

Nordic Forest Professionals' Values

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The present study analyses the values held by forest professionals in three Nordic countries: Finland, Norway, and Sweden. The data is from a large (n=1113) internet survey that used cognitive mapping as a research tool, which is a novelty in value measurement. The questionnaire is based on the organisational value theory of Schein (1992), supplemented with relevant forest-related and environmental values. The forest-related main value factors were in the following order of importance: Expertise, Private forestry, Forest production, Nature conservation, and Tradition. The measurement included two kinds of cases: action values, referring to present decision-making, and ideal values, referring to decisions concerning future ideals.

Most of the values' scores were similar. Almost all values received higher scores of importance in the ideal cases compared to action cases, a fact that can probably be explained by constraints related to the professionals' current working environment. Some international differences were also found: Sweden and Norway were closer to each other and both differed from Finland, where private forestry, forest production, and traditions are highly valued. Moreover, respondents working in industry were found to be slightly more production-oriented than other forest professionals. The study also revealed several weaknesses of the cognitive mapping method in measuring values.

Keywords forest professionals, values, cognitive mapping, Nordic countries

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1 Introduction

The forest sector globally is facing several challenges, including its diminishing relative importance in national economies, its need to balance different aspects of sustainability, climate change and deforestation. Fundamental in today's open and global society are communicative attitudes and values. For instance, communication will definitely fail if people overly respect restraint or are more reactive than proactive. Therefore in order to understand the ability of the forest sector to tackle new challenges we should understand not only the values of the general public but also the values of those working with forest policy and management issues.

Despite the central role of forest professionals in forestry only a few studies have explored their values.¹⁾ As Kaufman (1960) wrote in the preface of his classic study *The Forest Ranger: "Field compliance in the Forest Service is not total, naturally, but it is so high, despite powerful factors tending to reduce compliance, that it cries out for study."* This high degree of professional value conformity was also found by Duerr and Duerr (1975), Glück (1987), and Kennedy (1988). In contrast with these results, Pregernig (2001) reported that foresters' value differences related to certain policy instruments. And finally, foresters' values have been seen as more utilitarian or economically oriented than the values of the general public (Wagner et al. 1998, Vining and Ebreo 1991).

A cultural study of foresters by Saarimaa (1993, 1998, 1999) reported that a single forester may simultaneously have different cultural models related to forests and forestry. These may compete with each other and therefore need compromising, but altogether they may provide a wider view of forest values than the models laymen have.

Forestry professionals have been critical of the excessive use of power by experts and the

promotion of vested professional interests in decision-making processes (e.g. Ellefson 1992 and Cabbage et al. 1993). In addition, Glück (1987) worries that an excessive emphasis on expert-driven decision-making is a threat to democratic decision-making: "the role of citizen is taken over by experts". Glück et al. (2005) discuss these problems in the context of traditional top-down hierarchical forest policy-making as well as in the context of the transition towards a more citizen-inclusive and democratic decision-making culture.

Glück (1987) lists the values of forest professionals that are probably most typical of Central European foresters: timber primacy in relation to other goods and services forests produce, sustained yield, the long term, and absolute standards. He trusts that scientific information on forests can define the preferred goals of forest policy. The values of foresters are also associated with conservatism and a preference for "traditions, morals, religion, and family" and with a suspicion of libertarianism (capitalism) and pro-environmental political thinking (Glück 1987:159). Moreover, the foresters' values are assumed to include a strong emphasis on "common welfare" and "public interest".

Most of the above-mentioned empirical studies are national or more limited in their scope. The only empirical international comparison concerning professionals' values has been Berninger et al. (2008) who found that these values varied between countries depending on the relative role of forestry. Their data came from three regions in Finland and Canada and showed in particular that as the importance of commercial forestry increased, the more the importance of economic issues was expressed.

In the past, forest policy and management have been more in the hands of forest professionals. However, their role has evolved so that they no longer possess as much authority in forest issues. For example, environmental issues have had a central role in the public discussion on forests (Rantala 2006). In addition to this, the number of women in the profession has increased constantly in recent decades. For instance, the percentage of female Finnish academic foresters has risen from 1.6% in 1960 to 24% in 2004 (Naismetsänhoitajat... 2004).

¹ Instead of forest professionals' values, the values of forest owners have been studied more extensively (e.g., Kurtz and Lewis 1981, Young and Reichenbach 1987, Egan and Jones 1993, Birch 1994, Bourke and Luloff 1994, Nagubadi et al. 1996, Egan et al. 1997, Lönnstedt 1997, Kuuluvainen et al. 1996, Kangas and Niemeläinen 1996, Karppinen 1998, 2000).

In these circumstances it is of special interest to learn about the values of forest professionals. The forest profession is defined here as comprising individuals working within the forest sector, potentially not limited only to forestry and the forest industry. In the present survey, belonging in the forest sector was based on a respondent's self-evaluation. Although an educational analysis was not conducted the forest professionals in this study are most likely academic foresters and forest engineers who have graduated from polytechnics or applied universities.

Within any profession it is of general interest to know how values are divided between those affiliated with different organisations, such as forest industry companies and public organisations. This information can be utilised in analysing whether exists any covariance between employees' values and the official values declared by the very same organisation.

The aim of this study is to explore the forest profession's values in Finland, Sweden, and Norway. These Nordic countries have a strong forestry and forest industry sector which, in contrast with several other countries, is highly international. Through international forest industry companies, the organisational cultures and values of Nordic forestry professionals are diffused into other geographical areas. This is why, it is important to analyse the Nordic countries. The data for the study comes from an internet survey conducted in 2002 (see Hellström et al. 2003 for details).

In the article we examine the following three issues:

- 1) *The forest profession's values.* What are the main values of forest professionals?
- 2) *Value differences related to professionals' backgrounds.* Do main values differ with respect to individuals' backgrounds, such as nationality, type of organisation, age, occupational position, and gender?
- 3) *Value differences related to action and ideal values.* Do action values differ from ideal ones?

The contribution the study makes is that it reports on forest professionals' values from a large-scale international survey. The speciality of this survey was that it measured forest professionals' values in four different contexts that depict both present and future decisions. Moreover, the measuring

of values with Cognitive Mapping (CM), a relatively new method in value research, is briefly discussed.

2 Theoretical Framework and Operationalisation of Values

Forest professionals' values can be explored from the perspectives of several disciplines, theories and models. Here, three potentially useful perspectives are outlined. First, most forest professionals are affiliated with organisations, such as forest industry companies or state forest services. *Organisational cultures* are thus a natural starting point for exploring an individual's values. Organisational cultures have been researched by Pettigrew (1979), Smircich (1983), and Schein (1992), for example. Second, forest professionals can be seen as actors who consciously perceive their environment, process this information and solve problems. The *cognitive (social) psychology* perspective stresses the importance of goals, expectations, and knowledge (Fishbein 1975, Ajzen 1991, Glass and Holyoak 1986, and Eysenck 2005). Third, because forest professionals manage natural resources, knowledge on specific models related to *environmental values* is certainly necessary here. Models, especially applied to nature and the environment, include such aspects as altruism, anthropocentrism, and ecocentrism (Heberlein 1972, Dunlap and Van Liere 1977, O'Riordan 1995, Kalof and Satterfield 2005).

The data for the study is taken from Hellström et al. (2003) which utilised Schein's (1992) theory of organisation cultures as a survey framework. Schein (1992) defines culture as a collection of deep, mostly unconscious shared assumptions that are largely taken for granted. These assumptions originate from everyday problems that an organisation and its members face. The assumptions can be seen from the results of the organisation's efforts in its battle to survive.

According to Schein (1992), culture in general consists of three dimensions: *assumptions*, *values* and *artefacts*. Assumptions are widely held, ingrained, subconscious views and concepts regarding human nature and social relationships.

Table 1. Value categories and values within categories. Schein's (1992) value categories in parenthesis.

