamist RMK poolt, kuigi neid valdkondi peetakse paljude huvigruppide poolt kõige stagneerunumaks Eesti metsanduses. Oodatult ei ole sertifitseerimine RMK-le kaasa toonud otsest rahalist lisatulu, kuigi nii RMK töötajad kui huvigrupid olid kindlal seisukohal, et kasvanud on RMK maine nii siseriiklikul kui rahvusvahelisel tasemel.

Saadud tulemused aitavad eelkõige keskenduda valdkondadele, mis vajaksid rohkem tähelepanu. Positiivsete mõjude puudumine mitmes valdkonnas viitab kasutatava standardi indikaatorite liigsele üldsõnalisusele ning teisalt annab alust arvata, et standard ei ole piisavalt hästi kohandatud Eesti oludele. Seega on tulemused olulised rahvuslikule FSC töögrupile, kes võiks neid standardi koostamise protsessis arvesse võtta. Samuti aitavad tulemused sertifitseerijatel keskenduda aspektidele, mis seni on jäänud piisava tähelepanuta.

Kuigi käesolev juhtumiuuring on ka rahvusvahelisel tasemel üks esimesi ühe metsamajandaja tasemel sertifitseerimise mõjusid hindavaid töid, on piirkondlike trendide mõistmiseks vaja rohkem analoogseid uurimusi. Töös kasutatud meetodeid, eriti indikaatoripõhist raieankide metoodikat, tuleks edasi arendada, et saada empiirilisi andmeid sertifitseerimise mõjude laiema spektri kohta.

Appendix I Interview form (in Estonian)

Austatud kolleeg,

Tartu Ülikooli geograafia instituut viib läbi metsandusliku sertifitseerimise mõju uuringut. Eesmärgiks on kirjeldada neutraalsest vaatenurgast erinevate sertifitseerimisskeemide arengut, tulemuslikkust ja probleeme.

Palume teil vastata järgnevatele küsimustele ja saata küsimustik tagasi aadressil hh@nepcon.dk, või TÜ geograafia instituut, Vanemuise 46, Tartu, Eesti, tel 56 679 888

Palume võimalusel vastata küsimustele 9. veebruari õhtuks.

Rein Ahas TÜ geograafia instituudi vanemteadur

Hando Hain TÜ magistrant

Palun vastata lühidalt elektrooniliselt või paberil.

Vastaja nimi; Vastaja amet

Vastaja osalemine sertifitseerimisega seotud protsessides

Metsandusliku sertifitseerimise algus Eestis ja reaktsioonid sellele.

Küsimused	Vastused
FSC sertifitseerimine	
1. Millal FSC sertifitseerimise teema Eestis päevakorda kerkis?	
2. Kas initsiatiiv tuli eelkõige Eestist või väljapoolest?	
3. Kas turunõudlus mängis sertifitseerimise käivitumises rolli, millist ja mis tasemel?	
4. Kuidas Eesti säästva metsanduse töögrupp alustas, kuidas standardi (FSC) töögrupis otsuseid langetati?	
5. Kuidas Eesti säästva metsanduse standardi töögrupis huvimid tasakaalustati (häälte jaotus)?	
6. Mille poolest erines standard igapäevasest metsanduse praktikast?	
7. Missuguseid kohalikke metsanduse probleeme sertifitseerimisega eelkõige lahendada üritati:	
- varimetsandus	
- biol mitmekesisuse vähenemine	
- metsade hävimine	
- eksporditurgudele pääsemine	
- mittepuiduliste väärtuste parem kasutamine	
- avalikkuse suuremat kaasamist otsustamisprotsessi	
8. Milliseid reaalseid Eesti metsanduse probleeme pole suutnud/ei suuda FSC lahendada?	
9. Missugused olid/on sertifitseerimise peamised takistused?	
10. Kas ja millist rolli mängisid sertifitseerimise käivitumises riigiasutused, poliitikud, valitsus (Keskkonnaministeerium)?	
11. Kes (missugused huvigrupid – ametnikud, teadlased, keskkonnakaitsjad, omanikud, töösturid, metsaülemad, poliitikud) olid sertifitseerimise?	
- vastu	
- skeptilised	
- neutraalsed	
- pooldasid	
- omasid/omavad juhtivat rolli sertifitseerimise edendamisel	
12. Kas teie arvates töötab FSC sertifitseerimine Eestis praegu hästi?	
13. Missugused projektid toetavad FSC sertifitseerimist?	
14. Kas FSC sertifitseerimine töötab ühtlaselt suurte ja väikeste omanike jaoks?	
15. Kas FSC tarneahela sertifitseerimine töötab ühtlaselt väikeste ja suurte ettevõtete jaoks?	
16. Missuguseid tooteid Eestis täna FSC puidust toodetakse?	

