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**ATTITUDE-BEHAVIOR FRAMEWORK
IN CONTINGENT VALUATION
OF FOREST CONSERVATION**

EIJA POUTA

Academic Dissertation

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To Sampo and Tapsu

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Separate studies I-V

Abstract

Nature conservation or forestry programs have impacts on the supply of non-market forest goods, such as the level of biodiversity. Special methods have been developed in environmental economics in order to account for the value of non-market public goods in a cost-benefit analysis. One of these is the contingent valuation method (CVM). Contingent valuation surveys include one or more questions concerning the expenses that respondents could accept in order to increase the amount of a public good, e.g. to improve the quality of the environment. In this way CVM produces information on the monetary value of environmental goods. This study contributes to the on-going discussion of the validity of CVM by investigating how survey respondents make their choices in contingent valuation surveys. Here, CVM is combined with an approach from social psychology, viz. the theory of planned behavior (TPB), to understand and interpret the value of environmental good. In cases of nature and forest conservation, willingness to pay (WTP) for an environmental good is explained with variables of TPB, particularly, with attitudes and beliefs. Furthermore, the study aims to produce empirical estimates of WTP for programs of nature and forest conservation in Finland. It addresses also some questions regarding the effect of variations in measurement of non-market values, such as the variation in the policy context or in the scope of the good.

In the present study TPB provided tools to obtain information about respondents' decision making, and this information proved to be useful in interpreting the CV data. The results supported the validity of CVM, as WTP was consistent with the attitudes and beliefs. On the other hand, the analysis revealed a potential problem in integrating TPB in CVM. Attitude and belief measurement impaired the respondents' sensitivity to the expenses of the program to the respondents' household.

The study produced empirical estimates of WTP for nature conservation areas and for environmentally oriented management of forests. These estimates are essential in order to evaluate forest policy changes in an environmental direction. High WTPs seemed to be related to younger age, higher income and education, and urban living environment. The results indicate that the policy context had a significant effect on respondents' WTP for nature conservation. In the case of the Natura-2000 network the actual planning method, which the Finnish public had criticized as excessively bureaucratic, decreased the benefits of conservation. However, only respondents with high motivation to process information were able to recognize the difference between the effects of planning and the effects of conservation itself. In the case of environmentally oriented forest regeneration cutting practices, two levels of program were valued. The results showed that the probability of choosing the environmentally oriented practice over the status quo was insensitive to the scope of the program. The scope insensitivity seemed to be related to a situation in which respondents connect negative side effects to the more extensive environmentally oriented program.

According to these results TPB can be used effectively to analyze respondents' decision-making processes and such an analysis can be used to assess the validity of CV as well as to understand the effect of variations in measurement of non-market values in CV. In addition to the welfare measures, information about citizens' attitudes and beliefs is useful in evaluating a forest or nature conservation program. However, incorporating measures based on TPB into a CV survey requires additional research.

Abstrakti

Luonnonsuojelu- tai metsäpolitiikka muuttaa metsän tuottamien markkinahinnattomien hyödykkeiden, kuten biodiversiteetin, tarjontaa. Arvioitaessa politiikan hyötyjä ja kustannuksia onkin tärkeää ottaa huomioon markkinahinnattomien hyödykkeiden arvo kansalaisille. Ehdollisen arvottamisen menetelmä (contingent valuation method) on yksi tähän tarkoitukseen ympäristötaloustieteessä kehitetyistä menetelmistä. Ehdollisen arvottamisen menetelmään kuuluvassa kyselyssä henkilö vastaa kysymykseen, kuinka suuret henkilökohtaiset kustannukset hän voisi hyväksyä ympäristön laadun parantamisesta. Menetelmä tuottaa näin tietoa ympäristöhyötyjen rahamääräisestä arvosta. Ehdollisen arvottamisen menetelmän validiteetista on käyty vilkasta keskustelua tieteellisessä kirjallisuudessa. Tässä tutkimuksessa tutkitaan menetelmän validiteettia selvittämällä, mihin kansalaisten mielessä tapahtuva arvottaminen perustuu. Tutkimus esittää tavan hyödyntää sosiaalipsykologian suunnitellun käyttäytymisen teoriaa (TPB) ehdollisen arvottamisen menetelmän tuottaman ympäristöhyötyjen arvon tulkinassa. Luonnon, ja erityisesti metsien, suojeluun liittyvissä arvottamistilanteissa maksuhalukkuutta selitetään TPB mukaisilla muuttujilla, varsinkin asenteilla ja uskomuksilla. Tutkimuksen tavoitteena on myös tuottaa empiirisiä maksuhalukkuusestimaatteja, jotka kuvaavat suojeluhyötyjen arvoa rahassa. Tutkimuksessa paneudutaan lisäksi ehdollisen arvottamisen menetelmään itseensä liittyviin kysymyksiin, kuten siihen, onko politiikkakontekstilla tai hyödykkeen laajuudella vaikutusta arvottamistuloksiin.

Tutkimuksessa TPB tarjosi välineen tarkastella niitä tekijöitä, jotka ovat vastaajan arvostusten taustalla, ja myös välineen tulkita ehdollisen arvottamisen tuottamaa tietoa ympäristöhyödyn rahamääräisestä arvosta. Tulosten mukaan ehdollisen arvottamisen menetelmän luotettavuus sai vahvistusta tiettyjen asenteiden ja uskomusten selitettäessä maksuhalukkuutta ympäristöhyödyistä. Tutkimus toi kuitenkin esiin myös mahdollisen ongelman TPB:n yhdistämisessä ehdolliseen arvottamiseen. TPB:n mukainen asenteiden ja uskomusten mittaaminen näytti heikentävän vastaajien kykyä ottaa huomioon ehdotettuun ympäristöohjelmaan liittyvät kustannukset.

Tutkimus tuotti politiikan suunnittelussa olennaista tietoa siitä, kuinka paljon suomalaiset ovat enimmäkseen halukkaita maksamaan luonnonsuojelualueiden lisäämisestä ja ympäristölähtöisistä uudistushakkuukäytännöistä. Maksuhalukkuudet riippuivat vastaajan iästä, koulutuksesta, tuloista ja asuinympäristön kaupunkimaisuudesta. Tulosten mukaan myös suojeluohjelman suunnittelumenetelmällä oli keskeinen vaikutus siihen, kuinka paljon ohjelmasta oltiin valmiita maksamaan. Natura-2000 ohjelman yhteydessä voimakasta julkista arvostelua herättänyt suojelun suunnittelutapa kaiken kaikkiaan alensi suojelun koettuja hyötyjä. Kuitenkin vain ne kyselyyn vastaajat, joiden motivaatio käsitellä informaatiota oli korkea, kykenivät erottamaan suunnittelutavan vaikutukset itse suojeluohjelman vaikutuksista. Ympäristön tilaa parantavan ohjelman laajuuden vaikutusta sen kannatettavuuteen analysoitiin arvotettaessa ympäristölähtöistä metsien uudistamiskäytäntöä. Tulosten mukaan uudistushakkuuta sääntelevän ohjelman laajuus ei juurikaan vaikuttanut siihen, kuinka suuri osa vastaajista kannatti ohjelmaa. Ohjelman laajuuden vähäinen vaikutus kannatettavuuteen näytti liittyvän siihen, että vastaajat yhdistivät enemmän ympäristöhyötyjä tuottavaan laajaan ohjelmaan myös haitallisina koettuja sivuvaikutuksia.

Yhteenvetona voidaan todeta, että TPB tarjoaa hyödyllisen apuvälineen analysoida vastaajan päätöksentekoprosessia niin ehdollisen arvottamisen validiteettia tarkasteltaessa kuin menetelmään liittyvien kysymysten ymmärtämisessäkin. TPB:hen pohjautuva tieto kansalaisten asenteista ja uskomuksista on arvottamistiedon ohessa käyttökelpoista metsien tai luonnonsuojeluun vaikuttavan ohjelman arvioinnissa. TPB:n mukaisten mittareiden kytkeminen ehdollisen arvottamisen kyselyyn edellyttää kuitenkin lisää tutkimusta.

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Helsinki, 20 May 2003

Eija Pouta

List of separate studies

- I. Pouta, E. & Rekola, M. (2001). Theory of planned behavior in predicting willingness to pay for abatement of forest regeneration. *Society and Natural Resources*, 14: 93-106.
- II. Pouta, E., Rekola, M., Kuuluvainen, J., Tahvonen, O. & Li, C-Z. (2000). Contingent valuation of the Natura 2000 nature conservation program in Finland. *Forestry*, 73: 119-128.
- III. Pouta, E., Rekola, M., Kuuluvainen, J., Li, C-Z. & Tahvonen, O. (2002). Willingness to pay in different policy-planning methods: insights into respondents' decision-making processes. *Ecological Economics* 40: 295-311.
- IV. Pouta, E. (2003). Sensitivity to scope in contingent valuation of forest cutting practices. Manuscript.
- V. Pouta, E. (2003). Attitude and belief questions as a source of context effect in the contingent valuation survey. *Journal of Economic Psychology*, in press.

Author's contribution

Article I was co-authored by Mika Rekola. Pouta provided the research idea, the theoretical frame, analysis and wrote the article. The data collection was jointly planned. Articles II and III were co-authored by Mika Rekola, Jari Kuuluvainen, Chuan-Zhong Li and Olli Tahvonen. In these articles Pouta provided the theory, measurement and analysis related to variables from social psychology. She also wrote the first drafts. Authors jointly planned the research ideas, data collection, and revised the manuscripts. Pouta was the sole author of articles IV and V.

1. Introduction

1.1. Theoretical and methodological background

This study broadens the economic approach of contingent valuation (CV). It discusses the usefulness of the attitude-behavior framework from social psychology in a CV context and develops on this basis a framework of studying citizens' valuation of alternative forest conservation programs and policies. This study shows that combining attitude-behavior framework with contingent valuation can increase our understanding of how citizens' preferences are formed concerning forest conservation issues.

Forest policies, nature conservation or forestry programs or other kinds of public policies may be designed specifically to conserve or improve the forest environment. In addition to affecting timber production, these public policies change the supply of non-market goods of the forest, such as the level of biodiversity and the quality of forest as a recreation environment. Social cost-benefit analysis requires measurement of the costs and benefits. Markets give information concerning the benefits and costs of production and consumption of private goods. Special methods have been developed to include the value of non-market public goods in the cost-benefit analysis. One of those methods is the contingent valuation method (CVM) (e.g. Mitchell and Carson 1989, Bateman and Willis 1999). In a contingent valuation survey, respondents are asked either how much they are willing to pay (WTP) in order to increase the amount of a public good, e.g. improve the quality of the environment, or how much they would require as compensation to accept (WTA) the loss in quality. The validity of contingent valuation has been widely discussed in the scientific literature, in policy processes, in damage assessments, and in legal proceedings (e.g. Hausman 1993).

One way to study the validity of CVM is to explain and understand how survey respondents make their choices in contingent valuation surveys. Contingent valuation is based on economic consumer theory, according to which individuals make choices following their preferences. Economic theory does not focus to the processes of individual reasoning behind choices. Therefore this study combines an approach from social psychology with the contingent valuation method to illustrate individual reasoning behind and formation of willingness to pay for non-market goods related to forest and nature conservation. Furthermore, the study evaluates whether using social psychological theory, the theory of planned behavior (TPB) (Ajzen 1991), can produce relevant information concerning individual choice behavior. This approach logically leads to an assessment of how the measurement of social psychological variables can be included in a CV survey.

In addition, the effect of some relevant parameters in the measurement of non-market values, such as scope, policy context and provision of additional information to survey respondents, is tested. Finally, this research produces information on the value of perceived benefits of alternative forest regeneration cutting practices and of benefits of a nature conservation program.

1.2. Empirical background

During recent decades, forest conservation has been a subject of intense public discussion and development in Finland. The process has focused on forest management practices in timber production forests as well as on the need for forest conservation areas. Forest regeneration cutting practices have been especially criticized in the media (Hellström 2001). During the 1960s the basis of the arguments against clear-cutting and seed-tree cutting focused on their harmful effects on forest recreation and scenery. In Finland recreational use of forests is traditionally based on the so-called “everyman’s right,” which means that even forests of private land owners (61% of forest lands in Finland) are open to public access. Therefore, forest regeneration practices in private forests have a direct effect on the well-being of non-forest owners as well. Since the 1980s protection of biodiversity has been the main argument for protection. Currently about 650 of the species living in forested areas are considered to be endangered (Metsien suojelun tarve... 2000). Almost half of them live in herb-rich forests, and almost one fourth live in old growth forests.

Several steps have been taken to preserve biodiversity in timber production forests (Etelä-Suomen ... 2002). These include the Forest Act (Metsälaki 1996) and several other nature-related acts that define allowable forest management practices. Forestry extension organizations have produced environmentally oriented forest management guidelines and have educated forest owners and professionals. Forest certification has been implemented in all areas administered by regional forest centers. In addition, various other programs and campaigns have been conducted to promote environmentally oriented forestry. However, new tools are still being developed to preserve biodiversity in timber production forests (Etelä-Suomen ... 2002).

During recent decades some forest land has been reallocated from timber production to nature conservation in Finland. Since the 1970s, representative areas of various biotopes have come under the protection of so-called nature conservation programs. To implement these programs the state has bought and is still purchasing privately owned land for nature conservation. Currently about 3.6% of forest land is strictly protected (Finnish Statistical ... 2001).

Additional impulses to nature conservation came when Finland joined the EU in 1995, and the EU directives concerning the Natura 2000 network became legally binding in Finland. The Natura 2000 network of nature conservation areas in Europe dates back to 1992, when the European Union decided to coordinate its nature protection policy within the member countries. The aim of the program is to protect natural habitats, including forest, in order to guarantee favorable protection levels for species. According to the program, specific areas were chosen using purely biological criteria. The total area of the Natura 2000 network is about 4.88 million hectares (<http://www.ymparisto.fi/luosuo>). However, most of this area had already been previously conserved. After the planning of the Natura 2000 network, the focus of nature conservation in Finland has been on increasing the conservation of forests in southern Finland (Etelä-Suomen... 2002).

The present study focuses on benefits citizens perceive from three separate forest or nature conservation programs. Two of these programs relate to forest regeneration cuttings. The first program is a local general land use plan. The purpose of this hypothetical plan is to delay forest regeneration cuttings on specific areas in the municipality of Loppi. The second is a national forest regeneration policy that aims at the implementation of more environmentally oriented forest regeneration practices, including conservation of trees on cutting areas for the purpose of preserving biodiversity. The third policy relates to increasing the amount of nature conservation areas in Finland within the framework of the Natura 2000 network.

1.3. Aims and outline

The study aims to fulfil both empirical and methodological objectives related to four topics: 1) analyzing respondents' decision-making processes in valuation of environmental goods, 2) including variables of the attitude-behavior framework in a CV questionnaire and developing and evaluating their measurement, 3) testing the effects of descriptions of the environmental good and context on valuation results (policy context, scope of the good, information) and 4) producing empirical results of the benefits of forest conservation.

The present study aims to develop a procedure which applies ideas from the theory of planned behavior (TPB) in a CV context. The use of the TPB can produce information on the theoretical validity of the CV method. The study appraises how strongly empirical CV results, particularly willingness to pay measures, are related to the relevant determinants proposed by the theory. The theory also helps to interpret the responses to the valuation question.

Furthermore, the study focuses on some aspects of measuring non-market benefits using the CV method. The CV question or the scenario in questionnaire is varied regarding the scope

of the good, social context or information provided. In interpreting the effects of this variation, it is important to obtain insights into respondents' evaluative decision-making processes. In this regard, attitude theory is more successful in interpreting these phenomena than is a plain economic model. In addition, this study aims to produce empirical estimates of the willingness to pay for forest and nature conservation, as such estimates are essential for the evaluation of policy initiatives designed to protect or improve the environment.

