



## Management motives of Estonian private forest owners

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### ABSTRACT

Private forestry has been re-established as a rather new phenomenon in many Central-Eastern European countries including Estonia. The sustainable management of these forests has become a question over the years. We aimed to find answers how different values and objectives form management motives and influence decision making in forest management by these new forest owners. Principal-component and correlation analysis were applied to a collected dataset from forest owners in 2011 containing 254 responses. By the collection of datasets these forest owners were divided also by assessment methods. The results showed that randomly selected forest owners may have some different motives in their approaches to forests and forest management than forest owner organisation members, but mainly their motives overlap. The correlation analysis between individual forest owners revealed also that forest owners are very different in how they arrive to a particular decision in management. In addition, perceived values and long-term objectives are one of the fundamental cornerstones for these decisions. Forest policy often neglects the diversity of landowners and therefore policy implementation is often not successful. More flexibility in policies could be an answer.

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### 1. Introduction

After regaining independence in 1991 private land ownership was re-established in Estonia and now the restitution and privatization process is close to its finish. Forests cover 2.2 million ha (50.6% of the total land area) in Estonia. Private ownership accounts 45.3% and land under privatization 14.8% of total forest area (Keskkonnateabe Keskus, 2012). In 2011 there were 93 271 private individuals and 4001 enterprises and organisations who owned respectively 747 000 ha (74%) and 263 000 ha (26%) of private forest land (Forinfo, 2011). The forest properties are very different in size—e.g. 76% of forest owners have properties between 0.1 and 10 ha while covering a relatively small part of the total private forest area. Private owners who own 20 ha or more forest cover 42% of private forests yet they make up only 9% of the total number of private forest owners (Forinfo, 2011).

During the two decades not only the political concepts have changed but diversification had occurred in parallel and within private forestry during the ongoing changes in political thinking. The institutional environment (defined by North, 1990) has changed over the time gradually and crucial parts of these institutions are not given as much attention as needed. These parts include mainly beliefs and norms. As Schlüter and Koch (2011) point out a significant extent of institutional changes can be explained through mental models and ideologies. All these processes

have enormously influenced the management of private forests in Estonia. In this context the sustainable management of private forests comes into question. Many management-related problems have arisen—low efforts to reforest, lack of interest in stand development and low harvesting rates. According to the National Forest Programme (NFP) until 2020 (Keskkonnaministeerium, 2010) the baseline for reforestation in private forests is 20% of the total final felling area. The aim is to increase this to 40% by 2020. The main ways to improve reforestation and stand development are nowadays subsidies that are given to forest owners through the state foundation Private Forest Centre. In addition the NFP outlines that the annual harvested volume is ~2/3 of the optimum (Keskkonnaministeerium, 2010). Most of this shortage could be accounted to private forests. In addition to the goals set in the NFP also other policy areas like energy and nature protection play an important role in private forest management and in national strategies. For example the NFP aims to increase the area of strictly protected areas; at the same time the National Renewable Energy Action Plan (Majandus- ja Kommunikatsiooniministeerium, 2010) outlines that “wood has the greatest economic potential as a biofuel for electricity and heat production in Estonia”.

Motive is a reason that makes or might make a person choose to act in a certain way and reasons reflect e.g. persons' needs. Irrespective of that need, it is based on broader mental constructs. Ní Dhúbháin et al. (2007) argue that forest owners' attitudes and objectives might be the most important variables influencing decision-making and that often it is seen only as an indirect assumption and not a subject for direct analysis. This is also pointed out by Karppinen (1998) who concludes that in terms of decision-making, values and objectives form the general guidelines for a particular decision. Bliss and Martin (1989), using qualitative

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**Table 1**  
Characteristics of questionnaire respondents by forest owner assessment method.

Assessment method	Number of respondents	Mean age (y)	Gender (male/female, %)	Number of properties (mean/median)	Forest area owned* (mean/median, ha)	FOA member (%)	Owners living close to their forest property (%)
Method 1—through FOA	155	50	78/22	3.9/2	54.1/25.5	88	59
Method 2—random	99	56	58/42	1.8/1	13.1/8.0	12	54
All respondents	254	53	70/30	3.1/2	38.0/17.0	59	57

methods, identified a huge spectrum of different motives to conduct forest management. They also underlined that many of those motives might not be quantifiable and that a particular decision can be influenced by different motivations. In relation to harvesting Favada et al. (2009) found that forest owners' objectives have a quantifiable and statistically significant influence. Therefore it is essential to understand these aspects and processes to understand the management behaviour of forest owners, especially because of the short ownership traditions and the rapid dynamic development of private forest ownership as it often occurs in transition countries.