17. Kas FSC toodetele leitakse turgu?	
18. Mis on FSC sertifitseerimise kitsaskohad täna?	
PEFC sertifitseerimine	
1. Kuna PEFC sertifitseerimise teema Eestisse jõudis?	
2. Kas initsiatiiv oli Eestist või väljast?	
3. Kuidas koostati Eesti PEFC standard, kuidas otsuseid langetati?	
4. Kuidas Eesti PEFC töögrupis huvisid tasakaalustati (hääle jaotus)?	
5. Mille poolest erines standard igapäevapraktikast?	
6. Missuguseid kohalikke metsanduse probleeme PEFC sertifitseerimisega lahendada üritati:	
- varimetsandus	
- biol mitmekesisuse vähenemine	
- metsade hävimine	
- eksporditurgudele pääsemine	
- mittepuiduliste väärtuste rakendamine	
- avalikkuse suuremat kaasamist otsustusprotsessi	
7. Milliseid reaalseid Eesti metsanduse probleeme pole suutnud/ei suuda PEFC lahendada?	
8. Missugused olid/on PEFC sertifitseerimise peamised takistused?	
9. Kas ja millist rolli on mänginud PEFC sertifitseerimise arengus riigiasutused, poliitikud, valitsus (Keskkonnaministeerium)?	
10. Kes (missugused huvigrupid – ametnikud, teadlased, keskkonnakaitsjad, omanikud, töösturid, metsaülemad, omavalitsused, poliitikud) olid PEFC sertifitseerimise	
- vastu	
- skeptilised	
- neutraalsed	
- pooldasid	
- omasid/omavad juhtivat rolli sertifitseerimise edendamisel	
11. Kas teie arvates töötab PEFC sertifitseerimine praegu hästi?	
12. Missugused PEFC sertifitseerimisega seotud tegevused praegu käivad?	
13. Kas PEFC sertifitseerimine töötab ühtlaselt suurte ja väikeste omanike jaoks?	
14. Kas PEFC tarneahela sertifitseerimine töötab ühtlaselt väikeste ja suurte ettevõtete jaoks?	
15. Mis on PEFC kitsaskohad täna?	
16. Kui palju puitu toodetakse PEFC märgi all Eestis? Prognoos?	
17. Kui palju metsamaad on PEFC märgi all sertifitseeritud Eestis? Prognoos?	
Teiepoolseid kommentaare:	

Sertifitseerimise mõjud ja tulemused.

Küsimus	Vastus
I Võim	
1. Kas sertifitseerimine muutis metsandusega tegelevate huvigruppide (ametnikud, teadlased, keskkonnakaitsjad, omanikud, töösturid, metsaülemad, omavalitsused, poliitikud) jõuvahekordi? Kuidas?	
2. Kuidas avalikkus sertifitseerimisse suhtub?	
3. Kuidas suhtuvad sertifitseerimisse erametsaomanikud?	
4. Kas metsandus muutus läbipaistvamaks?	
5. Kas sertifitseerimine kutsus esile või vähendas huvigruppide vahelisi konflikte?	
II Sotsiaalsed mõjud	
1. Kas sertifitseerimine mõjutas kohalike elanike	
- juurdepääsu toorainele?	
- juurdepääsu kõrvalsaadustele ?	
- sissetulekutele?	
2. Kas sertifitseerimine mõjutas:	
- suhteid kohaliku omavalitsuse ja riigi tasandi vahel?	
- kohalike töötajate ja väljastpoolt tulijate konkurentsi?	
- varimetsandust (vargused, maksupettused, raie-eeskirjade	