How these objectives were met in the five separate studies can be summarized as follows. The aim of the Studies I, II, III and IV was to analyze how respondents form valuations and, with the help of attitude-behavior framework, to evaluate the theoretical validity of the contingent valuation method. To include variables of the attitude-behavior framework into a CV-questionnaire, we developed and evaluated measurements for them in Studies I and V. Tests of the effects of the characteristics of the environmental good and the context of valuation on WTP were reported as follows: Studies II and IV concerned the effect of the scope of the good, Study III described the effect of social context, particularly the effect of nature conservation policy planning method, and Study I investigated the effect of information on the valuation. The policy-relevant aim – to measure non-market values of forest conservation in Finland, first the value of nature conservation areas and second the value of environmentally oriented management of forests – was addressed in Studies II, III and IV.

The outline of the summarizing report of this dissertation is the following. In Chapter 2 the CV method, including its theoretical background and the measurement of environmental benefits in CV, is briefly reviewed, and the validity of CV is discussed. Chapter 2 also discusses how attitude-behavior theory can be helpful in CV. Chapter 3 reviews some previous empirical studies relevant in this work and clarifies the contribution of this study. Chapter 4 gives a brief introduction to the empirical data sets used in separate studies, and Chapter 5 summarizes their results. Chapter 6 summarizes how the objectives were met and offers some conclusions.

2. Contingent valuation and attitude-behavior models

2.1. Economic consumer theory and value of environmental services

Consumer theory of neo-classical economics provides a theoretical framework for monetary measures of changes in utility caused by changes in the environment. According to this theory, consumers make choices among alternatives following their preferences (e.g. Johansson 1991). Preference can be defined as the outcome of a comparative evaluation of

a set of objects (Druckman and Lupia 2000). In economic consumer theory, an individual's response that A is preferred to B is understood to mean that the individual feels better off under situation A than under situation B.

The following description of how economic valuation of environmental goods is understood in economic choice models very much follows that presented by Johansson (1993). In the theory individuals' preferences are assumed to be represented by a utility function. In the case of market goods $x=[x_1, x_2, \dots, x_n]$ and environmental services z , the utility function can be expressed as $u=u(x, z)$.

Consumers' choices are constrained by income. Individuals maximize their utility under budget constraint y and a set of prices $p=[p_1, p_2, \dots, p_n]$ for market goods:

$$v(p, y, z) = \max u(x, z) \quad \text{s.t.} \quad y = px.$$

Therefore, the indirect utility function $v(p, z, y)$ expresses the maximum utility that can be achieved given p , z and y . Individuals' decisions can also be seen as a cost minimization problem:

$$e(p, z, u^0) = \min \sum_{i=1}^n p_i x_i, \quad \text{s.t.} \quad u^0 = u(x, z).$$

The solution to the cost minimization problem leads to Hicksian compensated demand functions $x=x(p, z, u^0)$. Utility remains constant along the compensated demand curve. The income required to keep the utility level constant is known as the expenditure function $e(p, z, u^0)$.

Environmental services are public goods, and individuals are not able to make the decision on how much is being consumed. In the case of a policy designed to improve the supply of environmental services from the original level z^0 to z^* keeping the individual's utility level constant requires a change in expenditure. The change in expenditure is a compensating surplus, namely the money needed to compensate the higher level of environmental services,

$$CS = e(p, z^*, u^0) - e(p, z^0, u^0).$$

We can also define the CS measure using the indirect utility function. In the case of an increased supply of environmental services, individuals are able to give up a certain amount of money, CS (compensating surplus), from their income and still retain the same level of utility

$$v(p, z^0, y) = v(p, z^*, y - CS).$$

The use of the Hicksian compensating measures assumes that consumer's utility level remains the same as before the change in the supply of environmental services. Equivalent measures hold utility constant at some specified alternative level. Hicksian surplus measures are to be used when the consumer is constrained to consume fixed quantities, as is often the case in environmental goods. In variation measures, on the other hand, the consumer is free to vary the quantity of the good considered (Randall and Stoll 1980). Compensating and equivalent surplus measures are presented graphically in Figure 1. Those are the welfare measures defined by this framework of economic consumer theory and measured using contingent valuation.

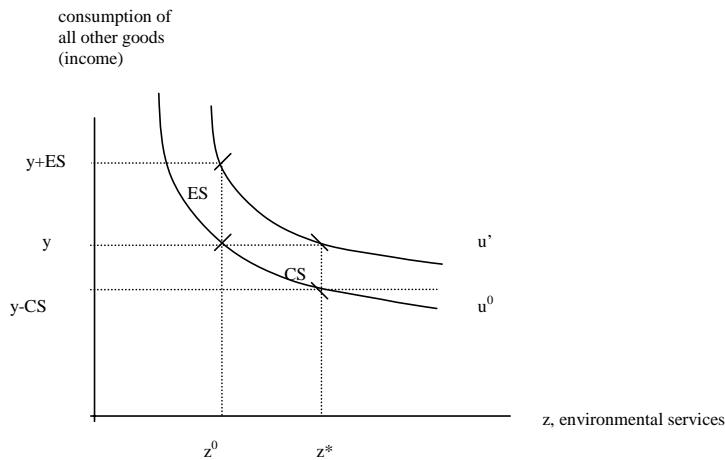


Figure 1. Compensating (CS) and equivalent surplus (ES) measures of welfare change by environmental services

2.2. Elements of contingent valuation: good, context, payment

In doing a cost benefit analysis of a nature conservation program it is important to value the costs of implementing the program as well as the benefits the program produces. Costs that relate to a forest conservation program come mainly from the negative impacts on timber production, and can be determined with the help of market prices. Making cutting practices more environmentally oriented or increasing the number and size of nature conservation areas both produce non-market benefits that are directly related to the variety of species and habitats, as well as other benefits, such as improved recreation environment and forest scenery. Benefits may also include improved water quality, hunting opportunities and berry- and mushroom-picking opportunities.

Economic literature has distinguished various value categories within the total value of a natural resource (summaries presented by Mitchell and Carson 1989, Randall 1992, Perman

et al. 1996, Lesser et al. 1997, Turner 1999). These components take the motives behind individual values into account. Passive-use values are separated from use values. Existence value (EV), which is among the passive-use values, is the essential value component in nature conservation. Existence value refers to the utility received from the resource as such, without any expectations that it be used. In evaluation of forest or nature conservation policy, the total economic value of the change, including all the value categories, is taken into account.

The nature of the good sets limits to the methods by which its total economic value can be defined. The environmental goods that have only existence value are pure public goods and are consequently non-exclusive and non-rival (Johansson 1991). Non-exclusiveness means that an individual cannot be prevented or cannot prevent other individuals from consuming the good. Non-rivalness means that increased consumption by someone does not reduce the amount available to others. Because existence of the variety of species and biotopes has these properties of public goods, the value of nature conservation benefits can be measured only by using specific methods. These methods rely on measuring stated preferences, an individual's statement about the perceived value of the good. The most frequently used of these methods is contingent valuation (CV).

In contrast to revealed preference methods of non-market valuation, such as the hedonic price method and the travel cost method, CV or other methods based on stated preferences do not require data about the use of the non-market good or goods that are its complements. Using survey research methods, CV measures the total monetary value of the utility change caused by a policy or project that affects the environment. The method is termed contingent because the information sought from survey respondents is conditional upon a particular hypothetical situation (Bishop et al. 1995). In a way, a hypothetical market is created for the non-market good under study in a survey.

A considerable literature exists on how to implement a CV study and especially how to create hypothetical markets (e.g. Arrow 1986, Fishhoff and Furby 1988, Mitchell and Carson 1989, Bishop et al. 1995). The population of a CV survey can be defined in terms of sampling unit (individual citizen), location (geographical region), and time. In contrast to the use-value studies, in CV studies that focus on existence values, the population cannot be limited to those who actually use the resource. After defining the population, the sampling is usually done randomly. Personal interview is the recommended method of implementing a CV survey (Arrow et al. 1993). However, in many cases the budget or time constrains the choice of survey method, and a mail survey is often the only feasible way to collect the data. The process of designing the questionnaire may benefit from several approaches, for example using in the exploratory phase focus groups that raise issues that should be included in the CV scenario or questionnaire. In pre-testing the questionnaire, think-aloud experiments and separate pilot surveys are recommended.

Fishhoff and Furby (1988) regard the scenario of CV as similar to a process of market transaction and define what kind of information is necessary in order to create conditions under which the transaction in a CV is satisfactory. Three constituents are defined as necessary for a satisfactory transaction: 1) something being received, i.e. the good, 2) something being given, i.e. the payment, and 3) and a social context, the i.e. marketplace within which the exchange would take place (Table 1). In earlier literature the claim has been sometimes made that including other components in addition to the good would bias the results. Nowadays, all such components are considered essential in a contingent valuation (CV) scenario (Kahneman 1986, Brown and Slovic 1988, Mitchell and Carson 1989, Arrow et al. 1993, Bishop et al. 1995). The less prior knowledge the respondents have about the components of the transaction, the more details need to be explained and steps taken to ensure that they are well understood. Table 1 lists the information that according to Fishhoff and Furby (1988) needs to be defined in designing a CV scenario. These constituents listed in Table 1 were used also in designing the questionnaires of this study.

Table 1. Components for defining a CV scenario in a nature conservation context adapted from Fishhoff and Furby (1988)

The good	Attributes
	Context
	Source of change
	Reference and target levels
	Extent of change
	Timing of change
	Certainty of provision
The value measure	Money
	Payment vehicle
	Constituency (household – individual)
	Reference and target levels
	Elicitation method (open-ended, dichotomous choice, other)
	Extent: frequency and duration
	Timing of payment
	Certainty of payment
The social context	Provider of the good
	Other people involved
	Resolution mechanism
	Parties involved
	Iterations
	Constraints (e.g. institutional)
	Other stakes
	Externalities (e.g. altruism, other impacts)
	Precedents
	Legitimacy of process

One essential decision in designing a contingent valuation survey is the choice of elicitation method. In the separate studies included here, both an open-ended willingness to pay measure and a dichotomous choice measure are used. In the simple form of dichotomous choice an individual is presented with a program which improves the quality of environment but induces costs to respondent (bid). Based on the respondents' choices between the status quo and the program on various bid levels the average, WTP for the population is estimated (e.g. Hanemann and Kanninen 1999).

Contingent valuation research received an impetus to critical discussion and research from Exxon Valdez oil spill of 1989. Recent literature on contingent valuation has focused on improving the method in the critical issues identified in that discussion (e.g. Hausman 1993, Arrow et al. 1993). Contingent valuation research since the NOAA "blue ribbon panel report" (Arrow et al. 1993) has demonstrated that carefully designed and conducted CV studies can satisfy many of the panel's guidelines and meet its burden of proof (Randall 1997). However, there are still many controversial issues in contingent valuation literature. Carson et al. (2001) discusses these controversies and summarizes the research evidence related to them. Carson et al. (2001) links the controversies to the following topics in the CV literature: passive use values, unfamiliarity of the good, market size, scope of the good, income effects, WTP-WTA disparity, sequence and context effects, and strategic behavior related to various elicitation formats.

2.3. Validity of the contingent valuation method

One approach to assess contingent valuation critically is to focus on the validity and the reliability of the method. The reliability of measurement has not been considered as problematic in CV as the validity of measurement. In social research methodology literature, the validity of any measurement has been typically considered from three perspectives, viz. content or face validity, criterion validity and construct validity (Babbie 1992, Baily 1987). These validity concepts have been used also in discussions of the validity of CV (e.g. Mitchell and Carson 1989, Bishop et al. 1995). Content validity refers to the degree to which a measure covers the range of meanings of the concept. The assessment of content validity is based on subjective judgement. According to Mitchell and Carson (1989), when assessing the content validity of CV it is essential to focus on the structure of the market and on the description of the amenity; e.g. whether the description of the environmental good is unambiguous and meaningful for respondents, and how property rights are defined. Comparisons with numerous state-of-the-art books is one alternative to evaluate the content validity of CV.

In assessment of criterion validity, the measure is compared with a criterion which is closer to the theoretical construct than the measure itself. One criterion in contingent valuation is

the actual market price. The limitation of this kind of assessment is that it can be applied only if the good is private and marketable, such as a hunting permit (Bishop and Heberlein 1979) or if the market can be simulated (Sinden 1988). However, in the case of pure public goods simulating market conditions is more complicated (Navrud 1992, Brown et al. 1996). The results of several comparisons of actual and hypothetical WTP measurements have been summarized in a meta-analysis. According to it, the hypothetical WTP in the most common types of CV studies was found to be about 30% higher than the actual WTP (List and Gallet 2001). A component of criterion validity in the case of future events is predictive validity, which refers to the ability of the measure to predict future events. The contingent valuation literature has attempted to define the conditions under which CV could be expected to predict actual market behavior.

Construct validity consists of convergent validity and theoretical validity. In convergent validity, which is not a focus of this study, two measures are compared, neither of which is assumed to be a true measure. CV results can be compared with the results of the hedonic price method or the travel cost method, although these two methods are not necessarily intended to measure exactly the same construct with the same assumptions. In the event that they give considerably different results, it is unclear which method (if either) gives valid results.

The second part of construct validity, theoretical validity, is of interest from the point of view of this study. Theoretical validity is assessed by determining to what degree the findings of a study are consistent with expectations of the theory (Mitchell and Carson 1989). Most commonly, this is analyzed by comparing the variables and coefficients of the WTP model with the theoretical expectations. For example, in the dichotomous choice model the probability that a policy will be supported should decrease as the expenses to household increase (Study IV). Willingness to pay should be sensitive to the scope of the good; it should be higher in direct proportion to the amount or the quality of the environmental good supplied (Study IV). In the case of the environment it can also be assumed that the higher the income, the higher the WTP, or actually, the higher the education level, often correlated with income, the higher the WTP (e.g. Uusitalo 1986).

The above examples refer to economic variables familiar from economic consumer theory. However, the theoretical validity of CV could be evaluated from the broader consumer theory perspective. Consequently, other theories besides economic consumer models can also be used to assess the theoretical validity of the CV method. In this dissertation we are particularly interested in how the theory of planned behavior could be used for that purpose.

2.4. Attitude-behavior models

2.4.1. Explaining preference formation

Economic behavior has been explained with many theories from psychology (Lea 1992). In the interdisciplinary field of economic psychology, the interests of economists and psychologists overlap. Lea (1992) classifies the theories used in economic psychology in nine separate categories, of which theories of cognitive social psychology are most frequently applied. These theories consider behavior, including economic behavior, as striving for congruence with a set of attitudes. Thus attitudes, which can be measured in fairly direct ways, can predict behavior. Attitude measurements are a natural source of the ‘soft data’ on tastes or preferences that are needed to complement ‘hard data’ on behavior in the market if we are to have a full socio-economic picture on the economic lives of individuals (Etzioni (1991).

Also, according to economic theory, people make choices in accordance with their preferences. However, the question considered to be beyond the scope of neoclassical economics is how individuals form their preferences. For example, Durckman and Lupia (2000) who focus on preference formation in political science, classify models that describe individuals’ preference formation as either on-line models or memory-based models.

In on-line models individuals form and maintain in their minds a running ‘evaluation counter’ of certain objects. This evaluation counter contains affects related to objects. When an individual encounters new information and new stimuli about an object, she or he recalls this evaluation counter into working memory and updates it with that new information. After that, the evaluation counter is no longer connected to that information and the information is forgotten. On-line models are applicable when people believe that judgement will probably be required in the future.