Value categories	Values
1) Forest	Ecocentrism/anthropocentrism, monism/pluralism, private/public usage
2) Time and change (Nature of time)	Short-term/long-term, reactivity/pro-activity, innovativeness/traditionalism
3) Internal operations within the forest sector (Human relationships)	Expertise/practicality, benefit/responsibility, democracy/authoritarianism
4) External relations with the rest of society (Relationship to organisation's environment)	Openness/restraint, co-operation/autonomy, customer/production orientation

Table 2. The cases used as a stimulus in the survey.

Present	1) Contract (breach of contract). Various parties have commonly agreed on the use of a local forest area. Now, one party is unilaterally acting in breach of contract. You have been assigned to solve the resulting dispute. How do you act?
	2) Interview (request for an interview). There is a dispute about the harvest rates and multiple-use of forests in the local press. A trustworthy journalist has already interviewed various parties concerned and now he contacts you. How do you respond?
Future	3) Education (planning education). It is the year 2010. The forest sector and its operational environment have changed. It is necessary to redesign forest sector education. You are a member of a working group developing education. What do you propose?
	4) Planning (compiling a planning team). It is the year 2010. The forest sector and its operational environment have changed. You have been assigned to assemble a working group to prepare a new forest management plan for the forests within your area. Who do you invite?

Assumptions have been utilised for a long time and are thus taken for granted. Values refer to articulated, publicly announced principles that a group claims to be trying to put into effect. Artefacts are more physical and solid representations of culture, such as rituals, slogans and traditions; in general, artefacts can be (directly) observed from people's behaviour. In this study, values are examined.

The data collection by Hellström et al. (2003) applied Schein's (1992) three value categories describing organisational values: the nature of time, human relationships (power distribution) and relationship to the organisation's environment. Hellström et al. (2003) slightly modified these categories and also applied a fourth dimension concerning forest-related and environmental values (Table 1). Three pairs of values were

constructed in each category. These were meant to represent partly counter-values and partly complementary views that are needed in covering the full range of values.

Hellström et al. (2003) measured four value categories through four hypothetical but concrete cases that aimed to represent dilemmatic issues faced in practical work. The idea was that concrete cases motivate respondents and also validate measurements, compared to value measurements that operate with statements. These cases were labelled as contract, interview, education, and planning (Table 2). The first two (contract and interview) were situated in the present and aimed to explore current *acting* values, the last two (education and planning) were aimed at tackling future actions and thus reflecting upon *ideal* values.

The values were operationalised by concrete

descriptions of behaviour, called here Modes of Actions (MA). The MAs connected the concepts of values with the practical cases of decision-making. All operationalizations are described in Appendix 1. The total number of MAs was 96, resulting from four cases, four value categories, and six values (4*4*6=96). Appendix 1 describes cases, value categories, values and MAs as they were used in the survey.

Some MAs were applied from Schein, while others were constructed for this purpose by studying the value statements of forest sector organisations, such as customer-production orientation. For example, the value 'democracy' in a contract case was operationalised through the MA participation with the following wording: "I suggest public discussions and participatory planning in support of the renewal of the contract".

3 Data and Methods

3.1 Collection of Data

The data was collected by an internet survey conducted in April–May, 2002. The target group was contacted through the email lists of several organisations preparing the 20th Nordic Forestry Congress (for more details, see Hellström et al. 2003:11–13). A total of 1352 responses were received. Most of the respondents were from Finland (76%), followed by Sweden (11.0%), and Norway (9.6%). This is mainly because the dissemination of information about the survey was sent through the organisations supporting the forest congress held in Helsinki. Both Iceland and Denmark made less than 30 observations and were dropped from the analysis.

3.2 Respondents

The sampling procedure was not representative but was based rather on information dissemination through certain forest sector organisations, and therefore it can be assumed that the sample represents the forest professionals who work with forest issues in these organisations but not necessarily all those with a forestry education.

Table 3. Descriptive statistics of data

Variable	Value	Frequency	Percentage
Nationality	Finland	805	78
	Sweden	123	12
	Norway	106	10
Occupational position	Expert	276	27
	Not working	1	0
	Leading position	194	19
	Official	472	46
	Worker	69	7
Organisation	Entrepreneur	22	2
	Other	274	16
	Education	61	6
	Forest owner	22	3
	Industry	293	28
	Research	143	14
	State forestry	204	20
Public officials	137	13	
Gender	Male	846	82
	Female	188	18
Age groups	–30	117	11
	31–40	279	27
	41–50	345	33
	51–60	252	24
	61–	41	4

The respondents classified themselves as either belonging to the forest sector or not. They may have been affiliated with several different organisations, for instance, in research and education, extension services, companies, state forest administration and other public bodies of the forest sector. Most respondents (85%) classified their occupation as belonging to the forest sector. Respondents outside the forest sector were excluded from further analysis. After removals, 1113 observations remained.

A summary of the data is presented in Table 3. The respondents' occupational status was covered mainly by three categories, namely officials (46%), experts (27%) and leading position (19%).

The respondents' organisations' sectors were industry (28%), state forestry (20%), research (14%), and public administration (13%). Most of respondents were male (82%). The mean age was 43 years, with a ranging from 25 to 65 years

with a standard deviation of 10 years.

The survey did not specify what kind of education the respondents had. In the case of Finland, the statistics show 90 000 employees in forestry and the forest industry (Metsätaloustoiminta... 2007). More specifically, the Finnish target group most likely comprise the 7000 forest engineers graduated from the polytechnics or applied universities and 2600 academic foresters graduated from the universities (Turunen 2002). Considering these figures, the amount of data is rather large.

We can compare the data to figures from the annual survey by the Society of Finnish Professional Foresters, SFPF (Työmarkkinakatsaus. 2007). According to that survey 6.6% of respondents had the highest leadership position, 9.8% had a leadership position of some kind, and 15.6% had an upper-middle level position. The range of the leaders is thus 16.4–32%, which very much matches with the figure 18.8% from the data of this study. There were no comparable statistics for positions other than leadership ones. Industry was the employer for 20% of all foresters, which is less than the figure of 28.3% in this study. The most likely reason for this over-representation

of industry is the way the data was collected. The snowball method originated from the sponsor organisations which considered large-scale forest industry companies. According to the SFPF survey, of all forest professionals 10.3% were working in education. In the data here the percentage is only 5.9.

The gender division was also somewhat biased in this study. Only 18.2% of respondents were female whereas in the SFPF survey 30% were. The reason for this is most probably the large number of responses from industry where the proportion of men is greater than women.

3.3 Measurement of Values and Recoding of Observations

The survey utilised cognitive mapping (CM) to measure values. The CM software showed respondents a display where a case was placed in the centre of the screen and 24 MAs (value statements) were shown along the sides of the map (Fig. 1). Respondents were asked to draw each of the MA the closer to the centre the more relevant they thought it was. The closer to the

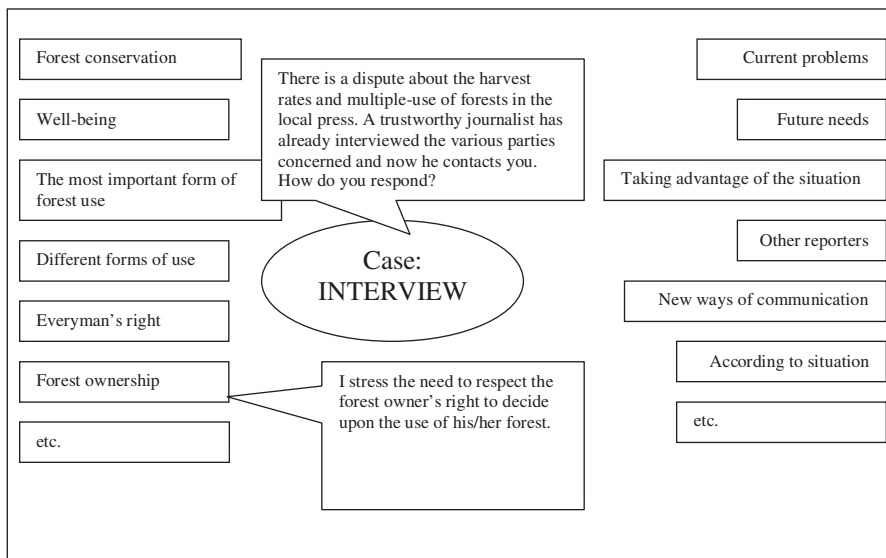


Fig. 1. Cognitive mapping. An example of the computer display in the initial stage (modified from the figure in Hellström et al. 2003:11).