rikkumised)?	
- kohaliku elanikkonna sissetulekute stabiilsust?	
- traditsioonilist perekondade struktuuri ja suhteid?	
- maksude maksmist eraisikute ja firmade poolt?	
- töökohtade legaliseerimist?	
3. Kas sertifitseerimine muutis tööliste:	
- turvalisust tööõnnetuste vastu?	
- tervise kaitset?	
- täiendõpet ja haridustaset?	
- tööliste oskusi ja professionaalsust?	
III Majanduslikud mõjud	
1. Kas sertifitseerimine suurendas või vähendas tootjate:	
- töötajate arvu?	
- tööjõukulusid?	
- raieahte?	
- tooraine hindasid?	
- lisakulusid? (missuguseid)	
- kasumeid	
2. Kas sertifitseerimine muutis (kuidas?):	
- turgusid?	
- toorainet?	
- tooteid?	
- ärisidemeid?	
- äritavasid?	
IV Keskkonnamõjud	
1. Kas sertifitseerimine muutis (kuidas?):	
- metsade majandamise tavadid?	
- raiete teostamise protseduure?	
- kaitsealuste liikide seisundit?	
- bioloogilise mitmekesisuse säilitamist?	
- kõrge kaitseväärtusega alade ja võtmebiotoopide kaitsmise praktikad?	
- püsimetsana majandamise ulatust?	
- mulla kahjustamist?	
- võõrpuuliikide kasutamist?	
- kemikaalide kasutamist?	
- lindude-loomade häirimist kevadisel pesitsusperioodil?	
- maastiku ja roheliste koridoride arvestamist raiete kujundamisel?	
2. Kas metsamajanduse sertifitseerimine muutis metsaomanike ja firmade üldist suhtumist keskkonda ja töötajatesse?	

Appendix II Multiple choice questionnaire form (in Estonian)

Mida on RMK-s muutnud FSC sertifitseerimine?

RMK-l on juba peaaegu kolm aastat olnud FSC sertifikaat. Paljusid huvitab mis sellest on kasu olnud ja kas midagi on ka tegelikult muutunud? Esitatud küsimusele otsib koos RMK-ga teadusuuringu käigus vastuseid Tartu Ülikooli Geograafia instituut. Uuringu üheks osaks on RMK töötajate arvamuse selgitamine.



Oleme välja pakkunud valiku asjadest, mida FSC standard käsitleb. Palume teil oma isikliku arvamuse põhjal hinnata kas ja millises suunas on FSC sertifitseerimise protsess muutnud nimetatud asju RMK-s. Kuigi kõik muutused ei pruugi olla Teie meelest positiivsed, palume objektiivselt hinnata eelkõige toimunud muutuste suunda ja ulatust.

Küsimustikus sisaldub 94 aspekti, mille kohta Teie hinnangut palutakse ning kogu küsimustiku täitmine võtab hinnanguliselt aega ca 15 minutit. Palun proovige igat küsimust hinnata eraldi, lähtuvalt küsimuse formuleeringust.

Küsitluse tulemused avaldatakse siin samas lehel käesoleva aasta detsembris. Kui Teil on küsimusi alloleva ankeedi või käesoleva uurimuse kohta üldisemalt, võtke palun ühendust Tartu Ülikooli Geograafia instituudi magistrandi Hando Hainiga (tel: 56 679 888; email: handoh@ut.ee)

Struktuuriüksus:

Amet:

Mitu aastat olete töötanud riigimetsa majandamise struktuuris:

Vanus:

Sugu:

AVALIKKUS					
Suhtlus	Kindlasti parandanud	Pigem parandanud	Pole mõjutanud	Pigem halvendanud	Kindlasti halvendanud
1 kohalike elanikega	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 teiste riigiasutustega	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 avalikkuse kaasamine arengusuundade määramisel ja muudes otsustes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
RMK maine	Kindlasti parandanud	Pigem parandanud	Pole mõjutanud	Pigem halvendanud	Kindlasti halvendanud
4 Eesti erametsaomanike hulgas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 Eesti roheliste ja keskkonnakaitsjate hulgas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6 Eesti avalikkuse ja meedia silmis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7 RMK partnerite hulgas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8 rahvusvahelisel tasandil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9 avatus ja asjaajamiste läbipaistvus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
RMK suhe kohalikega	Kindlasti parandanud	Pigem parandanud	Pole mõjutanud	Pigem halvendanud	Kindlasti halvendanud
10 metsas asuvate kohalikele inimestele oluliste kultuuriväärtustega alade teadvustamine ja säilitamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11 heade marja- ja seenekohtade ning muude levinud külastatavusega kohtade teadvustamine ja säilitamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12 kohalike kaasamine RMK tegevustesse ja nende arvamuse küsimine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13 tülid ja (kohtu)vaidlused maanaabritega	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Info avalik kättesaadavus		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
14	RMK kodulehel oleva info kvaliteet ja maht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15	uued kirjalikud infomaterjalid RMK tegevuse kohta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16	metsamajandamiskavade üldinfo kättesaadavus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TÖÖTAJAD JA TÖÖKESKKOND						
Teadlikkus		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
17	üldine keskkonnavaline teadlikkust RMK töötajate seas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18	erialane teadlikkus RMK töötajate seas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	töövõtjate keskkonna-alane teadlikkus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19	ühine arusaam bioloogilise mitmekesisuse elementide mõistest ja ideest (lamapuit, säilikuud jne.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Töötajate suhtumine		Kindlasti parandanud	Pigem parandanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
20	metsa kui elukeskkonda ja ühiskondlikku väärtusesse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21	metsa looduslähedase majandamise põhimõtetele	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22	töövõtjate suhtumine metsa kui looduskeskkonda	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tööohutus		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
23	õnnetusjuhtumite arv ja raskusaste	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24	hoiatusmärkide olemasolu raietööde lähisel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25	turvavarustuse olemasolu RMK oma metsatööliste seas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26	turvavarustuse olemasolu töövõtjate seas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27	turvavarustuse olemasolu metsatöömasinates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28	juhtumid kus raietööline töötab metsas üksi	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MAJANDUSSUHTED						
Turustamine		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
29	RMK kasum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30	RMK kogukäive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
31	metsamaterjali müügihind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
32	nõudlust sertifitseeritud materjali järele	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
33	kohalikele elanikele ja ettevõtetele müüdnud metsamaterjali osakaal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
34	mittepuiduliste ressursside ja teenuste turustamise maht (joulukuused, jahindus, turism jne.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partnerid		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
35	partnerite arvukus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
36	keskkonnateadlikumate ja/või seaduskuulekamate partnerite osakaal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Töövõtjad		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
37	töövõtjate arvukus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
38	keskkonnateadlikumate ja/või seaduskuulekamate partnerite osakaal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
INFO JA MUUTUSTE JÄLGIMINE						
Kaitsealade info		Kindlasti parandanud	Pigem parandanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
39	asukohtade kohta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
40	kaitseväärtuste kohta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
41	majandamisjuhiste osas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kaitsealuste liikide info		Kindlasti parandanud	Pigem parandanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
42	asukohtade kohta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

43	ohustavate tegurite kohta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
44	linnupesade asukohtade ja kaitse osas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Elektrooniline info		Kindlasti parandanud	Pigem parandanud	Pole mõjutanud	Pigem halvendanud	Kindlasti halvendanud
45	GIS andmebaaside ja digitaalkaartide kvaliteet ja asjakohasus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
46	elektroonilise dokumendihje süsteemi kasutatavus ja sealse info kvaliteet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Muu info		Kindlasti parandanud	Pigem parandanud	Pole mõjutanud	Pigem halvendanud	Kindlasti halvendanud
47	langil olevate loodusväärtuste kohta enne ja pärast raiet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
48	raietööde käigus tekitatud kahjustuste kohta	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
49	siseauditite efektiivsus ja tulemuslikkus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
METSAMAJANDAMINE JA KESKKOND						
Raiete maht		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
50	raied kinnitatata kaitsestaatusega aladel (Natura eelvaliku alad, EMKAV alad)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
51	RMK üldine raie maht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
52	raied kevad-suvisel perioodil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
53	kaitserežiimiga või piiratud majandamisrežiimiga metsade pindala	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Raiete planeerimine		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
54	segapuistute osakaal (läbi harvendusraiate planeerimise)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
55	kõvalehtpuude osakaal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
56	linnupesade kaitset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
57	kaitstavate liikide asupaikade kaitse ja säilimine langil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
58	säilikuude jätmise ulatus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
59	lamapuidu säilitamise ulatus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
60	erinevate rinnetega puistute kujundamine raiete käigus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
61	erivanuselist puistute kujundamine raiete käigus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
62	puhvertsoonide jätmise looduslike veekogude äärde	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
63	puhvertsoonide jätmise avamaastike ääres	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
64	tehnooloogilise raielangi joonise olemasolu raitöödel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
65	naabermetsade ja –maade omanike raiest teavitamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Raieviiside osakaal		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
66	lageraiete osakaal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
67	valikraiate osakaal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
68	keskmine väljaraie harvendusraietel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Metsamaa parandus		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
69	kuivenduskraavide rajamise ulatus ja maht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
70	kuivendussüsteemide renoveerimise intensiivsus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
71	metsateede seisukorra üldine kvaliteet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Metsauuendus		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
72	loodusliku uuenduse kasutamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
73	LUK-i kasutamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
74	looduslike erinevustega arvestamine sama langi piires uuendamisel (erinevate liikide ja uuendusmeetodite kasutamine sama langi ulatuses)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
75	vähem intensiivsete pinnase ettevalmistusmeetodite kasutamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