The idea behind memory-based models is that people base their evaluations on information that they retrieve from their long-term memory. Each individual recalls relevant information and integrates it into an overall evaluation (e.g. Fishbein and Ajzen 1975). According to memory-based models, individuals engage in large amounts of computation when they form their preferences. The development of these models has led to models that describe preference formation assuming less computation. These models point out that only some accessible or salient considerations or beliefs will be retrieved from the memory when forming a preference. In an extreme case, when there is no motivation or ability to engage in a memory search, a person bases her or his evaluation on whatever information happens to be accessible (Fazio 1990). The most accessible considerations are likely to be the most recent ones.

2.4.2. Theory of planned behavior

The theory of planned behavior (TPB) is a memory-based model to understand individual evaluations and behavior. It is based on a long research tradition in social psychology focusing on attitudes as predictors of behavior, i.e. on an attitude-behavior framework. An attitude can be defined as a disposition to respond favorably or unfavorably to a commodity or event (Fishbein and Ajzen 1975). Since the beginning of attitude research, in the early 1900's, attitudes have been used to explain behavior. Early attitude-behavior studies simply tested the assumption that attitudes toward object serve as behavioral predisposition for any action with respect to that object (for summaries of the historical perspective, cf. McGuire (1985) and Ajzen and Fishbein (1980)). An alternative approach to the simple attitude-behavior link was a multicomponent view of attitudes according to which attitudes were seen as a system of three components: a person's beliefs about the object (cognition), his feelings toward the object (affect), and his action tendencies with respect to the object (behavior). In the expectancy value model of attitude, the affective component of attitude is a function of products of expectancies (person's beliefs that attitude object has certain attributes) and values (a person's evaluation of these attributes) (e.g. Fishbein 1963).

The attitude model of Fishbein (1963) was originally developed to predict and explain attitudes towards objects, but it was then reformulated to predict attitudes toward behavior. Especially, an earlier version of the attitude model than TPB, viz. the theory of reasoned action (TRA) by Ajzen and Fishbein (1975), is one of the most frequently applied social psychological theories of human behavior. It has dominated attitude research in consumer psychology and has been extensively used in predicting buying of market goods (cf. Sheppard et al. 1988, for a summarizing meta-analysis). It has also been applied in forest research (Young and Reichenbach 1987).

The theory of reasoned action was developed to predict individual volitional behavior. According to TRA, actual behavior is preceded by behavioral intentions. In the causal chain, behavioral intention is a composite of attitudes towards this specific behavior and subjective norms.

Ajzen and Fishbein (1980) suggest that attitudes are viewed as overall evaluations. They define that an attitude toward any concept "is simply a person's general feeling of favorableness or unfavorableness of that concept". In the theory of reasoned action the concept of interest is implementation of a specific behavior, on which the attitude focuses, in order to be able to predict the behavior. The theory includes an additive model in which attitude (A) is formed as a summative belief index that is composed of n salient beliefs concerning the outcomes of specific behavior (b_i) and the evaluations of those outcomes (e_i),

$$A = \sum_{i=1}^n b_i e_i.$$

A subjective norm deals with the influence of the social environment on intentions and behavior. A subjective norm (*SN*) refers to a person's perception whether people who are important to him think he should or should not perform the behavior in question. *SN* is directly proportional to the sum of products composed of normative beliefs (n_i) and motivation to comply (m_i) with the k salient referents that are important for the individual,

$$SN = \sum_{i=1}^k n_i m_i.$$

The theory of reasoned action incorporates a feedback mechanism, reflecting the fact that attitudes, beliefs, norms and expectations are influenced by behavioral experiences. Because of this process of dynamic adjustment, predicting behavior under novel conditions or predicting a unique type of behavior is more difficult than predicting customary behavior.

The theory of planned behavior (TPB) expands the applicability of TRA also to behaviors that cannot be assumed to be dependent only on volitional control (Ajzen and Madden 1986, Ajzen 1991). TPB includes a new control factor in explaining behavioral intention, namely perceived behavioral control (*PBC*). By this is meant the actor's evaluation of the perceived ease or difficulty of performing the specific action. Perceived behavioral control often reflects past experience and anticipated impediments and obstacles based on second-hand information. Perceived behavioral control is proportional to the summation of h control beliefs (c_i) as well as of the perceived power (p_i) of the control factor under consideration,

$$PBC = \sum_{i=1}^h c_i p_i.$$

Thus, in addition to including components of the theory of reasoned action, attitude (*A*) and subjective norm (*SN*), the theory of planned behavior also includes perceived behavioral control (*PBC*) as a determinant of behavioral intention (*BI*). Therefore, as shown in Figure 2 behavioral intention is formed as a weighted combination of attitudes, subjective norms and perceived behavioral control,

$$BI = f(A, SN, PBC).$$

In the theory of planned behavior as well as in the theory of reasoned action, an attitude is determined as a function of the strength of beliefs (b_i) and the evaluations (e_i) associated with the attributes.

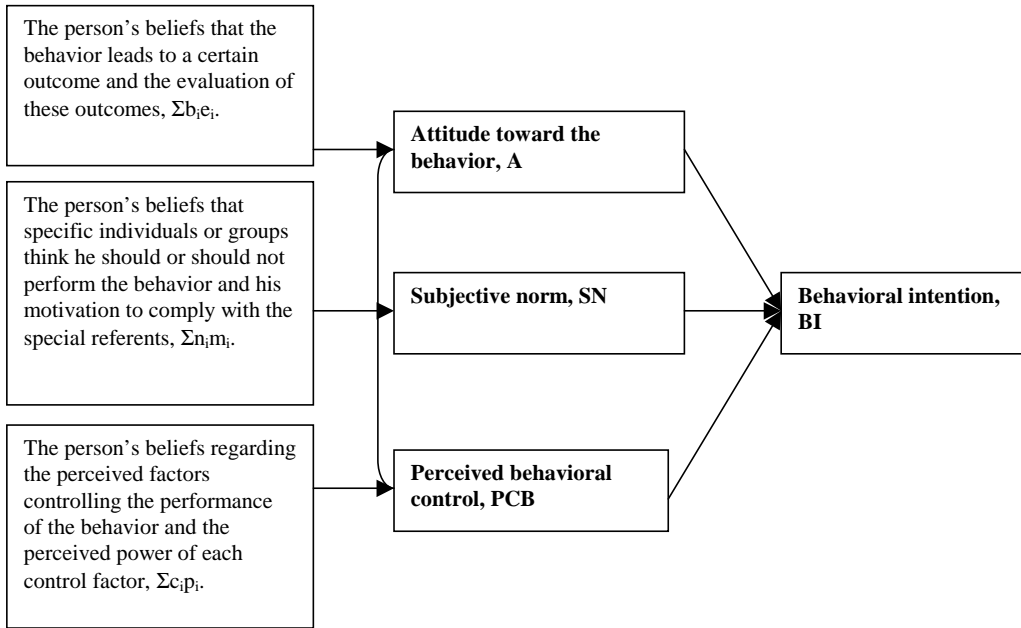


Figure 2. The theory of planned behavior

The theory of planned behavior has been applied, for example, to explain environmentally oriented behavior (e.g. Lynne et al. 1995, Moisaner 1996, Taylor and Todd 1997, Harland and Staats 1999, Cheung et al. 1999, Trumbo and O'Keefe 2001) and nature-related leisure behavior (e.g., Hrubes et al. 2001, Ajzen and Driver 1992a).

2.4.3. How to apply and use the attitude-behavior models in contingent valuation

In the studies presented in this dissertation, the theory of planned behavior is applied to a varying extent in order to explain the respondent's willingness to pay for environmental good measured in CV and in order to analyze the consistency of WTP with the variables of TPB. In the following we summarize previous literature that outlines some alternatives of applying attitude-behavior theories in CV. In addition to the discussion focusing on components of attitude-behavior theories that may be beneficial in a CV context, this literature also generally shows why attitude-behavior theories can be useful in CV.

Ajzen and Peterson (1988) discuss how willingness to pay could be assessed using the theory of reasoned action. They point out that a whole scale of attitudes – from the attitude

towards the public good, to the attitude towards the policy dealing with the public good and, finally, to the attitude towards paying for the public good – are related in valuation. The value placed on the good itself may differ from the value of the policy designed to provide the good, and in addition the value of policy may again differ from the willingness to pay for the good. However, attitude-behavior models focus precisely on predicting individual behavior based on the attitude toward that behavior. The problem in implementing the model in paying for a specific public good in a context-specific CV question is that the attitude measure is very similar to the measure of willingness to pay itself. Their opinion is that little is to be gained by assessing only attitudes toward paying for a good instead of intention to pay for a good. Instead, they outline a possible approach to assessing a psychological value of an environmental good by using an expectancy value model. Such a model would consist of attitude toward the public good and attitude toward the policy providing that good. Expectancy value components of beliefs and their evaluations could be used to estimate benefit and cost categories.

Green and Tunstall (1999), on the other hand, consider Fishbein and Ajzen's (1975) attitude model as a promising starting-point to complement the thin economic theory with a model that aids in understanding preference formation and choices in the case of CV. The attitude model of Fishbein and Ajzen (1975) offers them a basis to identify the components of the model and the relationships between them.

Although, according to Green and Tunstall (1999), attitude towards the good is usually found to be inferior to attitude toward the act itself as a predictor of behavioral intention a measure of the attitude toward the desirability of the proposed change must be included in the study. According to them this is because there is no certainty that willingness to pay under one payment mechanism and policy is the same as under other forms. In the case of non-market valuation, cognitive beliefs can include measures of beliefs about the proposed means of payment, about the form of action to be undertaken (the policy), about the organization that would undertake that action, as well as about the consequences of the change in the good itself. In addition to including cognitive beliefs and evaluations related to them, Green and Tunstall (1999) include affective negative beliefs (e.g. anger), which are emotional.

They discuss the social norm component and emphasize that social norms may be related to particular payment vehicles. Behavioral intentions towards other acts that are logically dependent on the same attitudes can be included in a CV study. Beyond the model developed by Fishbein and Ajzen (1975), Green and Tunstall (1999) include values or higher-order core beliefs that predict lower-order beliefs. They recommend that these values be operationalized as questions which explore what concepts of values motivated the respondents in WTP question. Spash (2002) point out that one aspect that is missing from the TPB approach and is essential in CV context concerns fundamental ethical beliefs.

Fundamental ethical beliefs cover the moral basis for action and include such issues as rights and justice.

Green and Tunstall discuss how attitude-behavior theories relate to the concept of preference. According to them the weakness of attitude theory in the CV context is related to preferences. One essential aspect in the economic concept of preferences is that preferences refer to the fact that actions have a preference order. It follows that positive attitudes toward an action do not necessarily mean that individual prefers that action. Another aspect is that preferences give priorities constrained by resources. An attitude toward an action does not include the conceptualization of the sacrifice.

Many authors have discussed the usefulness of attitude-behavior models in CV studies. First, attitude-behavior research has been seen as a method **to investigate the predictive validity of CV**. This means the evaluation of the correspondence of the hypothetical willingness to pay measured in CV with willingness to pay in actual market-like conditions (Bishop and Heberlein 1986, Mitchell and Carson 1989, Garrod and Willis 1999). For example, Mitchell and Carson (1989) refer to studies of attitude-behavior that have shown high correlation between attitudes, intention and behavior with the purpose of proving the predictive validity of the contingent valuation method. They summarize three conditions that might promote a strong relationship between hypothetical intention of paying in CV with actual behavior. The first is a high degree of correspondence of attitude/intention and behavior in terms of action, target, context and time. The second is the number of intervening stages between a variable in the model and the behavior. According to this factor the strongest predictor of the behavior is intention. The third factor is familiarity. The more familiar the action is, the more likely it is that attitude or the behavioral intention will predict the behavior. Mitchell and Carson (1989) consider this factor as most problematic from a CV point of view.

Bishop and Heberlein (1986) point out that if CV is successful in measuring respondent's willingness to pay under realistic market conditions, also major beliefs why people express existence values, for example, should be in line with WTP. The significant positive relationship between these beliefs and CV results supports the hypothesis that behavioral intentions expressed in CV may correspond to actual behavior.

The second application of attitude-behavior theories in the literature on non-market valuation is **in identifying the importance of different value categories**. A frequent topic of discussion has been the role of different categories of value: various existence, use and option values. The prevalent understanding is that contingent valuation measures all the value dimensions that compose the total economic value of an environmental good (e.g. Randall 1992). One procedure to measure the magnitude of these value dimensions has been to elicit opinions from the respondents about the importance of the dimensions.

Including beliefs about an environmental good in the measurement, increases our understanding of why respondents value that good and helps us to evaluate the importance of different value dimensions. Mitchell and Carson (1989) point out that knowledge about the attitude-behavior model components can help researchers to specify the most appropriate context in the scenario. If, for example, the respondents' beliefs are investigated beforehand in an elicitation survey, the CV scenario can be focused to standardize respondents' beliefs at realistic levels. In addition, Harris et al. (1989) suggest that the framework can be used to evaluate how hypothetical the presented valuation scenarios are.

The third application of attitude-behavior theories is **in assessing the theoretical validity of CV**. This assessment can be made by studying how strongly CV findings are related to theoretically relevant determinants of intention (Mitchell and Carson 1989). For example, the consistency between variables of TPB (attitudes, subjective norms, perceived behavioral control) and willingness to pay indicates that WTP is in line with those variables that in theory form individual's payment behavior of environmental good. Measures of attitudes and beliefs have been pointed out as being helpful in interpreting the responses to the primary valuation question (Arrow et al. 1993). Among items that would be helpful in interpreting willingness to pay, Arrow et al. mention income, prior knowledge of the site, prior interest in the site, attitudes toward the environment, attitudes toward big business, distance from the site, understanding of the task, belief in the scenarios, and ability/willingness to respond to the questionnaire.

Harris et al. (1989) suggest that CV can be assessed in relation to measurement paradigms that have been widely tested in social psychology. While being consistent with economic theory, this kind of approach could offer even better information about the individual decision-making processes being employed. Harris et al. (1989) come to the conclusion that contingent valuation measurement could be appraised using TRA and TPB. Theoretical structuring can provide a useful means of testing whether the valuation process provides an adequate decision structure compared with a real-world decision situation. They suggest that it can also be used to define the influence of social peer pressures on valuation results.

The critics of contingent valuation method have argued that it measures only a general attitude toward the good and not the intention of paying or supporting a policy, as it is assumed to measure (e.g. Kahnemann et al., 1993). If this is the case, CV results are mainly related to the attitude toward the good itself and less to the other variables predicting behavioral intention. Attitudes predicting WTP for a policy can aid in understanding the nature of the WTP measure, i.e., whether WTP can be seen as a behavioral intention or as a general environmental attitude.

3. Previous empirical studies and the contribution of the present study

3.1. Applying the attitude-behavior framework in contingent valuation

3.1.1. Previous studies

In many CV studies attitudes have been used ad hoc as predictors of willingness to pay. However, although the possible usefulness of attitude-behavior theories has been discussed extensively, only very few CV studies have actually used more elaborate attitude models, such as TRA or TPB (Table 2).

Ajzen and Driver (1992b) give one example of how an attitude-behavior framework can be applied to understand WTP judgements in the case of participating in leisure activities. They used variables of TBP to focus on two different issues. The first set of variables focused on the behavior of participation in leisure activities, while the second set focused on paying a reasonable user fee for an opportunity to engage in the leisure activities in question. In addition they measured moral considerations related to paying. They found that the variables connected to the act of paying were more predictive of stated WTP than the variables connected to participation. Only some of the variables that are important according to TPB were significant predictors of making a monetary contribution. Significant variables included those dealing with positive or negative attitudes associated with participation in a leisure activity, and with moral considerations of the fairness of paying a user fee and of the moral satisfaction obtained from doing so. When the amount of monetary payment was under consideration, the social norm (important others) and perceived behavioral control (affordability) were significant components of predicting WTP, while the attitude toward paying was not.