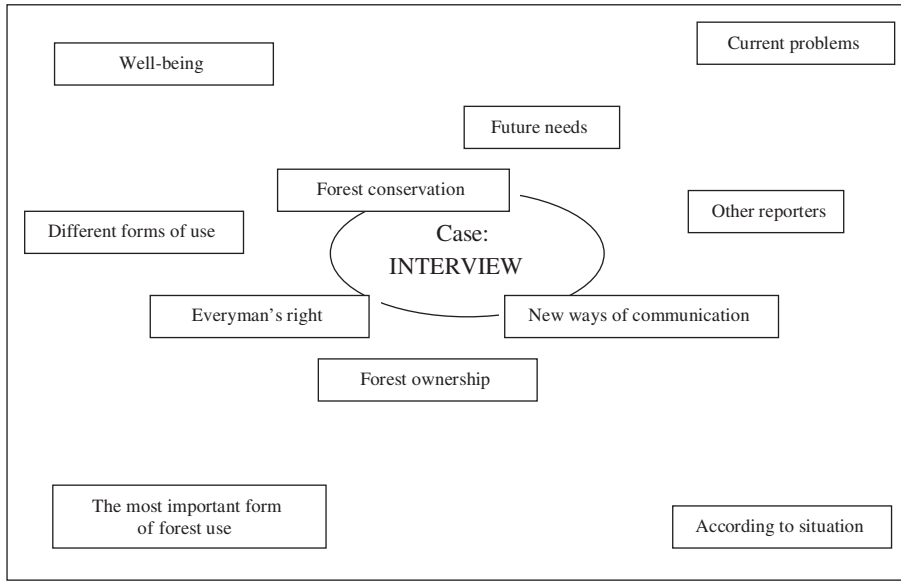


Fig. 2. Cognitive mapping. An example of the computer display after reply (modified from the figure in Hellström et al. 2003:11).

centre the respondent moved any MA the higher was the numerical value attached to it (Fig. 2). Values given by the software ranged from 0 to 460. It was also possible to move the MA out of the display or not touch the MA at all. Under the circumstances, the measurement is a mixture of ordinal and interval scales.

In order to reduce unintentional variation in measurements and to interpret the observations “untouched” and “moved out”, we scaled all responses of MAs as ordinal measures. The ordinal scaling is shown in Fig. 3.

If a respondent touched no MAs related to the specific case, it is probable that the respondent had simply not answered properly and all MAs related to this case would have missing values for the respondent. If only one MA was placed on the display or was “moved out”, it was interpreted as valid answering for the case. All the other MAs (23 altogether) proposed in the case were therefore coded as “untouched” instead of having missing values. Each of the four cases was treated separately because respondents evaluated MAs case by case.

Acceptable responses for the different cases totalled 1056 for case 1, 1076 for case 2, 1080

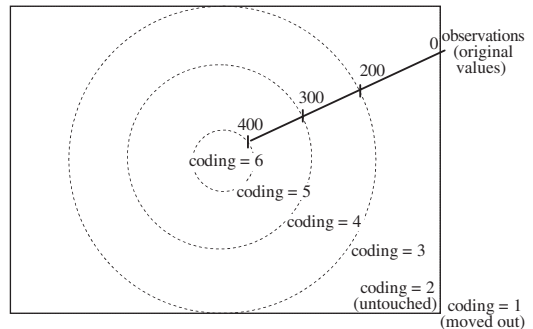


Fig. 3. Cognitive mapping. Conversion of observations to ordinal scale.

for case 3, and 1072 for case 4. There were no large differences between the cases. The total number of responses that included a reply to all four cases was 1034.

3.4 Statistical Methods

Exploratory factor analysis using the maximum likelihood method was employed to analyse the

main values.²⁾ Factor analysis, with an orthogonal solution and varimax rotation, was carried out separately in each of the four value categories. The purpose of the analysis was to find MAs that were related to each other, i.e., to find latent values behind the MAs. These latent variables were later applied to form sum variables to represent main values.

The starting point in creating the sum variables were those the MAs that were originally intended to indicate the same single value. However, not all these MAs had high loadings in the same factor. Whenever at least three out of four MAs measuring the same single value had a loading of at least .35 in the same factor, the value was explored further. In most cases several other MAs had high loadings in the very same factor. If these MAs were easily interpreted, meaningful and seen as important in the context of Nordic forestry, they were selected for further analysis. The sum variable measuring a main value factor was calculated as the average of the MAs having loadings higher than .50 and being meaningful from the point of view of substance.

4 Results

4.1 Important Single Values

First we report some of the most interesting single values, after which the main value factors among respondents are covered. The respondents' backgrounds' influence on values then dealt with, and finally we report, how the action values differ from the ideal ones.

The mean of MA measure was 4.06 (see Appendix 2 for the complete description of the means, presented separately for Finland, Sweden and Norway). A systematic difference was found in the level of evaluations given in each country: the mean of Finnish forest professionals was 4.13,

Swedes 3.87 and Norwegians 3.80 on average.

The means of value categories (Table 4) ranged from 3.96 ("External relations") to 4.24 ("Relation to forest and its usage"). The mean of the cases ranged from 3.95 ("Contract" and "Interview") to 4.18 ("Education").

Some notions on the measures of modes of actions are presented, considering their significance interest in relation to previous studies and also the correlations between MAs found in the factor analysis (Appendix 3a–3d). In general, most MAs scored a relatively close average of 4.06, but some exceptions were found.

Among the MAs that were scored above average, *Continuous development* (4.8), *Mutual understanding* (4.8) and *Broad basic knowledge* (4.8) received the highest scores. Other above average MAs were *Societal point of view* (4.6), *Speciality knowledge* (4.6), *Pluralism* (4.4), as well as *Long term* (4.4), *Private usage* (4.3), and *Expertise* (4.3).

MAs that were well below average included *Own interests* (3.1), *Confidentiality* (3.3), *Own article* (3.3), and *Other reporters* (3.3). Others below average were *Custom* (3.4), *According to need* (3.4), *Authority settlement* (3.4), *Benefit* (3.5), *Authoritarianism* (3.5), and *Restraint* (3.6).

4.2 Main Value Factors

Five main value factors were found and labelled as follows: *Private forestry*, *Nature conservation*, *Tradition*, *Expertise*, and *Forest production*. (see Appendixes 3a–3d). The sum variables were formulated based on the factor analysis. The components of each of the sum variables (later: main value factors) are shown in Table 5 (see Appendix 1 for a complete description of MAs).

The descriptive statistics of the main value factors are shown in Table 6. The ordinal MAs of the main value factors varied mainly from 1 to 6, with *Expertise* and *Forest production* being exceptional and having minimum values of 1.60 and 1.50, respectively. The means of the main value factors were mostly slightly over 4, with a maximum of 6, for most factors except *Tradition* which scored 3.6. Standard deviations for most factors were very close to each other, varying

² The structure of the survey made it potentially possible to use the structural equations to analyse the model suitability and modelling errors. However, the results of the confirmatory factor analysis using LISREL and AMOS softwares showed that the survey did not succeed in measuring the theoretical constructs properly, i.e., the three-level structure (value categories, values, modes of action) was not statistically valid. In particular, there were no unidimensional value categories.

Table 4. Means of value categories across cases.

Cases	Value categories Relation to forest and its usage	Relation to time and change	Internal operations	External relations	Mean
Contract	4.10	3.78	4.04	3.86	3.95
Interview	4.14	4.01	3.85	3.80	3.95
Education	4.30	4.28	4.03	4.11	4.18
Planning	4.41	4.18	3.99	4.07	4.16
Mean	4.24	4.06	3.98	3.96	4.06

Table 5. Main value factors and their components, with the respective MA codes in parentheses.