Our aim was to target random forest owners as well as more active forest owners as they influence the forest sector more significantly and they are also influenced more by the policies that are implemented. The aim of this paper is to have an insight how values and objectives of forest owners might influence their management intentions. Also implications of different motives for forest management in Estonian private forests are looked upon. A previous study on Estonian forest owners' objectives concentrated more on forest owners' information needs (Toivonen et al., 2005). We hypothesize that private forest owners are a very diverse in their motives and that forest policy often does not take this into account. Even more, a narrow policy approach, together with strict rules, by concentrating on technical management issues might lead to a non-compliance with national strategies. As Weiland (2010) shows, this is often the case in post-socialist countries where there is an imbalance between the state and private sector which might lead to a low interest in private activities and difficulties in implementing “top-down” policies.

## 2. Material and methods

The data was obtained through a questionnaire survey conducted in 2011 among private forest owners. Two assessment methods for reaching forest owners were used. More active forest owners were reached with the method 1 and random forest owners were reached with the method 2. Using method 1, 163 questionnaires were collected through regional forest owners associations (FOA) by the help of the Estonian Private Forest Union. Using method 2, another 110 questionnaires were collected using a random sample from the forest owners' database. To access it, a special permit from the Ministry of the Interior was obtained. From the whole database, 1000 forest owners were randomly selected and 606 of them received the questionnaire (response rate 18%). From all the questionnaires received 19 were excluded from

the data analysis due to a large number of missing answers which resulted in 254 usable questionnaires. An overview of respondent characteristics is given in Table 1 and distribution of respondents' forests in Table 2.

In the questionnaire respondents were asked to indicate how well each statement reflected their aims and values for forest management using a Likert scale with five levels—“Strongly Agree” (5), “Agree” (4), “Neutral” (3), “Disagree” (2), and “Strongly Disagree” (1).

A large number of forest values and long-term objectives enabled us to use principal component analysis (PCA) with the ‘varimax’ rotation. The rationale behind this process was to decrease the overall number of original variables and to combine both values and objectives to see if any combinations arise. Based on the components scores for each original variable and combinations between the scores for values and objectives, the components were named accordingly.

Variables with PCA loadings above 0.4 were considered equally important and were used in calculation the numeric values of motives. The motive scores were calculated taking an average of scores of respective objective and value variables. Determining the importance of a motive was by comparing the motive values with the threshold value. Threshold value was determined as the upper third on Likert scale (>3.67 for single variable). Fig. 1 shows the share of respondents according to different motive scores depending from the signal strength on Likert scale together with the threshold value. In the end correlation coefficients between individual motive scores and answers to specific forest management questions were found.

## 3. Results

### 3.1. Management motives of forest owners

The analysis indicated that five different principal components is a reasonable output. The amount of variance that is accounted for by each of the five components is larger than one. Since the components were based on both ownership objectives and forest values the components are considered as motives for forest owners. None of the components (Table 3) stand out in terms of explained variance which indicates a high diversity between the components. Overall they explain 66% of the total variance. As mentioned the distribution of explained variance between the components suggests that there is a significant diversity between the components i.e. they are not strongly linked. In addition there are strong links within the components which was the basis for

**Table 2**  
Distribution of respondents by number of properties and forest area.

Assessment method	Number of properties					
	1	2	3	4	5	More than 5
Method 1 (%)	32.3	34.2	9.0	6.4	7.1	11.0
Method 2 (%)	55.6	26.3	11.1	3.0	2.0	2.0
All respondents (%)	41.3	31.1	9.8	5.1	5.1	7.6
	Forest area (ha)					
	(0–5]	(5–10]	(10–20]	(20–50]	(50–100]	More than 100
Method 1 (%)	6.6	8.5	26.3	34.9	14.5	9.2
Method 2 (%)	34.3	26.3	21.2	15.2	3.0	0.0
All respondents (%)	17.5	15.5	24.3	27.1	10.0	5.6

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