Kerr and Cullen (1995) applied an attitude-behavior framework in contingent valuation of possum control in a national park. They constructed a predictive model of WTP from beliefs related to national parks and evaluations of the importance of these beliefs. They optimistically suggest that non-market values can be transferred from one location to other by accounting for differences in attitudinal elements between locations.

Barro et al. (1996) focused on the conditions under which behavioral intention corresponds to actual behavior in the case of contingent valuation of nature preserves. They examined two separate treatments. The first of these treatments varied the specificity of the behavioral intention measures with respect to the context of the valuation, while the second varied the accessibility of attitude by varying the amount of information given to the respondents.

Their results showed the importance of the specificity of a WTP question in order to be able to predict voting behavior in a mock election.

Moisseinen (1997) discussed the differences and similarities of the TRA and the economic approach in CV. Applying attitude models in a CV context, Moisseinen created a behavioral model in which an attitude toward behavior and a subjective norm together with demographic variables and attitudes toward targets of protection predict intention, measured by WTP. Moisseinen applied the model in connection with a plan to protect a seal species living in a lake in Eastern Finland, the so-called Saimaa seal, and recommended either including external variables in the model of behavioral intention or including attitudes towards the action and subjective norms in the economic model of CV.

Luzar and Cosse (1998) included variables from TRA in a study explaining WTP for improvements in rural water quality in Louisiana. To improve the descriptive and predictive ability of the contingent valuation instrument, they tested the predictive power of an attitude and a subjective norm in predicting WTP. Both variables proved to be significant, and they improved the predictive power of the model.

Table 2. Applications of the attitude-behavior framework (e.g. TPB and TRA) in a CV context

	Ajzen and Driver (1992b)	Kerr and Cullen (1995)	Barro et al. (1996)	Moisseinen (1997)	Luzar and Cosse (1998)	Connelly et al. (2002)
Behavior			x			
Behavioral intention, WTP	x	x	x	x	x	x
Attitude toward the good	x	x		x		
Attitude toward the policy				x		x
Attitude toward paying	x			x	x	
Beliefs related to the good		x				x
Beliefs related to the policy					x	
Beliefs related to paying						
Subjective norms	x			x	x	
Normative beliefs					x	
Perceived behavioral control	x					
Control beliefs						

Connelly et al. (2002) used TPB to aid in understanding to understand the relationships between environmental beliefs, support for ecosystem restoration actions (attitude), and willingness to pay for restoration and protection goals of a river estuary. They used previous literature to construct general belief measures related to concern for environment and

concern for humans over nature. The attitude measure of TPB was replaced with the measures related to the support of protection and support of public use. According to their results attitude toward (support of) protection correlated with willingness to pay.

In summary, an attitude-behavior framework has been used in varying forms in six CV studies. All the studies interpreted willingness to pay as a behavioral intention. The theory of planned behavior, in the form of a measure of perceived behavioral control, was applied only in the study by Ajzen and Driver (1992b). In that study the control factor was conceptualized as an ability to pay. Only three studies measured beliefs related to the good or to the policy in order to reveal those perceptions that are of interest from the resource management point of view. The whole range of attitudes related to the valuation situations – attitude toward the good, the policy and paying, as recommended by Ajzen and Peterson (1988) and Green and Tunstall (1999) – was included only by Moisseinen (1997). Attitudes and subjective norms proved to predict WTP significantly in most of the studies. Kerr and Cullen (1995), optimistically, suggest that non-market values could be transferred by accounting for differences in attitudinal elements. However, including moral considerations seemed to reduce the explanatory power of the original variables of the attitude-behavior framework (Ajzen and Driver 1992b).

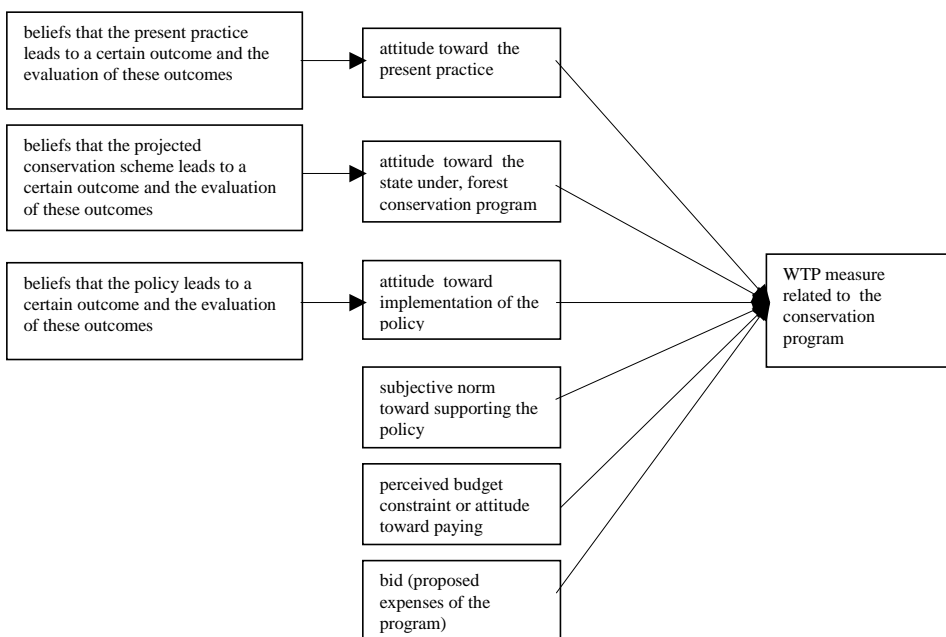


Figure 3. Application of TPB in this study

3.1.2 Application of the theory of planned behavior in this study

Despite discussion and suggestions about using the attitude-behavior framework in contingent valuation, empirical applications are still quite limited. The framework has been used in only in some studies, none of which is related to forest conservation.

The present study suggests a way to apply the theory of planned behavior in a CV context (Figure 3). The model includes attitudes toward the present state of the public good, toward the state of the public good under the program – the forest conservation scheme – and toward the policy by which the program would be implemented. Beliefs about the expected outcomes and their evaluations are used to conceptualize various benefits and costs involved with the present state, the state of the good under the program, and the policy implementing the program. Perceived behavioral control is interpreted either as the attitude toward paying or as the perceived budget constraint. The effect of the budget constraint, essential in any economic model, is evidently related to the bid. The dependent variable is the willingness to pay measure, either using the dichotomous choice between the present practice and a program that includes costs to respondents household, or using an open ended response of WTP.

In the five studies, measures of attitudes and beliefs are used to help interpret the responses to valuation questions. The theoretical validity of the CV method is tested by analyzing how strongly CV findings are related to theoretically relevant determinants of WTP. Questions of interest are whether the directions of relationships between the variables of TPB and WTP are as could be expected and whether all variables that are important according to model are also empirically relevant.

3.2. Studies testing the effects of scope, social context and information in CV

In addition to improving the applications of attitude-behavior framework to CV, the present study addressed three issues related to the contingent valuation method itself: the method's sensitivity to the scope of the good, the effect of social context, and the effect of information. Tests were performed for each of these three influences. In interpreting the test results it is important to obtain insights into respondents' decision-making processes. In that sense, attitude and belief measurements may also help in the interpretation of these phenomena, and give insights that a simple economic model cannot provide.

Scope insensitivity

The recent discussion of the validity of contingent valuation has, to a great extent, focused on the issue of respondents' sensitivity to the scope of an environmental good (Carson and

Mitchell 1995, Carson 1997, Frederick and Fischhoff 1998, Hovenagel 1996). Economic theory suggests that if an individual is willing to pay something to obtain a certain environmental good, she should be willing to pay more to obtain more of that good. In other words, the amount people are willing to pay should be proportional to the amount of good received. However, empirical studies often show scope insensitivity. The issue of scope insensitivity has arisen especially in cases involving large absolute changes (Kahneman and Knetsch 1992, Desvousges et al. 1993). Kahneman and Knetsch (1992) were the first to report evidence of insensitivity to scope and suggested that CV measures willingness to pay for the moral satisfaction of contributing to a public good, not for the economic value of the good.

Several concepts, including perfect embedding, regular embedding, part-whole bias, and nesting, have been used in the discussion of the validity of CV with respect to the matter of scope. Carson and Mitchell (1995) clarified the concepts connected to the issue of insensitivity to scope by specifying that two goods with different levels of scope are either 'quantitatively nested', 'categorically nested' or both. In quantitative nesting the extents of the two goods are measured with a common scale, and the first good is more extensive in scope than the second. Categorical nesting occurs when goods are distinguished by changes in more than one attribute in a multivariate utility function, e.g. a multi-faceted project might seek to improve biodiversity, scenic conditions and recreation opportunities, while a more narrow project might seek to improve only one of these attributes. This means that a good with only one positive attribute should be less valuable than a good with several positive attributes.

Many studies have shown that respondents are sensitive to scope (e.g. Carson and Mitchell 1993, Smith and Osborne 1996, Carson 1997, Smith et al. 1997), others have shown that they are not (Diamond et al. 1993, Schkade and Payne 1994, Svedsäter 2000), and some studies have even shown both tendencies (Loomis et al. 1993, Giraud et al. 1999).

There are two competing explanations for insensitivity to scope (Hovenagel, 1996). Critics of the CV method argue that the reason for the insensitivity is that the respondents will perceive moral satisfaction, or a 'warm glow' from their altruistic contribution, and their contribution will remain the same, regardless of the scope of the good. The other line of thought attributes insensitivity to scope to poor survey design and/or problems in administering the survey (Carson 1997). According to this view, a vague description of the environmental good can cause insensitivity. Another reason for insensitivity has been seen in the possibility of different interpretations of joint production: the researcher believes that one good does not encompass another, but the respondent finds the two goods to be indistinguishable. A third suggestion is small sample sizes or ways of administering the survey that do not encourage respondents to pay close attention to the questions being asked. However, the respondent's familiarity with the good and the high personal relevance

of the good are assumed to improve the sensitivity of the respondent to the scope of the good (Carson 1997).

In this dissertation scope sensitivity is analyzed using TPB for the purpose of understanding how respondents make choices in cases of two levels of scope. Study IV focuses on categorical nesting. The influence of scope is examined by varying the number of attributes of the good in a split-sample design with two respondent groups.

Social context

The components of a satisfactory transaction are the good, the payment and the social context in which the transaction is conducted (Fischhoff and Furby 1988). All of these components are also considered to be essential aspects of a contingent valuation (CV) scenario (Arrow 1986, Kahneman 1986, Brown and Slovic 1988, Mitchell and Carson 1989, and Bishop et al. 1995). Some empirical studies have focused on the effect of rules for payment (Johnston et al. 1999, Stevens et al. 1997), and others have focused on the effect of the provider of the good (Briscoe et al. 1993, Lindberg and Johnson 1997). However, aspects related to social context have not attracted much attention in the CV literature.

The aspect of the social context evaluated here is the way conservation policies are planned and implemented (Study III). The controversial conservation policy planning process related to the Natura 2000 program provided a good opportunity to analyze the influence of the different planning methods.

Information effects

As with market goods, WTP for non-market goods is conditional on the information available to the individual. Information about good, payment and context is especially relevant for valuation and will have an effect on WTP (Garrod and Willis 1999). Several studies have focused on the effects of information about the good and information about the substitutes (Munro and Hanly 1999). The effects of information have been found to be respondent-specific, depending on the previous information the respondent has. Information has an effect on WTP if it is truly new to the respondents (Hoehn and Randal 2002). According to Hoehn and Randall, depending on respondents' previous information new information either increases or decreases individuals' valuations.

In a CV context, Ajzen et al. (1996) applied the elaboration likelihood model to understand the way information influences WTP under low and high involvement situations. If the good was highly relevant to the respondents, they were not sensitive to irrelevant cues such as priming procedures. In conditions of high personal relevance willingness to pay increased depending on the quality of the cognitive arguments. In cases of low personal

relevance, affective priming cues had a greater effect on WTP than did cognitive arguments. The study showed that information in contingent valuation surveys should be planned with extreme care in order to avoid irrelevant cues that might bias WTP. However, an unresolved issue is still the amount of information that respondents require for reasonably informed valuations. Naturally a balance must be found between information overload and information so inadequate that it results in incomplete valuation (Hoehn and Randall 2002).

Study I deals with how additional information about the good, in this case forest regeneration, affects respondents' beliefs and contingent valuation results.

3.3. Applying CV in the field of forest and nature conservation

CV has been used to value perceived benefits from forests in various studies. In Table 3 forest-related CV studies are listed in chronological order, and the main benefits or the good of each study is mentioned. Studies have focused on (a) forest protection, (b) forest recreation, (c) forest quality or (d) conservation of endangered species. Some studies are not related to any policy or project; instead they just generally value all non-market forest benefits.

Table 3. Some forest-related CV studies. Type of good: a) forest area conservation, b) forest recreation, c) forest quality, d) endangered species, e) non-market benefits of a forest area

Reference	Publication year	Good	Location	Type of the good
Walsh et al.	1984	existing and potential wilderness designation	Colorado USA	a
Crocker	1985	value of health of a national forest	California USA	c
Daniel et al.	1989	scenic beauty	Arizona USA	c
Walsh et al.	1989	recreational visit	Rocky Mountains, Colorado USA	b
Hanley	1989	recreational visit to forest park	Scotland UK	b
Kriström	1990	preservation of forest areas	Sweden	a
Walsh et al.	1990	protection of forest quality	Colorado USA	c
Whitehead	1990	preservation of hardwood forest wetland	Kentucky USA	a
Halstead et al.	1991	recreational visit to Pemigewasset Wilderness Area	New Hampshire USA	b
Hagen et al.	1992	preservation of old growth forest and spotted owl	Pacific Northwest USA	a, d
Lockwood et al.	1993	preservation of East Gippsland national estate	Australia	a
Hanley and Ruffel	1993	access to forest with varying attributes and preservation of the opportunity to visit forests	UK	b, c
Hoen and Winther	1993	more cautious forest management and preservation of virgin coniferous forests	Norway	a, c
Maxwell	1994	non-marketable benefits of a forest area	Bedfordshire UK	e
Mattsson and Li	1994	using non-timber forest commodities	Vesterbotten Sweden	e
Blamey et al.	1995	forest management	Australia	c

Fried et al.	1995	elk hunting quality	Oregon USA	b
Condon and Adamowicz	1995	moose hunting	Newfoundland Canada	b
Echeverria et al.	1995	forest preservation	Costa Rica	a
Fredman	1995	white-backed woodpecker	Sweden	d
Bostedt and Mattsson	1995	forest management practices in nature tourism areas	Sweden	b, c
Shyamsundar and Kramer	1996	tropical forest protection	Madagascar	a
Flatley and Bennett	1996	tourist values of forest conservation in Vanuatu	Australian sample	a
Bateman and Diamand	1996	recreational woodland	UK	b
Boxall et al.	1996	forest quality changes from forest management for moose hunting	general	b
Hadker et al.	1997	maintenance and preservation of Borivli National Park	Bombay, India	a
MacDonald et al.	1997	forest pest control program	Canada	c
Kramer and Mercer	1997	protection of tropical rain forest	sample from USA	a
Boman and Bostedt	1997	protection of wolf	Sweden	d
Loomis and González-Cabán	1997	reduction of fire risk in spotted owl habits	California and Oregon USA	d
Tyrväinen and Väänänen	1998	non-market benefits of urban forest	Finland	e
Riddel and Loomis	1998	fire reduction program	Oregon and California USA	c
Gan et al.	1998	non-timber benefits of a national forest	USA	e
Desaigues and Ami	1999	biodiversity in a riparian forest area	France	a
Aldy et al.	1999	conservation of spruce-fir forest	Southern Appalachian Mountains, USA	a
Reaves et al.	1999	habitats of red-cockaded woodpecker	USA	a, d
Kline et al.	2000	improvement of wildlife habitat	Pacific Northwest USA	a, d
Holgen et al.	2000	recreational value of boreal forest with different silvicultural systems	Sweden	b
Scarpa et al.	2000	recreational benefits of nature reserves	Ireland	b
Stevens et al.	2000	ecosystem management practice	Massachusetts USA	c
Hailu et al.	2000	ecosystem conservation programs	Alberta Canada	c
Kenyon and Nevin	2001	forest flood plain restoration	Borders Region, Scotland UK	c
Winter and Fried	2001	protection of wildland from fires	USA	c
Tyrväinen	2001	urban forests	Finland	e
Hutchinson et al.	2001	forest recreation	Northern Ireland	b
Kohlin	2001	social forestry project	India	c
Siikamäki	2001	conservation of valuable habitats and old growth forest	Finland	a
Jakobsson and Dragun	2001	habitat of Leadbeater's possum	Victoria Australia	d
Muriithi and Kenyon	2002	conservation of biodiversity in the Arabuko Sokoke Forest	Kenya	a
Kuuluvainen et al.	2002	forest conservation program	Finland	a, d
Kniivilä et al.	2002	continuing current conservation	Northern Karelia Finland	a
Lehtonen et al.	2003	forest conservation program	Finland	a, d

In the United States, CBA and CV have been used by various public agencies as part of public decision-making processes. In many European countries the applications of CV have stimulated public awareness and even influenced decisions (Bonnieux and Rainelli 1999). The method has also been applied to forest issues in developing countries.