Factor	Components
Private forestry	Forestry (MA123)
	The most important user (MA134)
	Effects on forest owners (MA151)
	Forest ownership (MA152)
	Private forestry (MA153)
Nature conservation	Decision by forest owner (MA154)
	Ecological needs (MA111)
	Forest conservation (MA112)
	Forest ecology (MA113)
Tradition	Multiple use of forests (MA141)
	Everyman's right (MA162)
	Present duties (MA213)
	Examination of trends (MA221)
	According to need (MA231)
Expertise	Other reporters (MA242)
	Custom (MA261)
	Best specialists (MA313)
	Speciality knowledge (MA314)
Forest production	Practical training (MA323)
	Fully authorised (MA353)
	Users and buyers (MA454)
	Securing production (MA461)
	Forest management (MA462)
	Forestry specialist (MA464)

from 0.85 to 0.89; the exception was *Forest production* with a standard deviation of 0.96. The main value factors of the highest scores in the mean ranks were *Expertise* and *Private forestry* with means of 3.58 and 3.52, respectively. Tradition was the lowest ranked value with a mean of 1.76. This mean was statistically lower than any other main value factor.

Table 6. Descriptive statistics of main value factors (sum variables). N= 1034.

	Minimum	Maximum	Mean	Standard deviation	Mean rank ^{a)}
Private forestry	1.00	6.00	4.33	0.86	3.52
Nature conservation	1.00	6.00	4.06	0.88	2.77
Tradition	1.00	6.00	3.60	0.89	1.76
Expertise	1.60	6.00	4.34	0.85	3.58
Forest production	1.50	6.00	4.24	0.96	3.36

^{a)} The Friedman test uses rank ordering of the measures for each respondent. The rank of "5" is given to the highest of a subject's five sum variables, "4" to the next variable, and so on.

Value measures were compared using non-parametric methods. A total of 10 comparisons³ were made using a Friedman test and Bonferroni corrections (SPSS...2006). Most of the main value factors differed from each other. The pairs that did not statistically differ were *Private forestry / Expertise* and *Private forestry / Forest production*.

4.3 Value Differences Related to Background

The main value factors were analysed relating to the following background variables (Table 7): nationality, occupational position, type of sector, gender and age group. The analysis showed that the largest differences in values between occupational positions were between those in the lead-

³ $(n(n-1)/2)$ paired comparisons where n is the number of elements, in this case $n=5$.

Table 7. Medians of main value factors in the classes of background variables.

Variables	Private forestry	Nature conserv.	Tradition	Expertise	Forest product.
Nationality	*** a)	***	***		
Finland	4.50	4.17	3.83	4.60	4.50
Sweden	4.17	4.17	3.50	4.40	4.00
Norway	4.00	4.00	3.42	4.40	4.00
Employer	***	***	*	***	
non-industry	4.33	4.17	3.67	4.40	4.25
industry	4.67	4.00	3.83	4.60	4.75
Leader					
non-leader	4.50	4.17	3.67	4.40	4.50
leader	4.33	4.00	3.83	4.50	4.50
Age	**				
–30	4.50	4.33	3.83	4.60	4.25
31–40	4.50	4.17	3.83	4.60	4.50
41–50	4.50	4.17	3.67	4.40	4.50
51–60	4.33	4.00	3.67	4.40	4.50
61–	4.33	3.83	3.50	4.20	4.50
Sex	*				
male	4.50	4.17	3.67	4.40	4.50
female	4.33	4.33	3.83	4.40	4.25

a) Kruskal-Wallis test. Stars indicate the significance, namely * = 10%, ** = 5% *** = .1%.

ing positions and the rest of the respondents. Among the sectors that the respondents worked in, industry had values that differed most from other sectors.

Occupation and the type of sector were transformed into dichotomist variables. The type of sector was compressed into classes of industry-employed persons and non-industry-employed persons. The occupational position was converted into those working as leaders and the other positions were merged into the category of non-leaders.

The group means were analyzed by a non-parametric Kruskal-Wallis test. When the main value factors were analysed across the countries, the highest scores for *Forest production* were significantly higher in Finland (4.50) than Sweden and Norway (4.00).

Private forestry obtained the highest scores in Finland (4.50), followed by Sweden (4.17) and Norway (4.00). The difference between Finland and the two other countries is statistically significant. Related to the main value factor *Nature conservation* the scores were rather similar, from 4.00 in Norway to 4.17 in Sweden and Finland,

with no significant differences between countries. *Tradition* obtained the lowest scores of all main value factors in all countries. The Finnish scores (3.83) were significantly higher than the Swedish (3.50) and Norwegian (3.42) scores.

Differences between industry-employed and non-industry-employed persons were found. Among all main value factors across all countries the highest median scores (4.75) were given to *Forest production* by the forest-industry-employed persons while the non-industry-employed persons had a median of 4.25. The median of the *Private forestry* main value factor was 4.67 for industry-employed persons and 4.33 for others. The main value factor of *Tradition* was also more valued

Table 8. Main value factors divided into ideal values and action values, components of factors.

Factor	Modes of action
Action values	
Private forestry	Effects on forest owner (MA151) Forest ownership (MA152)
Nature conservation	Ecological needs (MA111) Forest conservation (MA112) Multiple use of forests (MA141) Everyman’s right (MA162))
Tradition	Examination of trends (MA221) According to need (MA231) Other reporters (MA242) Custom (MA261)
Expertise	Authority decision (MA362)
Forest production	Securing production (MA461) Forest management (MA462)
Ideal values	
Private forestry	Forestry (MA123) The most important user (MA134) Private forestry (MA153) Decision by forest owners (MA154))
Nature conservation	Forest ecology (MA113) Environmental organisations (MA114)
Tradition	Present duties (MA213) Co-operation partners (MA264)
Expertise	Best specialists (MA313) Speciality knowledge (MA314) Own interests (MA323) Fully authorised (MA353)
Forest production	Users and buyers (MA454) Forestry specialists (MA464)

among industry professionals than others (medians 3.83 vs. 3.67). There were also significant differences in the *Expertise* main value factor: the industry-employed persons had a median score of 4.60 in contrast with 4.40 for the others.

The leaders were somewhat less oriented towards *Private forestry* than non-leaders (4.3 vs. 4.5). They also had higher medians related to *Tradition* and *Expertise*, but their score in *Nature conservation* was lower. However, these differences were statistically non-significant.

The value differences related to the respondents' age were analysed in six age categories. The only statistically significant difference (risk level .10) was found in the *Expertise* main value factor. Younger professionals considered expertise to be more important than did older professionals. Younger professionals also considered *Private forestry* and *Tradition* to be more important main value factors than did older respondents.

Only a few differences in value scores were found between genders. Males had statistically significantly higher scores than females in the main value factor *Private forestry*. Females had slightly higher scores in the main value factors *Nature conservation* and *Tradition*, but these differences were not statistically significant.

4.4 Ideal Values vs. Action Values

Each of the main value factors was divided into two measures: action values and ideal values. Cases (1) contract and (2) interview were described as present issues measuring action values whereas cases (3) education and (4) planning were situated in the future and were assumed to reflect respondents' ideal values (see Hellström et al. 2003 for details). The sum variables were calculated as the means of the respective MAs, as presented in Table 8.

The action values were compared to the ideal values using a non-parametric Wilcoxon paired samples test. The results show statistically significant differences among all five factors (Table 9). With *Private forestry*, more respondents had higher scores for the acting values (46%) than those with higher scores for the ideal values (39%). This can be seen in the column showing the share of negative ranks (ideal value < action value), positive ranks (action value > ideal values) and ties (ideal value = action value). With the other four main values more respondents had scores higher for ideal values than for acting values. These latter four value differences were statistically highly significant.

Table 10 reports the differences between ideal and action values by nationality. Less than half (48%) of Finnish respondents had action values

Table 9. Comparison between acting and ideal values. Results from Wilcoxon paired samples test.