76	võõrpuuliikide kultiveerimine metsas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
77	erinevate liikidega uuenduse taotlemine sama langi piires	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keskkonnariskid		Kindlasti parandanud	Pigem parandanud	Pole mõjutanud	Pigem halvendanud	Kindlasti halvendanud
78	keskkonnariskide teadvustamine ja hindamine enne metsatöid ja tööde ajal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
79	keskkonnakahju ennetamise ja likvideerimise varustuse olemasolu metsatöömasinates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
80	keskkonnakahju ennetamise ja likvideerimise varustuse olemasolu RMK metsatöölise seas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
81	keskkonnakahju ennetamise ja likvideerimise varustuse olemasolu töövõtjate metsatöölise seas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
82	keskkonnariskide hindamine ja vähendamine kuivendustöödel ning teede ehituses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
83	pinnasekahjustuste ennetamine ja vähendamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kemikaalid		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
84	väetiste kasutamine metsas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
85	taimemürkide kasutamine metsas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
86	putukamürkide kasutamine metsas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rikkumised		Kindlasti parandanud	Pigem parandanud	Pole mõjutanud	Pigem halvendanud	Kindlasti halvendanud
87	metsa prahistamise ennetamine ja vähendamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
88	metsamaterjali varguste ennetamine ja vähendamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
89	kasvava metsa varguste ennetamine ja vähendamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PABERIMAJANDUS						
Dokumendihaldus		Kindlasti suurendanud	Pigem suurendanud	Pole mõjutanud	Pigem vähendanud	Kindlasti vähendanud
90	kasulike ja vajalike dokumentide maht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
91	mittevajalike ja üleliigsete dokumentide maht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
92	dokumendisüsteemi üldine korrastatus ja loogilisus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
93	vajalike dokumentide kättesaadavus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Kõik küsimused on nummerdatud. Juhul kui soovite lisada täiendavaid kommentaare mõne küsimuse kohta, kirjutage palun küsimuse number ja oma kommentaarid. Samuti võite soovi korral tuua välja muid mõjusid, mida nimekirjas polnud. Kasutage selleks palun allolevat tekstivälja.

Saada oma hinnang

Tühjenda kõik väljad

[Üles ankeedi algusesse](#)

Appendix III Field evaluation form

Metadata				
Filled in		date:	nr:	
Location	Forest district:	Sub-compartment:	Compartment:	
	Area:	Year of felling:		
	Remarks:			
Constant variables*				
Aspect				
Number of alive biodiversity trees	Total:		Per ha:	
Number of standing dead snags	Total:		Per ha:	
Length of lying deadwood (meters)	Total:		Per ha:	
Length of soil damage (meters)	Total:		Per ha:	
Other aspects*				
Aspect	YES	NO	NA	Remarks
Biodiversity trees damaged				
Buffer zones left along open landscapes and watercourses				
Garbage and signs of pollution				
Felling area borders corresponding with map				
Water regime of watercourses changed				

*Evaluation methodology given in section 3.4.

Appendix IV Field visit photos



Photo 1. Before certification it was not common practice to leave buffer zones along roadside (1999 site)



Photo 2. Certification introduced the buffer zone requirements (2004 site)



Photo 3. Buffer zone along smaller village road (2004 site)



Photo 4. Number of seed trees and biodiversity trees left on the cutting site has increased after certification (2004 site)



Photo 5. Clearfelling without any biodiversity trees and snags; a picture that was not encountered on the post-certification cutting sites (1999 site)



Photo 6. Fresh cutting site, similar in size to the site on photo above (2004 site)



Photo 7. Buffer zone along open landscape (grazing meadow) (2004 site)



Photo 8. The same buffer zone as in photo 7, view from the other side (2004 site).



Photo 9. Snags (dead standing trees) are much more common on sites harvested after certification (2004 site)



Photo 10. Snags left standing for biodiversity reasons during clearfelling (2004 site)



Photo 11. Soil damage is still a problem in state forest, although not very frequently encountered (2004 site)



Photo 12. Despite of public awareness and cleaning campaigns, illegal dumping of garbage is still serious problem in state forest, especially near big cities and resort areas (2004 site)