Despite the several contingent valuation studies related to forest conservation, willingness-to-pay information cannot be easily transferred from other countries to Finland. In addition, the environmental good and the valuation context vary between studies. Some studies valuing benefits of increasing forest conservation area in Finland have been published recently (Siikamäki 2001, Kuuluvainen et al. 2002, Lehtonen et al. 2003). In addition, the benefits of continuing current nature conservation in Northern Karelia have also been studied (Kniivilä et al. 2002). However, the current study (Studies II and III) related to the Natura 2000 network is the first to report data from a national CV survey in Finland valuing an increase in the amount of nature conservation. Moreover, the special controversy and publicity around the planning process of Natura 2000 made this valuation situation very unique.

Moreover, before Studies IV and V were performed, no attempts had been made in Finland to value the benefits of new, more environmentally oriented, forest regeneration practices. This thesis has importance for the evaluation of forest policy changes into an environmental direction. It produces empirically-based estimates of non-market forest values by measuring the population's willingness to pay for forest conservation.

4. Data and methods

4.1 Data sets: samples and survey methods

First data set – Local forest regeneration case in Loppi (1995)

The three data sets collected for this thesis focused on different valuation issues. The first data set focused on a local issue and were collected from the small rural municipality of Loppi in 1995. The subject of the valuation study was a hypothetical general land use plan for the Myllymetsä area, which is a forest area close to the community center, and for one more distant forest area. The hypothetical land use plan regulated forest regeneration cuttings. In the proposed plan only 30% of the maximum forest area (area of old-growth forests) was allowed to be cut in Myllymetsä during the coming 10 years. Other forest management or building regulations remained unrestricted.

The sample was randomly selected from the population register of Finland and included inhabitants and vacation property owners of the municipality above 18 years of age. The original sample size was 600. The data were collected in a two-stage mail survey, in which only 263 respondents of the first stage (outdoor recreation survey) received the second CV survey. This procedure reduced the final amount of respondents, and the second stage produced only 156 responses.

The second stage Loppi survey (Study I) included two willingness-to-pay questions; a referendum question in which “yes” and “no” options were complemented with “I do not know” and “do not want to answer” alternatives followed by an open-ended question (Appendix 1). The Loppi survey also included a test of the effect of information on WTP. For this purpose, the sample was randomly divided into two groups. One group received an information leaflet with the questionnaire. The leaflet gave information about the effects of forest regeneration on forestry, forest recreation, and the environment. The information concentrated on salient beliefs about the effects of cuttings. These belief items were formulated on the basis of a preliminary telephone interview. The information leaflet was not sent to the other group of respondents.

The survey included questions about attitudes toward forest regeneration cuttings, toward supporting regulative policy, about perceived behavioral control, and about subjective norms. Beliefs about the expected outcomes of forest regeneration and regulative policy as well as evaluations of the importance of the outcomes were measured. Seven-point rating scales (ranging from -3 to 3) were used to measure all of the attitude, norm, perceived control and belief variables. Salient attributes about forest regeneration cuttings and about outcomes of the cutting-restrictive policy were determined in telephone interviews with a systematic sample of 36 people selected from the Loppi area telephone directory. In the interview the possibility of regulating regeneration cuttings was explained, and the respondents’ beliefs about positive and negative outcomes of the policy were elicited. Belief statements in the mailed questionnaire were constructed for the attributes determined to be most salient on the basis of the telephone interviews.

Second data set - Nature protection benefits of Natura 2000 network (1997)

The second data set was generated by a contingent valuation survey conducted as a part of the environmental impact assessment of the proposed Natura 2000 network of nature conservation areas in autumn 1997. As the budget was tight, a mail survey was the only possible data collection method. The questionnaire was tested in a pilot study. The survey, which contained dichotomous choice WTP questions, employed two variants of the policy-planning method while keeping other aspects constant. The sample was divided into two groups, one for each policy-planning treatment. The scenario for the first group was based

on the actual Natura 2000 proposal (Appendix 2a), while the second group was given a hypothetical scenario, with a policy based on a more participatory planning approach (Appendix 2b). The questionnaires were mailed to a sample of 2400 Finnish citizens aged 18-70, randomly selected from the census register of Finland. After the first mailing in November 1997, reminder postcards were sent to the respondents. No re-mailing of the questionnaire was possible because of the tight timetable. The survey produced a response rate of 45% (1056 respondents).

In the Natura 2000 survey the willingness-to-pay question was posed in a dichotomous choice format, in which proposed expenses of the program varied. The choice alternatives were presented in an illustrative table summarizing the protection area, protected nature biotopes, and the costs of the alternatives. The first alternative was the status quo conservation situation and the second was an increased level of conservation along Natura 2000 lines. The payment, an increase in income taxes, which was the only realistic vehicle in this case, was connected to the second alternative. After being presented with the two alternatives, the respondent was asked to choose between them.

In addition to the contingent valuation question, several other questions measuring attitudes toward implementation of the proposed policy, motivation to process information, and the respondent's socio-economic background were asked. The attitude components, that is, beliefs about the effects of policy and protection on attributes based on topics in the public discussion were measured, along with respondents' evaluation of the importance of these attributes. Outside the basic TPB model, also the personal relevance of the issue to the respondent was also measured. It was assumed that the topic may be relevant to the respondent for two reasons, either because of the respondent's involvement in nature conservation issues or because of land ownership.

Third data set - Forest regeneration cuttings (1999)

The third data set came from a CV study in which the respondents were asked to assess the environmental benefits of new forest regeneration cutting practices in Finland. This study examined the benefits of regulations binding landowners to follow environmentally oriented harvesting practices. The sample used for the mailed questionnaire consisted of 1150 Finns aged 18 to 70. The random sample was drawn from the census of Finland. After the first mailing, reminder postcards and, after that, reminder questionnaires were sent to those respondents who did not respond to the earlier contacts. This produced a response rate of 50%, i.e., 550 at least partially completed forms. For some questions the response rate was thus lower than 50%.

The WTP question was in the dichotomous choice format, and the choice setting was illustrated by means of a choice table with two alternatives (Appendix 3), in a similar manner as in the Natura 2000 case. The first alternative was the status quo option

concerning the method of regeneration cutting. The second alternative was either a simple or a complex environmentally-oriented forest regeneration practice with a varying number of attributes. The table also presented hypothetical expenses per household that were connected to the environmentally oriented cutting alternative. Each respondent was asked to make a choice between the status quo and an alternative.

The original sample was randomly split into two groups of equal size. Half of the sample responded to a questionnaire which included a set of questions concerning their beliefs and attitudes regarding the effects of the present and the environmentally oriented cutting practice, and the other half did not receive these questions. Salient attributes concerning the practices and the outcome of the restrictive environmentally oriented cutting policy were determined in a separate elicitation study that was carried out by telephone interview. In the elicitation study a systematic sample of 50 people selected from the telephone directory answered open-ended questions about the positive and negative outcomes of forest regeneration cuttings and their regulation in Finland. Based on these telephone interviews, belief statements were constructed in the mailed questionnaire for the attributes of outcomes determined to be most salient. They focused on present cutting practices, the environmentally oriented cutting alternative and on policy regulating harvesting. In addition, we measured general attitudes toward current and optional forest regeneration practices. Attitudes toward proposed policy regulating harvesting and attitudes toward respondents' participation in paying the expenses of the new cutting practice were measured with semantic differential scales.

These three data sets were used in the various studies as shown in Table 4.

Table 4. Data sets and statistical analysis used in the studies

	Study I	Study II	Study III	Study IV	Study V
Data	1 st data set (1995)	2 nd data set (1997)	2 nd data set (1997)	3 rd data set (1999)	3 rd data set (1999)
Linear regression	x	x			
Logit models	x	x	x	x	x
Tobit models	x				
Path models				x	
Analysis of variance	x		x	x	x

4.2 Statistical analyses

The statistical methods used are summarized in Table 4. Regression techniques were used in various forms. In Studies I and II, linear regression was used to explain how attitudes were formed from beliefs and their evaluations. Attitudes were explained with either beliefs and the corresponding evaluations or with their products.

Logistic regression models were used in all studies to predict dichotomous choice behavior. Logistic regression allows a dichotomous response variable. Statistics used to analyze the goodness of fit of the model were chi-square, likelihood ratio index, and percentages of the prediction-correct statistic (Greene 1993). In logistic regression the significance of the explanatory variable was tested using Wald test statistics. In addition, in the case of testing the effect of one variable, models with and without the test variable were compared using the likelihood ratio test, and the structure of the data sets was compared using the Hausman test (Greene 1993). Logit models were used to estimate truncated and overall mean willingnesses to pay. In the truncated mean WTP is assumed to be non-negative. The overall mean also allowed negative values of WTP. The differences in means of WTP between groups of respondents were tested with a t-test and Mann-Whitney U-test.

Study I applied a tobit (censored regression) model to predict WTP measured by the open-ended question. The Tobit model was used because it produces consistent estimates when the dependent variable is censored to have non-negative values (Amemiya, 1986). Goodness of fit of Tobit models was measured using a likelihood ratio index. Specifications of the Tobit models were tested using likelihood ratio test based on parametric restrictions.

Study V applied path analysis to study attitude and belief structure behind the choice. Path analysis is a variant of multiple regression where independent source variables can affect a dependent variable either directly or indirectly via other variables (Loehlin 1987). Results of path analyses are commonly presented as path diagrams, which consist of path lines linking variables, and path coefficients, which are standardized regression coefficients associated with the size of the direct effects of a specific variable. Using structural equation modeling techniques (Bollen and Long 1993), several regression equations of an output path diagram can be estimated simultaneously. In Study V path models were estimated for two respondent groups with different descriptions of the scope of the environmental good, and the two groups were compared.

In addition to these regression techniques, analysis of variance was used to compare respondents' beliefs between different treatment groups, e.g. in Study I between groups having different information, in Study III between groups with different policy-planning methods and in Study V between groups with different scopes of the environmental goods. In Study IV respondents' perceptions of the quality of their own responses to the dichotomous choice were compared between the two measurement groups.

5. Main results of the separate studies

Study I: Theory of planned behavior in predicting willingness to pay for abatement of forest regeneration (Pouta, E. & Rekola, M. (2001). *Society and Natural Resources*, 14: 93-106)

In Study I the theory of planned behavior is introduced and used to explain dichotomous choices between current forestry practice and an environmental program and the value of environmental benefits of the program measured by open-ended willingness-to-pay measures. According to the theory of planned behavior, attitudes, subjective norms, and perceived behavioral control predict behavioral intention. Considering WTP as a behavioral intention, this study explained willingness to pay for abatement of forest regeneration using data from a community-level case study in southern Finland. The nature of the values expressed in CV of forest regeneration was assessed using subjective norm, perceived behavioral control and two types of attitude variables: 1) attitude toward forest regeneration and 2) attitude toward supporting a policy restricting forest regeneration.

The results of this study demonstrated how applying TPB in a CV questionnaire provides a way to examine the validity of WTP estimates. In the model for dichotomous choice and open-ended WTP, the dependent variable was consistent with attitude variables that predicted WTP reasonably well. A policy-related attitude was found to have less explanatory power than a general forest regeneration attitude, but both attitude variables increased the explanatory power of the model of WTP. This fact may imply that WTP cannot be seen only as an attitude toward the environmental good itself, but also as an expression of a behavioral intention targeted at a proposed policy. The perceived behavioral control, interpreted as perceived budget constraint, and subjective norms were used as explanatory variables in WTP models as well. The significance of a perceived budget constraint lends support to the conclusion that WTP can be interpreted as a behavioral intention, and that economic constraints limit the behavior and are included in the salient attributes when people chose between policies. The additional information provided in the questionnaires was not a significant variable in the two models of WTP.

In order to get further insight into the variables behind WTP, attitudes were regressed against beliefs about forest regeneration and the regeneration abatement policy. The results show that beliefs concerning forest regeneration predicted the corresponding attitude. In policy processes, these issues will be the essential in decision-supportive discussions and information seeking. In contrast to public discussions of forest regeneration, which emphasize effects on biodiversity and scenery, in this study the important beliefs concerned the effect of forest regeneration on future forest growth. This suggests that respondents in

the rural municipality of this case study emphasized the importance of forest income. The additional information provided did not significantly affect respondents' beliefs.

Study II: Contingent valuation of the Natura 2000 nature conservation program in Finland (Pouta, E., Rekola, M., Kuuluvainen, J., Tahvonen, O. & Li, C-Z. (2000). *Forestry*, 73: 119-128)

In Study II attitudes and beliefs were used to extend the contingent valuation method. The preferences of Finnish households for a particular nature conservation program, the Natura 2000 network, were explained using a dichotomous choice model. In order to study the influence of attitudes and beliefs on choice between the status quo and the new conservation project, an attitude-behavior framework was applied. Beliefs concerning the outcomes of nature conservation policy and evaluations of their importance described the formation of respondents' attitudes toward the program.

Results showed that the primary beliefs in opposition to the program were connected to landowner rights and costs to the national economy. The main beliefs to explain positive attitude in favor of the project were beliefs of the importance of conserving flora and fauna species and biotopes. The choices between status quo and increased conservation were then explained with a logit model in which choice was statistically significantly affected by attitude and socio-economic variables. The willingness to pay for an increase in nature conservation increased with income, decreased with age, and was higher among urban than among rural residents. The median willingness to pay for implementing at least a 3% increase in the current conservation level was about 33 € per household as a lump sum.

Study III: Willingness to pay in different policy-planning methods: insights into respondents' decision-making processes (Pouta, E., Rekola, M., Kuuluvainen, J., Li, C-Z. & Tahvonen, O. (2002). *Ecological Economics* 40: 295-311)

Study III applied a communication model, the elaboration likelihood model (ELM) (Petty and Cacioppo 1986), along with belief measurement based on TPB, to explain information processing regarding a policy planning method given in a CV questionnaire. This study compared two planning methods in otherwise identical valuation scenarios: the actual planning method, which the public criticized as being excessively bureaucratic, and a hypothetical participatory planning. A socially acceptable process of planning is an attribute of the conservation program itself, and it also has its own value. The actual planning method decreased the perceived benefits of a conservation program. Furthermore, average willingness to pay was dependent on the planning method. The WTP of the program varied from 16 € for actual planning to 74 € for participatory planning (92-435 FIM) as a lump sum.