	Ideal vs. action	Share of respondents (%)	Wilcoxon test score	Asymp. Sig. (2-tailed)
Private forestry	Ideal < acting	46	-1.937	0.053
	Ideal > acting	39		
	Ideal = acting	15		
Nature conservation	Ideal < acting	27	-11.03	0.000
	Ideal > acting	55		
	Ideal = acting	17		
Tradition	Ideal < acting	22	-15.44	0.000
	Ideal > acting	63		
	Ideal = acting	15		
Expertise	Ideal < acting	24	-14.88	0.000
	Ideal > acting	64		
	Ideal = acting	12		
Forest production	Ideal < acting	28	-5.907	0.000
	Ideal > acting	43		
	Ideal = acting	29		

Table 10. Difference between ideal and action value factors across nationalities. Percentage of respondents having action values higher than ideal values.

	Nationality % of respondents			Asymp. Sig.
	Finland	Sweden	Norway	
Private forestry	48	37	40	0.031
Nature conservation	28	23	26	0.564
Tradition	22	20	20	0.706
Expertise	20	38	33	<0.001
Forest production	29	24	25	0.372

higher than ideal ones concerning the factor *Private forestry*. The respective proportion of Swedish respondents was less (37%) than that of Norwegians, with 40%, were between Finland and Sweden. These percentages indicate that related to *Private forestry*, Finns had higher scores in actual values than Swedes and Norwegians ($p=0.03$).

Of Finnish professionals, 23% had action values higher than ideal values related to *Expertise* whereas the respective numbers were 28% for the Swedes and 26% for Norwegians, meaning that the Finns had higher scores in ideal values than the Swedish and Norwegian professionals had. The Finns thought more frequently than the others that expertise in the ideal case is important but in action they did not greatly acknowledge expertise, i.e., authorities' decisions. No statistically significant differences between countries related to the values *Nature conservation*, *Tradition*, and *Forest production* were found.

5 Discussion

The CM tool used in this study was found to be critical in several ways. The method was originally planned to measure and graphically represent the network structures of different values or attributes (see e.g., Kelly 1955, Eden 1988, Eden and Ackermann 2004). Here CM was applied in a more limited way: only the MA's distance from the midpoint of the computer screen was registered, and CM measures were simplified to

one-dimensional scales akin to a Likert scale.

Compared to a typical Likert scale, the CM method here entails a reliability problem: the computer display has two dimensions and is not square but rectangular in shape. There are thus infinite numbers of locations (a circle) for the MA to obtain the same numerical value (Fig. 3). How strictly the respondents have been able to identify these invisible circles is questionable. By rescaling the data as ordinal, this problem could be largely solved.

The original CM in Hellström et al. (2003) did not attach numerical values for MAs that were either not touched or moved out from the display. However, we assume that these are of special interest: when the respondent did not touch an MA it had less value for him/her compared to those MAs that he/she placed on the display. Moreover, MAs moved out from the display had an especially negative value for the respondent.

Compared to the original reporting of the survey (Hellström et al. 2003), the new coding did not markedly change the results. All three main values were also important in that survey; for instance, professionals strongly trusted science and knowledge in solving future problems.

It appeared that industry professionals were over-represented in the data. This is not necessarily a serious problem if the overrepresentation is equal with respect to other measures of interest such as nationality or any other background variables. The data itself was substantially large, with more than one thousand observations. It is also worth noting that the data was collected already in 2002. However, we believe that most of the values are inherent to professionals and changing rather slowly, so that the results describe not only that period but also the present. It would be necessary to establish follow-up studies measuring forest professionals' values. As far as we know there is no such an undertaking. In order to enable comparisons between foresters and other groups, future studies could apply more regular and tested value measures concerning attitudes to democratic government (Klingemann 1999) and postmodern values, such as de-emphasising authorities, individualism, cultural tolerance, and the pursuit of individual subjective well-being instead of economic growth (Inglehart 1999).

In general, concerning values and their meas-

ures, most of the surveyed values were relatively high and differences between groups and countries relatively small. Several earlier studies have found forest professionals tending to be less supportive of environmental values than production-oriented (or utilitarian/economic/materialistic) values or the primacy of timber production (Xu and Bengston 1997, Wagner et al. 1998). Further, information is available on other differences: foresters prefer timber production to a greater degree than forest owners (Kindstrand 2008) and the general public (Wagner et al. 1998). In this study, a comparative measurement was not available but both forestry-related and environmental values received relatively high scores among foresters. Compared to the results of Berninger et al. (2009) concerning Finnish forest professionals, we also found that forest production was more important for them than nature conservation.

As Glück (1987) suggested, forest professionals rank highly expert knowledge and long-term needs. Contrary to his suggestion, the valuation of expertise seems not to be in contrast with appreciation of democratic values because both received high scores. However, this result is at the sample level and does not necessarily hold with individual professionals. As well, authoritarianism scored below average, despite the fact that its operationalization was revealed somewhat by understatements. For example, strong leaders or authoritarian regimes were not referred to as is typical in survey studies concerning democratic ideologies and counter-ideologies (e.g. Linde and Ekman 2003, Sänkiäho 1996).

The value "Traditionality" was ranked slightly below average, and "Innovativeness", intended somewhat as a counter-value, received similar scores. Reconsidering the MAs that were measured concerning traditionality, those were found to be only loosely connected to traditionality and a more appropriate title for this value could be "Present values kept" or "Business as usual". Therefore, a hypothesis for forest professionals' traditionality (Glück 1987) cannot be satisfactorily analysed in this study, neither can values assumed to be connected to conservationism, namely a preference for "morals, religion, and family".

Considering the results of the factor analysis, the most important values were *Expertise*, *Private*

forestry, and *Forest production* in that order. The factor *Nature conservation* received lower scores and *Tradition* was ranked lowest.

The highest scores were related to *Forest production*. It is not surprising that among all main value factors the highest scores given to *Forest production* were from professionals working in the forest industry. In other words, these individuals working in industry differed from other professionals; but the difference was relatively small. The difference itself applied across Finland, Sweden and Norway. The factor *Forest production* is a manifestation of these values.

The role of *Private forestry* can be seen in the light of Nordic forestry where the role of non-industrial private forest (NIPF) owners is crucial. Of the total forest area, the NIPF comprises in Finland, Sweden, and Norway 52%, 50%, and 77% respectively (Metsätilastollinen... 2007: 33; Swedish... 2008: 29, Forest resources... 2009). In this respect it is not surprising that this value was emphasised.

The value *Nature conservation* received lower scores than forestry-related values. In particular, the professionals working in industry had lower scores than the others. These results are similar to Wagner et al. (1998) from Canada.

The highest scores for *Expertise*, *Private forestry* and *Tradition* were found among the youngest age group of respondents. With the latter two values these differences were not statistically significant. The difference in *Tradition* is worth noting, however, because normally older rather than younger people remain attached to traditions. It is also worth noting that this factor was not easily interpreted. That is, it does not necessarily measure the pure value of "Tradition".

Along with industry background and age, few value differences between respondents related to their background. Women had statistically lower scores in *Private forestry*. This result could partly be due to the fact that there are less women in the industry than in other sectors, and that private forestry had an above average score among industry people. In addition, leaders differed only slightly from others concerning main value factors. The relatively small differences suggest that the forest professions in the Nordic countries are rather homogenous groups (cf. Pregernig's 2001 findings on different sub-groups among foresters in

Austria). This is probably due to the self-selection among those who have begun to work within forestry and also the structure of foresters' education, which boosts group formation through intensive field courses (Paaskoski 2008). Unfortunately, our data did not include exact information about the respondents' education. However, it is likely that most respondents had an academic forester's background.

When comparing the three countries, it seems that Sweden and Norway are more similar and differ more from Finland, where private forestry, forest production, and traditions are valued slightly higher. This is not a surprise because Finnish culture as a whole, including its history and language, differs from the other two countries.

A systematic difference in the levels of evaluations between the countries was found: the Finnish professionals gave on average higher scores than Swedes and Norwegians. An explanation for this may be the nation-specific response style to the survey questionnaires (c.f. Harzing 1997, Pudelko and Harzing. 2007). For instance, it is possible that an unobservable shifter affected the scales resulting in Finns seeming to give comparatively higher scores for all values, with Norwegians systematically providing the lowest. If this is the case, more important than comparing a single value between countries would be compare the whole ranking of values within a country to the respective ranking in another country. Another explanation may be the genuine value differences between the countries.