Applying the concept of involvement from the ELM, respondents were divided in two groups based on their motivation to process the given information. Respondents with low motivation, for whom the information was of low personal relevance, did not distinguish between the valued good and the planning process. Consequently, their beliefs concerning the attributes of the good itself were affected by the planning method. In contrast, the highly motivated respondents, for whom nature conservation was of high personal relevance, were able to differentiate between the policy-planning method and the good itself.

The results suggest that from the policy point of view it is important to understand how people process information. The results of the CV survey may be dependent on respondents' motivation to process information, and in interpreting the results it is important to be able to recognize the groups with varying motivation. This emphasizes the importance of socio-psychological measurement techniques that make it possible to gain insight into respondents' cognitive processes in general and the effect of motivation in particular.

Study IV: Scope sensitivity in contingent valuation of forest cutting practices (Pouta, E. (2003). Manuscript)

Study IV applied TPB to explain scope insensitivity in contingent valuation. The CV scenario focused on a forest regeneration cutting policy in Finland that was designed to encourage cutting practices that take environmental concerns into account. This study examined the perceived benefits of a program that conclusively directed landowners to follow environmentally oriented cutting practices. The sample was divided into two subsamples in which the program was described to the respondents either in limited or in extensive form.

The results of a logit model show that increasing the number of attributes of the good (i.e. benefits) had no effect on the probability of choosing the environmentally oriented forest regeneration cutting practice. In that sense, the respondents were insensitive to the scope of the good. The scope variable was not significant in the logit model of dichotomous choice. However, the overall mean WTP for the extensive program was significantly higher than the mean for the limited program. The overall mean of the WTP for both programs, which were designed to produce environmentally oriented cutting practices, was positive (53 € annually). Support for the program was higher among those respondents who had higher education and lived in southern Finland.

Many attributes of the extensive program, including percentage share of large cutting areas, adequate scenery considerations, and regulation of ruts in land surface management, could be assumed to have an effect on perceptions of scenic beauty and recreation opportunities.

However, in the analysis of variance respondents' beliefs concerning the effects of the program on biodiversity conservation, forest scenery, outdoor recreation environment or economics of timber production were similar, regardless of the scope of the program (i.e. number of attributes). This reveals the difficulty of describing forest attributes in a way that is meaningful for the respondent, and this lack of meaning may be one reason for insensitivity. However, beliefs related to consequences of implementing the policy differed between the two groups. The respondents valuing the extensive program believed that the program would increase administration and unemployment and would limit the forest owners' decision-making power more than did respondents valuing the limited program. It is evident that respondents considered programs as packages that included not only the good but also the policy through which the good is offered and the effects of that policy.

Although the sensitivity to scope was weak in the dichotomous choice itself, in the path models based on TPB choice differed depending on the scope. According to the results, the scope affected the way respondents constructed their preferences. The scope of the good altered the weight placed on each separate component of the choice. Expenses of the program to households and beliefs regarding scenic and economic benefits were emphasized in the responses of those who received the extensive program. Recreation interests were given more weight by those who received the limited program. Differences in choice models also indicated that the choice was not only influenced by those beliefs that were connected to the good but also by those beliefs that were connected to the impacts of regulative policy. It seems that scope insensitivity in this survey was related to external factors, a situation where the respondents related other negative effects to the good than those which the researcher intended.

Study V: Attitude and belief questions as a source of context effect in the contingent valuation survey (Pouta, E. (2003). *Journal of Economic Psychology*, in press)

Study V focused on combining contingent valuation and TPB measures in the same survey. In the study the sample was divided into two groups; in one group attitude and belief items were included in the survey and in other they were not. The study analyzed to what extent attitude and belief items influenced the responses to a subsequent willingness-to-pay (WTP) question. In contingent valuation studies, attitudes and beliefs have been used to interpret WTP. However, in the process of pondering and expressing their beliefs and attitudes concerning the attitude object, respondents may also construct their preferences vis-à-vis the environmental good.

In the logit model of dichotomous choice for the entire sample, the variable that revealed the effect of attitude and belief measurement produced a statistically significant coefficient. Furthermore, attitude and belief measurement impaired the respondents' sensitivity to the

bid. When included in the model, the interaction term of the bid and belief measurement was statistically significant. In the separate model for the belief measurement group, the coefficient of the bid did not significantly differ from zero. Thus, it can be concluded that when belief and attitude items were included in the questionnaire, expenses to the respondents' household appeared to lose their importance as a factor in the choice. The difference in the coefficients of the bid variable in the models for each group had a significant effect on WTP estimates.

The belief statements that came from the elicitation study reflected the general beliefs of the public, but they appeared to function as priming questions for individual respondents. Even if the design of attitude and belief items is based on open-ended questions of pros and cons of the program to be valued, it is difficult to guarantee that the set of items in the final questionnaire will be totally in balance between those different aspects that respondents should consider.

In this case, attitude and belief items in the questionnaire also appeared to increase the support of environmentally oriented alternative, especially at high bid levels. One explanation for this may be that respondents, according to the responses given to attitude and belief questions, formed a perception of themselves as environmentalists and responded to the CV question in line with this self-perception.

The inclusion of belief and attitude questions did not increase respondents' perceived confidence in their decisions. It appears evident that responding to various belief questions concerning the environmental good reminds the respondents of attributes of the choice that they otherwise would not have considered. In this way the choice becomes more complicated and the respondents become uncertain. Thus, the present results cast doubt on treating attitude and belief items only as neutral warm-up questions in CV questionnaires.

6. Summary and conclusions

CV is an established method for valuing non-market benefits. However, the validity of the method is still a topic of discussion. The objectives of this dissertation were 1) to analyze how respondents form valuations and to evaluate the usefulness of applying the attitude-behavior framework in CV, 2) to develop and evaluate the measurement of the variables of the attitude-behavior framework in a CV-questionnaire, 3) to test the effects of descriptions of the environmental good and context on valuation results (the impacts of policy context, scope of the good and information), and 4) to measure perceived empirical benefits of forest conservation.

For **objective 1** Study I and Study II gave one example each to show how to analyze the consistency between variables of TPB and willingness to pay measured in CV. In Study I

WTP was explained on the basis of policy-supporting attitude and general forest regeneration attitude, both of which increased the explanatory power of the model of WTP. In addition, the significance of perceived behavioral control, interpreted as a perceived budget constraint, lends support to the conclusion that respondents are sensitive to the economic constraints on the behavior. This consistency between variables of TPB and WTP supported the theoretical validity of contingent valuation. However, WTP was not sensitive to subjective norms, which might arise from the fact that valuation is a previously unknown issue and respondents do not have perceptions of the opinions of their important others.

On the other hand, as Study IV shows, respondents' belief and attitude structures were not as straightforward and clear as the applied TPB model suggests. Intercorrelations between explanatory variables were high. Furthermore, in path models not only those expectancy value components that were conceptually targeted to the attitude object in question were significant explanatory variables; some components that were targeted to other objects were also significant. It seems that respondents' attitude and belief structures regarding environmental policy choices are complex and context-dependent. Consequently, when applying TPB or any other model from the attitude-behavior framework, the model must be modified to fit the context.

However, studying the formation of attitudes provided useful information for resource management. Citizens' beliefs illustrate arguments that should be raised in policy-making processes. For example, in Study I, in which the sample was mainly from the rural population, the belief concerning the effect of forest regeneration on future forest growth was most important to this population group. Citizens' attitudes toward nature conservation in Study II were connected to landowner rights and costs to the national economy, but the importance of benefits related to the flora and fauna, and biotope conservation was also stressed.

To produce information with regard to **objective 2**, Study V evaluated an approach to CV in which attitude and belief items were measured as part of a CV questionnaire. Including attitude and belief measurement seemed to alter the way respondents understood their dichotomous choice. When belief and attitude items were included in the questionnaire, the cost factor, viz. expenses of conservation to the respondent's household, appeared to decrease in importance as a determinant of the choice. Attitude and belief items appeared to increase the support of the environmentally oriented alternative, especially at high bid levels. These results can be interpreted as supporting the idea that by answering attitude and belief questions, respondents formed a perception of themselves as environmentalists, and they responded to the CV question in line with this self-perception. The results cast doubt on treating attitude and belief items as neutral warm-up questions in CV questionnaires. Using them did not increase respondents' perceived confidence in their decisions. It can be concluded that although TPB provides useful information about determinants of WTP,

combining measures based on TPB or other attitude models in CV survey requires additional research.

To meet **objective 3** some aspects related to the characteristics of the good and context in the valuation scenario were studied. The social context, in the form of policy planning method (Study III), had a considerable effect on the valuation results. The respondents were less willing to support an increase in nature conservation areas as part of the Natura 2000 nature conservation project, than as part of a hypothetical, more participatory planning process. A socially acceptable planning process is an attribute of the conservation program itself, which also has its own value. The way the actual planning took place, which the Finnish public had criticized as excessively bureaucratic, seemed to decrease the perceived benefits of the conservation program.

The effect of scope of the environmental good was tested in Studies II and IV. In Study II differences between mean WTPs at various levels of scope of conservation were not statistically significant. However in that study, scope insensitivity was not analyzed in detail. In Study IV scope sensitivity was tested by introducing two different sets of attributes describing forest cutting areas, resulting from a limited program or an extensive program. This study also revealed some insensitivity, for increasing the number of attributes that could be assumed to be perceived as benefits had no effect on the probability of choosing the environmentally oriented forest regeneration cutting practice. However, our results show also sensitivity to scope since the overall mean of WTP for the extensive program was significantly higher than the mean WTP for the limited program.

Comparing the decision-making processes of respondents between the two groups with different scopes of the good provided some insights into the reasons for scope insensitivity. One reason for insensitivity seems to be the difficulty of describing forest attributes in a meaningful way. In this case the scope insensitivity appears to be related the situation where respondents related such negative side effects to the more extensive good that they outweighed its extra environmental benefits.

In Study I additional information had no significant effect on WTP, nor did the beliefs of respondents regarding the program differ between information treatment groups. The problem in providing this additional information, as in other mailed questionnaires, was the difficulty in administering it: there was no certainty that the respondents read the information. Only every fourth respondent reported that he or she had read the information. Respondents' information processing was studied in Study III as well. Motivation to process information proved to be useful as an intermediate factor in analyzing the effect of policy-planning method. It was shown that only respondents who were motivated to process information given in a valuation scenario were able to recognize and fully understand elements in a contingent valuation scenario.

With these tests of the effect of social context, scope and information, this dissertation research gives examples showing how the attitude-behavior framework can help to obtain information and deepen insight into respondents' decision making, not only with respect to the CV measure, willingness to pay, but also in interpreting some additional effects of valuation scenarios.

Objective 4 was to produce concrete information and estimates of non-market valuation of forest conservation in Finland. The willingness to pay for an increase in nature conservation (Studies II and III) was higher among younger, higher income, and urban population groups. In 1997 the median willingness to pay for implementing at least a 3% increase at the current conservation level was about 33 € per household as a lump sum. For a forest regeneration cutting policy that was designed to encourage cutting practices that take environmental concerns into account, the annual median willingness to pay was 53 €. In this case, the support of the program was higher among those respondents who had higher education and lived in southern Finland.

The dissertation project was related to policy processes of evaluating the nature conservation program Natura 2000 in Finland (Hilden et al. 1998) and also to a discussion of new forest management practices in Finland. The valuation research related to these topics produced other information not reported in this dissertation (e.g. Rekola et al. 2000, Li et al. 2001). These and the studies collected here have served forest conservation policy processes and will provide information for ongoing processes. They might also offer material for benefit transfer in the future. These studies not only provided information on valuation but also introduced the valuation methodology into the processes of making forest and nature conservation policy in Finland.

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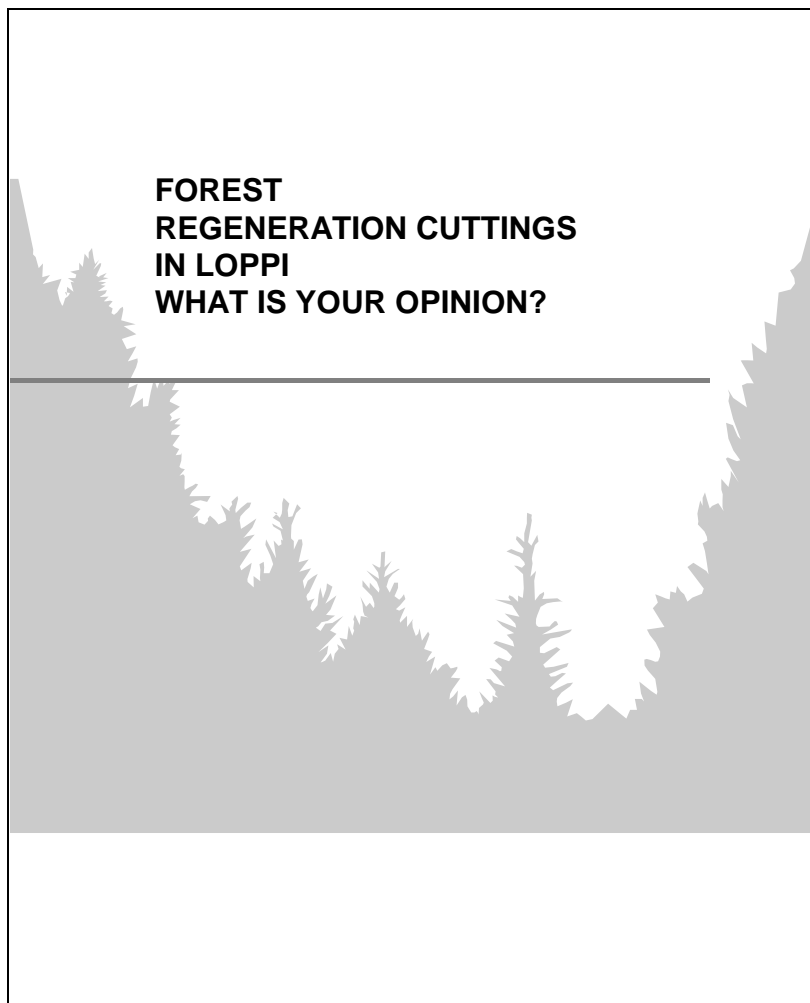
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Appendix 1. Questionnaire for the first data set: Local forest regeneration case in Loppi (1995).