Except for *Private forestry*, the respondents seemed to place more emphasis on all other main values in ideal rather than action cases. This result is not easy to explain because there seem to be some contradicting values which are stressed in ideal cases, for instance *Nature conservation* and *Forest production*. A solution to this problem would be to hide the value conflicts in actual disagreements, such as the contract and interview case described in the survey. When the ideal case was in question, individuals experienced less imagined social pressure and were more willing to reveal their own values.

Interesting cases in the international comparison were Finns who more often than Swedes and Norwegians acknowledged expertise in the

ideal but not action case. The Finns seemed to be, perhaps, more pragmatic and democratic in not setting expertise or authorities above other criteria in disputes. However, this result cannot be found in the literature, where Swedish and Finnish cultures have received similar levels in power distance measures (Hofstede 1991). The concept of power distance is related to the equality of subordinates and leaders and to the extent that the former accept and expect that power is distributed unequally. If experts are interpreted as being leaders, at least in the sense of managing knowledge, power distance and ideal-action measures could be comparable.

Many participation-related values scored above average and showed a preference for the broad participation of environmental actors as well as other social and civic groups. Very similar values can be found for example in the Codes of Ethics of The Society of Finnish Professional Foresters (Metsänhoitajan...2000) as well as The Society of American Foresters (see Cubbage et al. 1993: 244–246).

6 Conclusions

The present study identified five main values among forest professionals. These are, in order of importance, *Expertise*, *Private forestry*, *Production*, *Nature conservation*, and *Tradition*. The interpretation of this order, found in all countries to the almost similar, is plausible in the Nordic context of the survey. The low ranking of Nature conservation values can be seen as a problem because here a difference between forest policy and practice in the field is almost evident. In general, the pluralistic goals that were set in the several policy processes seem to have been accepted by forest professionals in the Nordic countries at least at the manifestation level. The question is whether these goals have been adopted in practice.

How government policy or company strategy is implemented very much depends on those who ultimately do the work in field. Forest professionals in the field are a crucial link between the national- or company-level strategies and what is actually done in the forests (Eckerberg 1986).

For companies, timber procurement strategy may or may not be realized depending on the local forester's attitudes, behaviour, and capacities.

The results of our study are applicable to practical forestry. We believe that human resource managers can utilise the finding that professionals' values differed between organisations. Further, forest professionals can perhaps reflect on their own values; for instance, within industrial organisations professionals may ask themselves what it means to be more production-oriented than other professionals. One implication of this circumstance could be a risk of communication failures between them and other professionals, as well as the general public.

Systematic differences were also found between ideal and acting values so that scores for ideal values were higher than action ones. This reminds us of the profound dichotomy between values and behaviour. We desire a number of good things in life but in reality we are constrained by such things as time, finances, social pressure and degree of willpower, and ultimately our behaviour changes in terms of what we have considered to be valuable. Another way to view these action-ideal divergences is that they exist because we wish to be different from what we are; that is, we may have value goals not yet reached.

Finally, clashes of values that any forest professional may have, such as conflicting ideal and action values, are important because only by changing one's own values will an organisation's values evolve in the short run. In the long run, the next generation of professionals with new values will certainly arrive. In general, all value differences may raise some internal controversy within an organisation. However, these should not be seen as unfavourable by any organisation because they boost innovation and development.

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Total of 65 references

Appendix 1. Value matrix (Hellström et al. 2003: 34–36). The coding of modes of action is described of the end of the appendix.

Values	Modes of action			
	Present		Future	
	1. Contract	2. Interview	3. Education	4. Planning
	<i>Breach of contract</i> Various parties have commonly agreed on the use of a local forest area. Now, one party is one-sidedly acting in conflict with the contract. You have been assigned to solve the resulting dispute. How do you act?	<i>Request for interview</i> There is dispute about the harvest rates and multiple-use of forests in the local press. A trustworthy journalist has already interviewed various parties concerned and now he contacts you. How do you respond?	<i>Planning education</i> It is year 2010: The forest sector and its operational environment has changed. It is necessary to redesign forest sector education. You are a member of a working group developing education. What do you propose?	<i>Compiling a planning team</i> It is year the 2010: The forest sector and its operational environment has changed. You have been assigned to assemble a working group to prepare a new forest management plan for the forests within your area. Whom do you invite?
I) Value category: Forest				
Ecocentrism (V11)	<i>Ecological needs (MA111)</i> I suggest that the ecological needs behind the dispute will be examined and taken into account.	<i>Forest conservation (MA112)</i> I state that the silvicultural methods should be reformed and the level of conservation increased in order to secure the habitat of different species.	<i>Forest ecology (MA113)</i> I suggest a substantial increase in forest ecology studies.	<i>Environmental organizations (MA114)</i> I invite representatives of environmental organizations.
Anthropocentrism (V12)	<i>Socio-economic impacts (MA121)</i> I suggest that the dispute's impact on the local economy and employment be examined and taken into account.	<i>Well-being (MA122)</i> I stress that it is important to pay attention to local people's well-being in relation to forest use and conservation.	<i>Forestry (MA123)</i> I suggest that an even greater emphasis be placed on the functions of forestry and the well-being it provides.	<i>Economic life and local community (MA124)</i> I invite representatives of business and the local community.
Monism (V13)	<i>The most important form of usage (MA131)</i> I make sure the form of forest use that I consider as most important is not threatened due to the breach of contract.	<i>The most important form of usage (MA132)</i> I found out if the journalist has adequately consulted parties who represent the form of forest use that I consider as most important	<i>Specialization (MA133)</i> I suggest that the opportunities for students to specialise in any one field of forestry be increased.	<i>The most important user (MA134)</i> I make sure that the party whom I consider as the most important is well represented in the planning group.
Pluralism (V14)	<i>Multiple use of forests (MA141)</i> I examine whether the previous contract took multiple use of forests adequately into account in the region.	<i>Different forms of use (MA142)</i> I emphasize the need to address different forms of forest use in the current discussion.	<i>Broad basic knowledge (MA143)</i> I stress that studies need to guarantee sufficient basic knowledge on several types of forests.	<i>Different user groups (MA144)</i> I invite representatives from broad a variety of user groups.
Private usage (V15)	<i>Effects on forest owners (MA151)</i> I examine whether the breach of contract affects the possibility of local forest owners to use their forests.	<i>Forest ownership (MA152)</i> I stress the need to respect the forest owner's right to decide upon the use of his/her forest.	<i>Private forestry (MA153)</i> I emphasize that education needs to contribute towards an understanding of the functions and significance of private forestry.	<i>Decision by forest owners (MA154)</i> I emphasise the local forest owners' opinion on who should be invited.

Appendix 1 continued.

Values	Modes of action			
	Present		Future	
	1. Contract	2. Interview	3. Education	4. Planning
Public usage (V16)	<i>Local welfare (MA161)</i> I make sure that the local people's rights to comprehensive well-being are secured even during the dispute.	<i>Everyman's rights (MA162)</i> I state that everyman's rights need to be secured in all forests.	<i>Citizens' point of view (MA163)</i> I regard it as important that students are familiarised with rights related to forests from the point of view of citizens and the whole society.	<i>Societal point of view (MA164)</i> I invite persons who have a broad understanding of the importance of forests for citizens and for society as a whole.
II) Value category: Time and change				
Short-term (V21)	<i>Peace of work (MA211)</i> I suggest that the dispute be resolved in a way that leads to work peace as soon as possible.	<i>Current problems (MA212)</i> I remind the parties current problems related to the use of the local forests and the need to solve them.	<i>Present duties (MA213)</i> I suggest that special attention be paid to knowledge and skills needed in present duties within the forest sector.	<i>Specialists of current issues (MA214)</i> I invite persons who are very knowledgeable in current issues related to forest usage and planning.
Long-term (V22)	<i>Examination of trends (MA221)</i> I suggest that broader future trends that are potentially reflected in this conflicts be taken into account in the resolution of the dispute.	<i>Future needs (MA222)</i> I stress the need for continuity and forest use that takes future needs into consideration already today.	<i>Continuous development (MA223)</i> I suggest that the ability for continuous development and lifetime learning be viewed as core objectives of the studies.	<i>Continuity (MA224)</i> I aim to involve people who seek continuity in forest use and planning.
Reactivity (V23)	<i>According to need (MA231)</i> I suggest that the breach of contract be settled only when there is a specific reason to do so from my organisation's point of view.	<i>Taking advantage of situation (MA232)</i> I make most of the possibility to impact the ongoing discussion about forests.	<i>Problem solving (MA233)</i> I emphasise skills that contribute to a successful solution to current problems.	<i>Interested parties (MA234)</i> I invite parties who have expressed their interest in participating in the work.
Proactivity (V24)	<i>Prevention (MA241)</i> I begin to arbitrate the dispute in such a way that will hopefully prevent future breaches of contracts.	<i>Other reporters (MA242)</i> I contact other reporter by myself in order to direct the ongoing discussion more efficiently.	<i>Anticipation of the future (MA243)</i> I stress that education needs to actively anticipate potential future problems.	<i>New groups (MA244)</i> I aim to arouse the interest of different parties to participate in the planning process.
Innovativeness (V25)	<i>New modes of action (MA251)</i> I try to come up with new modes of action, which makes the need for contract unnecessary.	<i>New ways of communication (MA252)</i> Together with the reporter, I come up with new ways of communicating about the subject matter.	<i>New degrees (MA253)</i> I come up with completely new or alternative degrees for the forest sector.	<i>New actors (MA254)</i> I try to identify new parties who have an interest in forests to participate in the planning work.
Traditionality (V26)	<i>Custom (MA261)</i> I suggest that we proceed by means with which my organisation already has experience.	<i>According the situation (MA262)</i> I answer the reporter's questions to the best of my abilities and to the extent that I see fit.	<i>Approved methods (MA263)</i> I suggest that current curriculum and teaching methods that have been found to be good so far are also maintained in the future.	<i>Co-operation partners (MA264)</i> I invite all my present co-operation partners.

Appendix 1 continued.

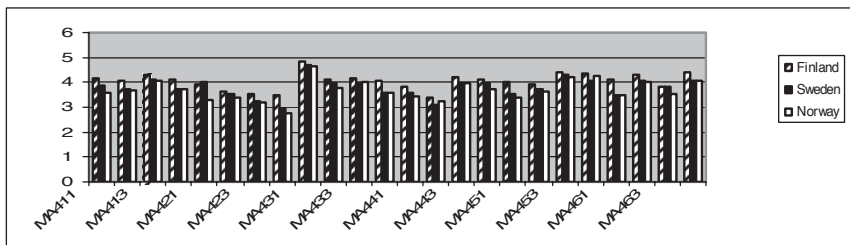
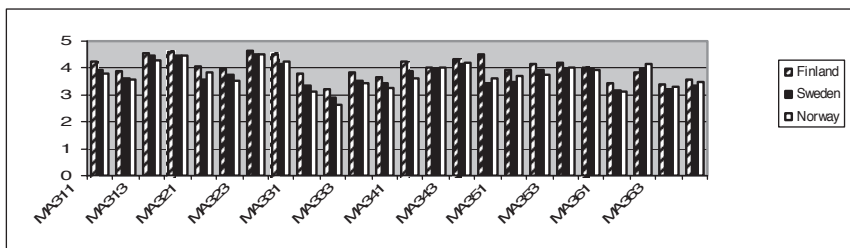
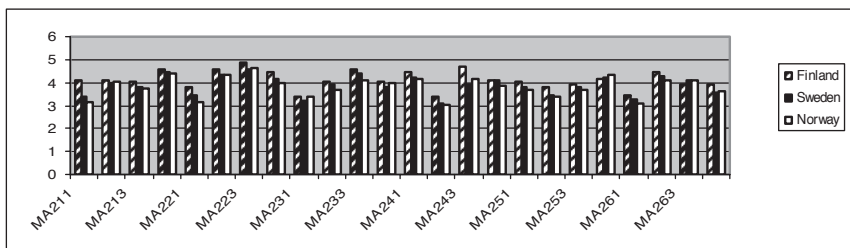
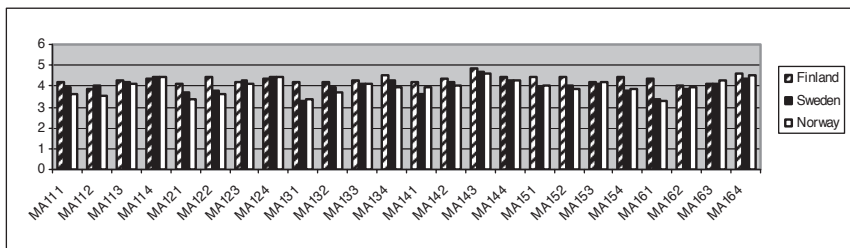
Values	Modes of action			
	Present		Future	
	1. Contract	2. Interview	3. Education	4. Planning
III) Value category: Internal operations within the forest sector				
Expertise (V31)	<i>Expert advice (MA311)</i> I propose that we consult a specialist who is experienced in dealing with the issue under dispute.	<i>Researchers (MA312)</i> I inform the reporter of researchers who are specialised in the issue at hand so that he may interview them.	<i>Best specialists (MA313)</i> I recommend the use of the best specialists and researchers in teaching.	<i>Speciality knowledge (MA314)</i> I invite persons who possess the latest knowledge needed for the task.
Practicality (V32)	<i>Local solution (MA321)</i> I stress that local actors are the best experts in settling the dispute.	<i>Forest workers (MA322)</i> I suggest interviewing a few people who work in the forest in practise.	<i>Practical training (MA323)</i> I propose that education include plenty of practical training and familiarisation with work in the forest sector.	<i>Forest planners (MA324)</i> I invite people who are responsible for the practical side of the forest planning.
Benefit (V33)	<i>Organisation's interest (MA331)</i> I make sure that the dispute is settled in a way that my organisation profits financially or image-wise.	<i>Own interest (MA332)</i> I use the opportunity to become noticed in this matter and promote my career.	<i>Organisation's goals (MA333)</i> I support proposals that are in accordance with my own organisation's objectives.	<i>Assisting partners (MA334)</i> I invite people who can help to accomplish the objectives of my organisation
Responsibility (V34)	<i>Impacts on others (MA341)</i> I am concerned about taking the impacts of the dispute on all parties into consideration in dispute resolution.	<i>Communication strategy (MA342)</i> I answer the reporter in accordance with my organisation's communication strategy	<i>Needs of different parties concerned (MA343)</i> I consider it important that the needs of all parties concerned are considered.	<i>Fairness (MA344)</i> I consider it to be important that the members of group are chosen in a just way.
Democracy (V35)	<i>Participation (MA351)</i> I suggest public discussions and participatory planning in support of the renewal of the contract.	<i>Joint decisions (MA352)</i> I emphasise that decisions regarding the use of local forests must be made collectively among as many parties as possible.	<i>Fully authorised members (MA353)</i> I propose an invitation to representatives of all essential parties such as teachers, students and employers to join the working group as fully authorised members.	<i>Representatives (MA354)</i> I ask various parties to nominate a representative for the planning group.
Authoritarianism (V36)	<i>Authority settlement (MA361)</i> I propose that the breach of contract be given to the local authorities or court for a settlement.	<i>Authority decision (MA362)</i> I emphasise the framework of forest usage of forest set by legislation and the authorities.	<i>Education authorities (MA363)</i> I propose that the governing bodies of each education institution decide the curriculum together with the educational authorities.	<i>Official invitations (MA364)</i> I suggest that the local authorities oversee the work and nominate the members of the planning group.

Appendix 1 continued.