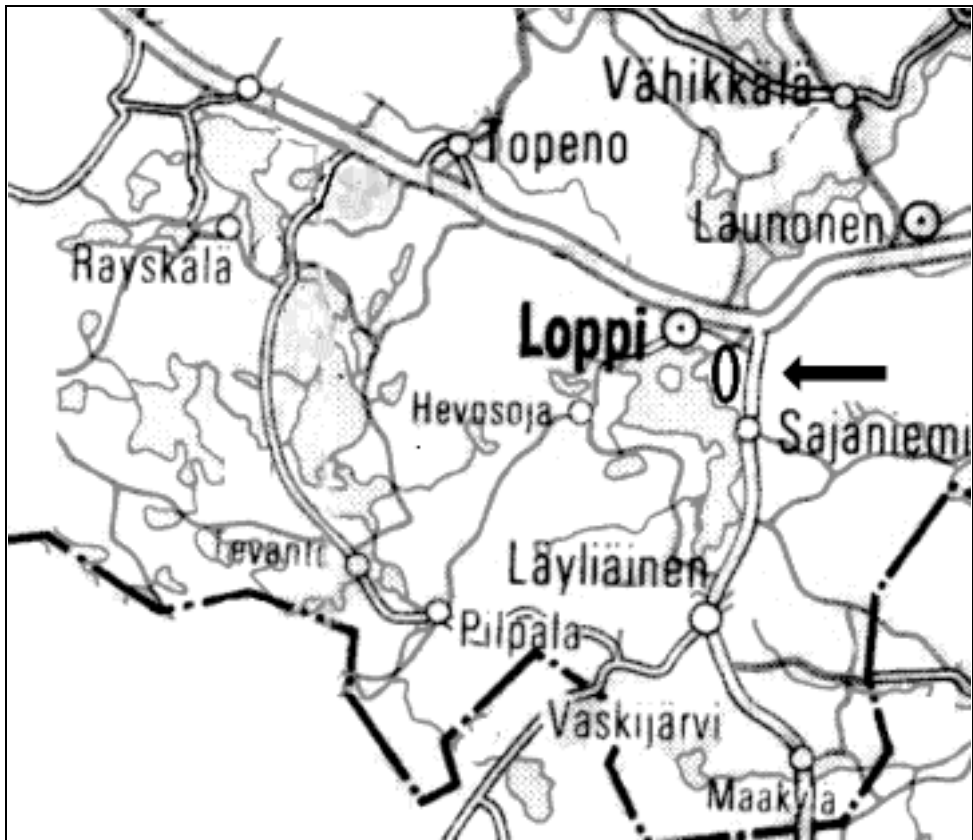


University of Helsinki
Department of Forest Economics
May 1995

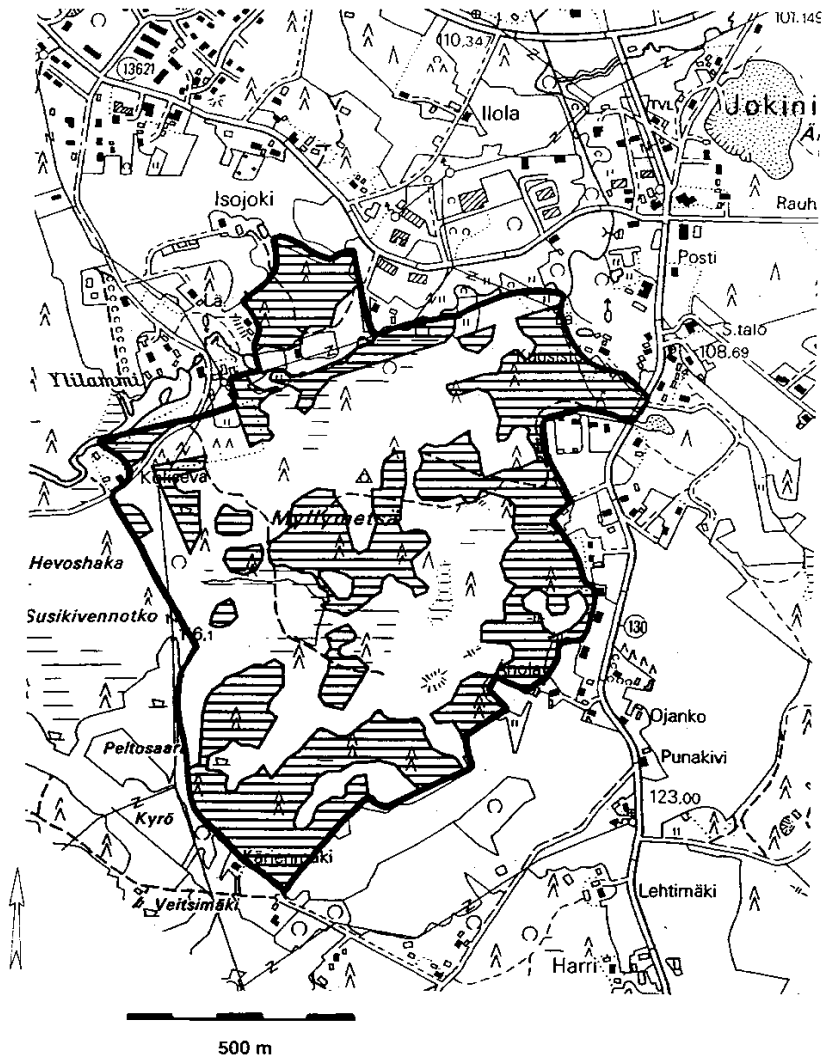
The questionnaire deals with the *Myllymetsä* forest in Loppi. We are studying local inhabitants' opinions about forest regeneration cuttings in this area.

The area has been selected purely for scientific reasons – forest owners, authorities, political decision makers or political organizations, or other organizations have not affected the decision to deal with this particular area.

The location and size of the area are described in the following maps.



The *Myllymetsä* area, outlined in the map, is located directly adjacent to the Loppi center. In the north the area extends to the vicinity of the road to Jokiniemi and in the east to the vicinity of the road to Läyliäinen. There are forest roads in the area. In the north, a small river runs down to Lake Loppijärvi. The forest area is about one kilometer long and wide. The size of the area is about 100 hectares. Forest owners have the option to regenerate about half of the total area. This area is marked with stripes on the map.



1. **How have you been in contact with the Myllymetsä area? Select all items that are correct.**

- 1 I live close to the area
- 2 my summer residence is close to the area
- 3 I pass the area repeatedly (by car)
- 4 I enjoy outdoor activities in the area
- 5 I pick mushrooms in the area
- 6 I pick berries in the area
- 7 I fish in the vicinity of the area
- 8 I hunt in the area or its vicinity
- 9 a relative or a friend lives close to the area
- 10 a relative or a friend owns land in the area or close to it
- 11 other reasons, what? _____

- 12 the location of the area is unclear to me, ⇒ move to question 4
- 13 I have not been in touch with the area at all, ⇒ move to question 4

2. **How often have you traveled in or passed the area?**

- 1 Daily or several times per week
- 2 A few times per month
- 3 A few times per year

3. **Have you noticed any cuttings in this area?**

- 1 yes
- 2 no

This questionnaire mainly consists of statements such as those below. Please respond to them by placing an x in one box for each item.

4. Think about the importance of the following items related to the Myllymetsä forest. Please mark whether you agree or disagree (an x in one box per item).

		Strength of the opinion								
		fully	quite	slightly	neither agree nor disagree	slightly	quite	fully		
1	It is important for me to take care of the forest scenery in the Myllymetsä.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
2	It is important for me to take care of the future growth in the Myllymetsä forest.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
3	It is important for me to take into consideration of wildlife in the Myllymetsä forest.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
4	It is important for me that the vegetation is preserved unchangeable in the Myllymetsä forest.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
5	Easy access to enjoy the outdoors in the Myllymetsä forest important for me.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
6	It is important for me that the Myllymetsä forest has continuously growing stands of trees.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
7	It is important for me that the forest owners of Myllymetsä have the possibility for earning an income from the forest.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree

FOREST REGENERATION

The following part of the questionnaire deals with forest regeneration. To regenerate forests, all or most trees are cut in a particular site. During regeneration attention is paid to the production of seedlings. If trees are left in the regeneration area, young trees will grow up from the seeds produced by these trees. On the other hand, if all trees have been removed, seedlings are planted or seeds are sown. Forests to be regenerated are rather old.

When thinning is made in rather young forests, a small proportion of the trees are selected and cut. Usually, larger trees are left to grow.

FOREST REGENERATION IN THE MYLLYMETSÄN AREA

In the map on page 3, striped areas indicate rather old forests, which forest owners may regenerate *if they want* over the next ten years.

The magnitude of future cuttings planned by forest owners is not publicly known. Future cuttings are affected by income needs of forest owner and timber prices. Probably forest owners' logging is at a *minimum* if the timber price is low. On the other hand, cuttings are at a maximum if the timber price is high.

In the following, we ask about your expectations regarding cuttings.

Note! Nobody has exact information on future cuttings.

Please answer according to your own estimate!

5a How much do you believe old-growth forests in this area will be cut at the *minimum* in the next 10 years?

Nothing	10%	20%	30%	40%	50%	60%	70%	80%	90%	all	don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	10	11	12

5b How much do you believe old-growth forests in this area will be cut at the *maximum* in next 10 years?

Nothing	10%	20%	30%	40%	50%	60%	70%	80%	90%	all	don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6	7	8	9	10	11	12

6. Assess forest regeneration in the *Myllymetsä* area with the help of the following statements. Please answer whether you agree or disagree (an x in one box per item).

Strength of the opinion
 fully quite slightly neither slightly quite fully
 agree agree agree agree nor disagree
 disagree

1	Forest regeneration cutting would deteriorate the forest scenery.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
2	Forest regeneration cutting guarantees forest growth.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
3	Forest regeneration cutting in the area deteriorates wildlife conditions.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
4	Forest regeneration cutting changes vegetation.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
5	Forest regeneration cutting reduces accessibility in the area.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
6	Forest regeneration cutting in the area increases forest owners' incomes.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree
7	Forest regeneration cuttings reduce forest owners' cutting potential in the near future.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	disagree

7. **Forest regeneration** in the *Myllymetsä* area is generally speaking

(mark one box per row)

1 useful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	useless
2 good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	bad
3 acceptable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	unacceptable
4 positive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	negative
	1	2	3	4	5	6	7	

LAND USE PLAN REGULATION OF CUTTINGS

House and road construction, forest cuttings, and several other activities that change the environment are based on different plans. The planning of land-use is called *zoning*. A general land-use plan is done for a whole municipality, and a partial general land-use plan covers only a part of a municipality. Land-use plans can also regulate forest cuttings.

In the following, we present a *hypothetical* situation designed only for this research. It is *not* connected with actual decision making in the municipality.

..... GENERAL PLAN OF MYLLYMETSÄ FOREST AREA

Location:	General plan area is presented on the map at the beginning of the questionnaire. It includes 50 ha of regenerable old forest.
Contents:	Regeneration cutting regulation. Only 30 % of the maximum forest area (area of old growth forests) is allowed to be cut in Myllymetsä. Other forest management or building regulation remains unrestricted.
Time frame:	Restriction covers the years 1996-2005, after which it can be continued or canceled.
Expenses:	Forest owners might lose income because cutting amount is restricted, but they would receive lump sum compensations from the community of Loppi in 1996. The compensations claimed are not yet known.
Funding:	Expenses are covered with local taxes collected from every community member during the year 1996. Residents will pay higher local income taxes and nonresident property owners higher property taxes.
Decision:	The plan is implemented if the majority of the community members are willing to pay the compensations needed by forest owners.

YOUR CHANCE TO HAVE AN INFLUENCE

Think about the proposed land use plan of Myllymetsä. Do you believe that regulating forest regeneration in *Myllymetsä* will be worth paying the extra tax?

8. **Do you accept the proposed plan if its total cost for your household was 50^a Finnish marks (FIM)? The cost would be paid in 1996 by income taxes.**

- 1 yes
2 no
3 I do not know
4 do not want to answer

9. **What is the maximum your household would pay for the proposed cutting regulating plan?**

FIM _____

If you did **not** answer the question above or you answered FIM 0, please, continue to question 10. Otherwise go ahead to question 11.

10. **I did not answer question 9 or I answered FIM 0, because**

- 1 I am pleased with forest management in Myllymetsä and I don't want any change.
2 Forest management in Myllymetsä doesn't concern me.
3 I cannot afford to pay for forest quality in Myllymetsä.
4 It is unfair to expect me to pay for forest quality in Myllymetsä.
5 I refuse to think about forest quality in Myllymetsä in monetary terms.
6 It is not right that forest management is regulated in Myllymetsä
7 other reason, why? _____

-
- 11a **Suppose the land use *plan is executed*. What do you believe will be the *minimum* area of old forests to be regenerated in the *next ten years*?**

- | | | | | | | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| non | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | all | don't know |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

-
- 11b **Suppose the land use *plan is executed*. What do you believe will be the *maximum* area of old forests to be regenerated in the *next ten years*?**

- | | | | | | | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| non | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | all | don't know |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

^a Bid levels are FIM 50, 200 and 500

12. Assess the Myllymetsä plan with the help of the following statements. Please mark whether you agree or disagree (mark one box per row).

Strength of the opinion
 fully quite slightly neither slightly quite fully
 agree- agree-
 nor disagree

		1	2	3	4	5	6	7	
1	It is possible for me to contribute to this plan.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
2	Most people important in my life would approve my supporting the proposed plan.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
3	The proposed plan will violate private property rights.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
4	Taking care of private property rights is important to me.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
5	The proposed plan violates the community coherence.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
6	Taking care of the community coherence is important to me.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
7	The proposed plan involves common people in payment of compensations.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
8	Fare payment share for common people in payment of compensations is important to me.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
9	The proposed plan saves natural state of forest from human intervention.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
10	Saving natural state of forest is important to me.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
11	The proposed plan would improve the quality of forests.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
12	Most people important in my life think that I should support the proposed plan.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
13	I cannot afford to support the plan	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree

13. Assess the *Myllymetsä* land use proposal with the help of the following statements

Strength of the opinion
 fully quite slightly neither slightly quite fully
 agree nor
 disagree

From my point of view supporting the proposed plan would be (mark one box per line).		1 useful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	useless
		2 good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	bad
		3 acceptable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	unacceptable
		4 positive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	negative
			1	2	3	4	5	6	7			

14. Evaluate the questionnaire with the help of the following statements.

Strength of the opinion
 fully quite slightly neither slightly quite fully
 agree- nor
 disagree

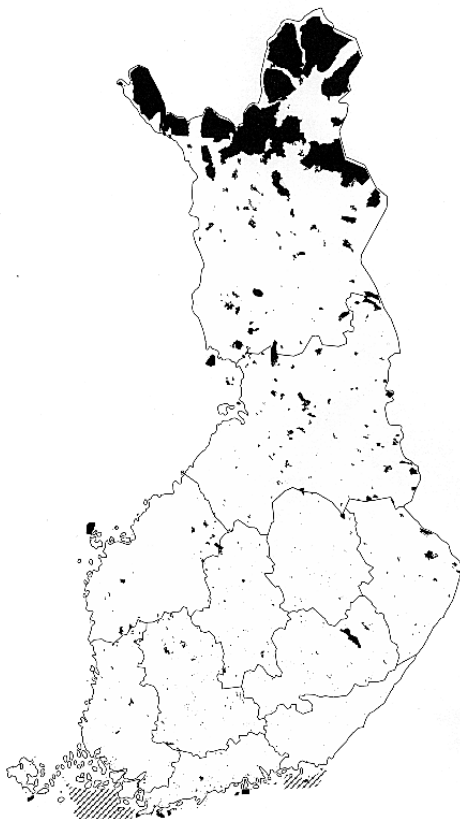
1	I responded to the questionnaire seriously.	agree	1	2	3	4	5	6	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			1	2	3	4	5	6	7							
2	It took a long time to think about the answers.	agree	1	2	3	4	5	6	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			1	2	3	4	5	6	7							
3	I understood all the questions.	agree	1	2	3	4	5	6	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			1	2	3	4	5	6	7							
4	The questionnaire was interesting.	agree	1	2	3	4	5	6	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Thank you for your response.

If you have comments on this questionnaire, forests, or forest regeneration, please write them here.

Appendix 2a. Questionnaire for the second data set: Natura 2000-network (1997), scenario based on the Natura 2000 proposal.