Values	Modes of action			
	Present		Future	
	1. Contract	2. Interview	3. Education	4. Planning
IV) Value category: External relations with the rest of society				
Openness (V41)	<i>Organisation's views (MA411)</i> I straightforwardly state my organisation's views on the disputed issue even though I am aware that it may cause disagreement.	<i>Personal views (MA412)</i> I inform the reporter of my own views and uncertainties about the situation.	<i>Alternative views (MA413)</i> I consider it important that teachers external to the institute who may introduce alternative views increasingly participate in teaching.	<i>Public hearing (MA414)</i> I suggest that public discussion and hearings be organised in support of the planning work.
Restraint (V42)	<i>Consideration (MA421)</i> I carefully consider whether I can elicit my organisation's actual aims in this sensitive situation.	<i>Background information (MA422)</i> I tell the reporter that I am willing to give relevant background information but do not want my personal views publicised.	<i>Own teachers (MA423)</i> I consider it important that the institute's own teachers whose views conform with the official policy of the school carry out the teaching.	<i>Confidentiality (MA424)</i> I propose that issues be dealt with confidentially within the working group throughout the planning process.
Co-operation (V43)	<i>Mutual understanding (MA431)</i> I will contact all parties concerned and suggest that we assess the dispute together.	<i>Helping the reporter (MA432)</i> I try to help the reporter in his work in every way possible.	<i>Teamwork (MA433)</i> I propose teamwork and interactive teaching methods in future education.	<i>Mapping the views (MA434)</i> I first consult various parties about who should be invited.
Autonomy (V44)	<i>Own decision (MA441)</i> I will reach a decision by myself after consulting others.	<i>Own article (MA442)</i> I will write an article on the issue for a newspaper myself.	<i>Independent learning (MA443)</i> I stress the importance of independent learning without constant supervision.	<i>Own experience (MA444)</i> I invite parties who are in my view the most important ones.
Customer orientation (V45)	<i>Customers' views (MA451)</i> I encourage my co-workers to find out our customers' views about the contract dispute before taking any action.	<i>Users and consumers (MA452)</i> I suggest that the reporter interview some local forest users and consumers of forest products.	<i>Employers' needs (MA453)</i> I propose a survey to be made about the employers' needs with regard to the content of education.	<i>Users and buyers (MA454)</i> I invite parties who have good connections with forest users or with buyers of forest products.
Production orientation (V46)	<i>Securing production (MA461)</i> I suggest solutions that do not endanger forest use in the area.	<i>Forest management (MA462)</i> I attempt to make sure that silvicultural perspectives are sufficiently presented in the press.	<i>Efficiency of teaching (MA463)</i> I stress the importance of graduating on time and measuring the efficiency of teaching.	<i>Forestry specialists (MA464)</i> I invite actors who know forest management practices well.

Variables measuring values were coded as follows: MA_{cv}s where
 c=the number indicating value categories, c=1-4 so that
 1=Forest
 2=Time and change
 3=Internal operations within the forest sector
 4=External relations with the rest of society
 v=the number indicating single values, v=1-6
 s=the number indicating the case, c=1-4 so that
 1=contract
 2=interview
 3=education
 4=planning

Appendix 2. Means of MAs across countries.



Appendix 3a. Factor analysis 1. Variables representing value categories “Private forestry” and “Nature conservation”. Loadings in boldface are related to variables taken into further analysis to form sum variables.

	Private forestry	Nature conservation	3	4
MA111 Ecological needs		.627		.449
MA112 Forest conservation		.710		
MA113 Forest ecology		.632		
MA114 Environmental organisations		.456	.488	
MA121 Socio-economic impacts				.614
MA122 Well-being	.403			.405
MA123 Forestry	.561			
MA124 Economic life and local community			.536	
MA131 Most important form of usage	.404			.516
MA132 The most important form of usage	.499			.313
MA133 Specialisation	.452			
MA134 The most important user	.448			
MA141 Multip use of forests		.549		.422
MA142 Different forms of use		.437	.308	
MA143 Broad basic knowledge			.399	
MA144 Different user groups		.301	.485	
MA151 Effects on forest owners				.354
MA152 Forest ownership	.318			
MA153 Private forestry	.525			
MA154 Decision by forest owners	.727			
MA161 Local welfare	.634			
MA162 Everyman's rights	.511			.533
MA163 Citizens' point of view	.320			
MA164 Societal point of view		.473	.534	
% of variance	14	12	10	8

Loadings less than .30 excluded
 Total variance explained by four factors: 53%
 Extraction Method: Maximum Likelihood
 Rotation Method: Varimax with Kaiser Normalisation
 Rotation converged in 8 iterations.

Appendix 3b. Factor analysis 2. Variables representing value category “Time and change”. Loadings in boldface are related to variables taken into further analysis to form sum variables.

	Tradition	2	3
MA211 Peace of work		.422	.341
MA212 Current problems		.378	.443
MA213 Present duties		.473	.362
MA214 Specialists on current issue			.495
MA221 Examination of trends		.560	.306
MA222 Future needs			.503
MA223 Continuous development			.486
MA224 Continuity			.530
MA231 According to need		.619	
MA232 Taking advantage of the situation		.440	.343
MA233 Problem solving			.561
MA234 Interested parties			.486
MA241 Prevention		.359	.437
MA242 Other reporters		.596	
MA243 Anticipation of the future			.523
MA244 New groups			.318
MA251 New modes of action		.460	.327
MA252 New ways of communication		.466	
MA253 New degrees		.332	.314
MA254 New actors			.704
MA261 Custom		.647	
MA262 According to situation			.468
MA263 Approves methods		.397	.396
MA264 Societal point of view		.386	
% of variance	15	14	9

Loadings less than .30 excluded.
 Total variance explained by three factors: 38%
 Extraction Method: Maximum Likelihood
 Rotation Method: Varimax with Kaiser Normalization.
 Rotation converged in 7 iterations.

Appendix 3c. Factor analysis 3. Variables representing value category “Internal operations within the forest sector”. Loadings in boldface are related to variables taken into further analysis to form sum variables.

	Expertise			
	2	3	4	
MA311 Expert advice			.317	
MA312 Researchers		.395	.382	
MA313 Best specialist	.509			
MA314 Speciality knowledge	.623			
MA321 Local solution		.320		
MA322 Forest workers	.352	.388	.312	
MA323 Practical training	.513			
MA324 Forest planners	.475			
MA331 Organisation's own interest			.725	
MA332 Own interests	.577			
MA333 Organisation's goals	.446		.329	
MA334 Assisting partners (objectives of my organisation)	.500		.333	
MA341 Impact on others			.460	
MA342 My organisation's communication strategy	.342		.393	
MA343 Needs of different parties concerned	.465			
MA344 Fairness	.385			
MA351 Participation		.581		
MA352 Joint decisions	.328	.467		
MA353 Fully authorised members	.509	.325		
MA354 Representatives	.480			
MA361 Authority settlement	.379			
MA362 Authority decision	.343			
MA363 Education authorities	.542			
MA364 Official invitation	.532			
% of variance	13	11	8	6

Loadings less than .30 excluded
 Total variance explained by four factors 48%
 Extraction Method: Maximum Likelihood
 Rotation Method: Varimax with Kaiser Normalization
 Rotation converged in 8 iterations

Appendix 3d. Factor analysis 4. Variables representing value category “External relations with the rest of society”. Loadings in boldface are related to variables taken into further analysis to form sum variables.

	Forest production			
	2	3	4	
MA411 Organisation's views			.523	
MA412 Personal views	.337			
MA413 Alternative views		.591		
MA414 Public hearing		.542		
MA421 Consideration	.355			
MA422 Background information	.401			
MA423 Own teachers	.527			
MA424 Confidentiality	.642			
MA431 Mutual understanding		.348		
MA432 Helping the reporter		.346		
MA433 Teamwork		.547		
MA434 Mapping the views		.430		
MA441 Own decision	.555		.476	
MA442 Own article				
MA443 Independent learning	.310	.400		
MA444 Own experience	.332	.417		
MA451 Customers' views	.348		.358	
MA452 Users and consumer	.385	.319		
MA453 Employers' needs	.525			
MA454 Users and buyers	.575			
MA461 Securing production	.514		.358	
MA462 Forest management	.627			
MA463 Efficiency of teaching	.507	.352		
MA464 Forestry specialists	.656			
% of variance	12	11	10	6

Loadings less than .30 excluded
 Total variance explained by four factors: 48%
 Extraction Method: Maximum Likelihood
 Rotation Method: Varimax with Kaiser Normalization
 Rotation converged in 6 iterations