Nature conservation in Finland *- what is your opinion?*



Department of Forest Economics
University of Helsinki
November 1997



“striped burnet”



“old growth sap beetle”



white backed woodpecker



orchard dormouse



“blue honeysuckle”



Shaw's Bristle-moss

1. First some questions concerning your nature related leisure activities.

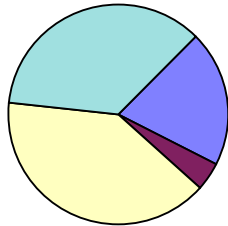
	Never	Sometimes	Often
Do you read literature concerning nature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you read magazines or articles concerning nature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you watch nature programs on TV or radio?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you spend your leisure time in natural settings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does your work take you out into nature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Consider if you fully agree, agree, disagree or fully disagree with following statements.

		strongly	somewhat	difficult	somewhat	strongly		
		to say						
		1	2	3	4	5		
1	Nature conservation has already been taken care of well enough in Finland.	strongly agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	strongly disagree
2	Profound changes in life style are needed to save nature for future generations.	strongly agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	strongly disagree
3	Pristine nature should be protected even at high cost.	strongly agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	strongly disagree
4	Nature conservation is needed even if it causes unemployment.	strongly agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	strongly disagree
5	Nature conservation allows society regulate private land use.	strongly agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	strongly disagree

Nature conservation in Finland 1997

-the total nature conservation area is 11.3 % of land area



- National parks (20%)
- Nature reserves (4%)
- Wilderness areas (40%)
- Conservation programs (36%), e.g. swamps, old growth forests

The following concerns the Natura 2000 nature conservation program.

3. How familiar are you with the NATURA 2000 nature conservation program?

- 1 not at all, turn to the following page.
- 2 only slightly familiar
- 3 quite familiar
- 4 very familiar

4. Evaluate the following statements; are they true or false?

		True	False	Don't know
1	Natura is a national conservation program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	All existing national parks belong to the Natura program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Natura will double the nature conservation area in Finland.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Natura affects every third forest owner's income.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Hunting and fishing opportunities will be affected in all Natura areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Natura does not affect everyman's right in Finland.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basic information on NATURA 2000

The aim of Natura 2000 is to protect typical and important biotopes and bird species in the European Union. The program follows an international agreement on protecting biodiversity, endorsed in Rio de Janeiro in 1992.

The planning and implementation of Natura is based on the EU directives. There are almost 200 important biotopes in Europe, 50 of which exist in Finland. Examples are old growth forests, minerotrophic bogs, balsa marshes and rich fens, and different biotopes on the coastline of the Baltic sea. Of the 200 bird species considered as important, 60 are found in Finland. These include the diver, crane, white-backed woodpecker and great grey owl.

Local environment agencies have proposed protection areas according to EU guidelines. The Ministry of the Environment has created a tentative national Natura 2000 program based on these proposals. The proposal is on display in municipalities from April to June of this year. The proposal has resulted in claims and comments that suggest both increasing and decreasing conservation areas.

The Natura 2000 program does not seem to have a big impact on Finnish nature conservation. In the preliminary proposal, about 95% of the areas are composed of nature conservation areas that were founded previously. The Natura 2000 program does not create new restrictions in existing conservation areas. The basic principle is that only land use that endangers protected biotopes is restricted. For example, forestry is not restricted on protected eskers, but extraction of soil resources is forbidden. Such restrictions exist already in areas of previous conservation programs; thus Natura 2000 does not create new restrictions.

Two thirds of the new areas are on private lands. However, the majority of these areas can be used as before. Land owners will be compensated for any new restrictions of the Natura program according to the Nature Conservation Act. In some cases land use is supervised using other regulations such as the Water Act. In these cases restrictions are usually on a small-scale and not compensated.

It should be taken into account that Natura does not prohibit projects of public interest, if no alternatives for them exist. In these cases the power to make decisions remains in Finland.

The Government will deal with Natura 2000 during autumn 1997. After that the Finnish proposal will be delivered to the EU commission.

5. What is your opinion about the Natura 2000 nature conservation program?

The Natura 2000 program as a whole is (one mark per row)	1 necessary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	worthless
	2 worth supporting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	objectionable
	3 positive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	negative

6. Please evaluate how important you consider the following issues related to the *Natura 2000-program*.

		extremely important	1	2	3	4	5	of no significance	Can not say
1	Considering landowner rights	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>
2	Conserving animal and plant species is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>
3	Compensating economic loss to private landowners is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>
4	Conservation of biotopes like eskers and swamps is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>
5	Taking into account the costs of conservation to national economy is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>
6	Following EU-regulations is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>
7	Informing the public when planning new conservation programs is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>

7. Evaluate the *Natura* nature conservation program with the help of the following statements. Even though you may feel that you are not knowledgeable enough about the issue, respond according to your own perception.

		fully	quite	neither	quite	fully		
1	The <i>Natura</i> nature conservation program takes land owners' rights well into account.	agree	1	2	3	4	5	disagree
2	<i>Natura</i> conserves animal and plant species well.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
3	<i>Natura</i> does not cause considerable economic loss to land owners.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
4	<i>Natura</i> conserves biotopes well.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
5	<i>Natura</i> causes considerable costs to the national economy.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
6	By implementing the program Finland follows EU-regulation.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
7	Informing the public is taken well into account in planning <i>Natura</i> .	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree

Natura 2000 proposal

The Natura 2000 nature conservation program is now being prepared. Several alternatives are to be evaluated.

In the following we ask you to familiarize yourself with two alternatives to the implementation of the Natura 2000 nature conservation program in Finland:

	<i>Option 1</i>	<i>Option 2</i>
Nature conservation area change to current area	same as current area	6% larger than current area ¹
% of the land area of Finland	11.3 %	11.9 % ²
Conserved nature types	Currently conserved: swamps, lake shores, bird wetlands, eskers, wilderness, old-growth forests, groves	In addition to option 1 ³ : rich fens, springs, lakes, rivers, river deltas, sea shores
Change in the income tax of your household	No change	340 FIM increase in income tax ⁴

Your opinion is important

The expenses of option two consist of the compensations paid for land expropriated to create new conservation areas. Compensations are assumed to be funded by taxes collected for the year 1998.

8. Please choose which of the previous alternatives you support.

I support option number _____

¹ The increase in the current nature conservation area varied between 3%, 6% and 9%.

² The share of the protected area of the total land area of Finland varied between 11.6, 11.9 and 12.1%.

³ Conserved nature types on two other conservation levels were:

11.6%: rich fens, springs, lakes, rivers, river deltas

12.1%: rich fens, springs, lakes, rivers, river deltas, sea shores, meadows, rocky terrains

⁴The income tax increase varied from FIM 60 to FIM 1200 (FIM 1 ≈ US\$ 0.17, October 1999) depending on the conservation level: (60, 170, 280, 400 FIM) for the 3% increase level, (120, 340, 560, 800) for the 6% increase level, and (180, 510, 840, 1200) for the 9% increase level.

9. Do you agree or disagree with the following statements.

		fully	quite	neither	quite	fully		
		1	2	3	4	5		
1	It was difficult to compare the pros and cons of the program.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
2	I am certain about my opinion of the Natura-program.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
3	It was very difficult to compare the alternatives.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
4	It is always important to compare costs and benefits when the level of nature conservation is under decision.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
5	Nature conservation may never be based on compulsory purchase of land even if the landowners were compensated.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
6	The nature conservation project (Natura 2000) has no meaning for me.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
7	Costs and benefits of nature conservation cannot be compared.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
8	Increasing income level is always more important than nature conservation	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
9	I do not have enough money for nature conservation.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
10	Nature conservation is always more important than increasing income level.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree

Finally some questions on your background.

10. Year of birth? _____

11. Are you

- male
- female

12. What is your all-round education? Have you graduated from:

- high school
- elementary school
- lower elementary school
- none of the previous

13. What is your professional education. Have you graduated from

- vocational school
- vocational college
- college
- university
- none of the previous

14. Are you working in the field of

- forestry or timber industry
- environmental conservation
- another field

15. Which of the following best describes your living environment?

- urban area
- suburb
- rural municipality center
- other rural population center
- sparsely populated area
- I do not know

16. Household income before taxation?

- under 50 000 FIM/year
- 50 000-100 000 FIM/year
- 100 000-150 000 FIM/year
- 150 000-200 000 FIM/year
- 200 000-250 000 FIM/year
- 250 000-300 000 FIM/year
- 300 000-350 000 FIM/year
- 350 000-400 000 FIM/year
- over 400 000 FIM/year

17. Number of household members? _____ persons, of whom _____ are under 18 year of age.

18. Do you or your close relative own more than over 5 ha of forest land?

- Yes No

19. If you or your family members own land, are there any nature conservation reservations on your land?

- Yes No I do not know

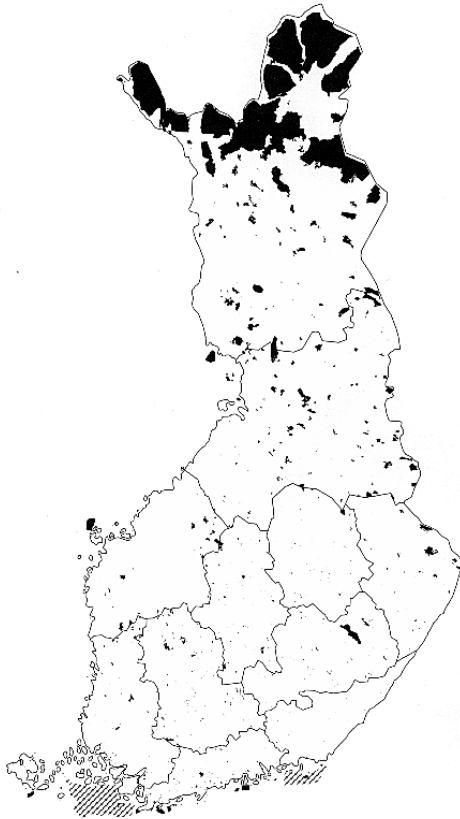
20. Date: _____ 1997

If you have questions or comments related to nature conservation you can write them here.

Thank you for your time.

Appendix 2b. Questionnaire for the second data set: Natura 2000 network (1997), scenario based on a hypothetical nature conservation planning approach

Nature conservation in Finland *- what is your opinion?*



Department of Forest Economics
University of Helsinki
November 1997



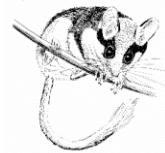
“striped burnet”



“old growth sap beetle”



white backed woodpecker



orchard dormouse



“blue honeysuckle”



Shaw's Bristle-moss

1. First some questions concerning your nature related leisure activities.

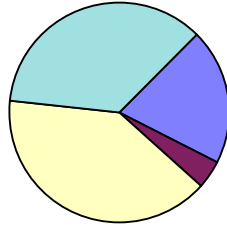
	Never	Sometimes	Often
Do you read literature concerning nature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you read magazines or articles concerning nature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you watch nature programs on TV or radio?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you spend your leisure time in natural settings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does your work take you out into nature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Consider if you fully agree, agree, disagree or fully disagree with following statements.

		strongly somewhat difficult somewhat strongly to say						
		1	2	3	4	5		
1	Nature conservation has already been taken care of well enough in Finland.	strongly agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	strongly disagree
2	Profound changes in life style are needed to save nature for future generations.	strongly agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	strongly disagree
3	Pristine nature should be protected even at high cost.	strongly agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	strongly disagree
4	Nature conservation is needed even if it causes unemployment.	strongly agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	strongly disagree
5	Nature conservation allows society regulate private land use.	strongly agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	strongly disagree

Nature conservation in Finland 1997

-the total nature conservation area is 11.3 % of land area



- National parks (20%)
- Nature reserves (4%)
- Wilderness areas (40%)
- Conservation programs (36%), e.g. swamps, old growth forests

3. How familiar are you with the nature conservation situation in Finland?

- 1 not at all, turn to the following page.
- 2 only a little familiar
- 3 quite familiar
- 4 very familiar

4. Evaluate the following statements; are they true or false?

		True	False	Don't know
1	Most of the endangered animal species in Finland are insects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	National parks exist only in Northern Finland.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Forest cuttings are regulated in protected wilderness areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Sea and lakeshore protection is secured with a special shore protection program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	All nature conservation areas are founded by the state.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Most of the nature conservation areas are accessible.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basic information on nature conservation

The aim of nature conservation is to guarantee biodiversity and scenic beauty, to support the sustainable use of nature and to contribute to the understanding and studying nature. Nature conservation is promoted, for example, by protecting areas, endangered species and biotopes. The focus is on protection of endangered species.

In Finland, national parks and nature reserves are protected by law. National programs protect some falls, wilderness areas, swamps, bird wetlands, eskers, groves, old-growth forests, and shores. Nature conservation areas can be based on regional and general land use plans.

Usually the state buys land for nature protection areas but private areas can be protected at a landowner's initiative.

Planning nature conservation in Finland

Revision of the nature conservation areas has been started in Finland. The aim is to evaluate the appropriateness of all the existing nature conservation areas for the protection of biodiversity. Mapping and evaluation will be followed by consideration of how to complement the current network of nature conservation areas, especially regarding those biotopes (e.g. meadows) that are underrepresented currently. On the other hand, some conservation areas can be taken into use if they are less important in conserving biodiversity.

Mapping and evaluation of nature conservation areas are still unfinished. If the evaluation recommends a change in the number of conservation areas, participatory planning will be used in making changes in nature conservation areas. This means that all stake holders e.g. landowners, people earning their living from natural resources and local residents can participate in planning from the beginning. In participatory planning, various communication vehicles will be applied, and sufficient public hearings will be arranged. Regarding the areas of national importance, national organizations will also have the opportunity to participate in planning and the opinions of local residents will be given equal consideration, for example, by using surveys.

Environmental impact assessment will evaluate the changes in nature conservation areas. The purpose of the assessment is to examine impacts on the environment and on various livelihoods.

5. If the previously introduced nature conservation plan would result in an increase in nature conservation areas,

nature conservation planning as a whole is (one mark per row)	1 necessary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	worthless
	2 worth supporting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	objectionable
	3 positive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	negative

6. Please evaluate how important you consider the following issues related to *nature conservation*.

		extremely important	very important	quite important	somewhat important	of no significance	Can not say		
1	Considering landowner rights	extremely important	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	of no significance	<input type="checkbox"/>
2	Conserving animal and plant species is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>
3	Compensating economic loss to private landowners is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>
4	Conservation of biotopes like eskers and swamps is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>
5	Taking into account the costs of conservation to national economy is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>
6	Following EU-regulations is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>
7	Informing the public when planning new conservation programs is	extremely important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	of no significance	<input type="checkbox"/>

7. Evaluate the previously introduced nature conservation planning and adjustment with the help of the following statements. Even though you may feel that you are not knowledgeable enough about the issue, respond according to your own perception.

		fully	quite	neither	quite	fully		
1	Planning of nature conservation takes landowners' rights well into account.	agree	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	disagree
2	Adjustment of nature conservation conserves animal and plant species well.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
3	Adjustment of nature conservation does not cause considerable costs to landowners.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
4	Adjustment of nature conservation conserves biotopes well.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
5	Adjustment of nature conservation causes considerable costs to the national economy.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
6	By implementing the nature conservation planning Finland follows EU-regulations well.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
7	Informing the public is taken well into account in the planning of nature conservation.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree

Proposals of adjusting nature conservation

The planning of nature conservation areas is still being prepared. Several alternatives are to be evaluated.

In the following we ask you to familiarize yourself with two alternatives to the implementation of adjusting nature conservation in Finland:

	<i>Option 1</i>	<i>Option 2</i>
Nature conservation area change to current area	same as current area	6% larger than current area ¹
% of the land area of Finland	11.3 %	11.9 % ²
Conserved nature types	Currently conserved: swamps, lake shores, bird wetlands, eskers, wilderness, old-growth forests, groves	In addition to option 1 ³ : rich fens, springs, lakes, rivers, river deltas, sea shores
Change in the income tax of your household	No change	340 FIM increase in income tax ⁴

Your opinion is important

The expenses of option two consist of the compensations paid for land expropriated to create new conservation areas. Compensations are assumed to be funded by taxes collected for the year 1998.

8. Please choose which of the previous alternatives you support.

I support option number _____

¹ The increase in the current nature conservation area varied between 3%, 6% and 9%.

² The share of the protected area of the total land area of Finland varied between 11.6, 11.9 and 12.1%.

³ Conserved nature types on two other conservation level were:

11.6%: rich fens, springs, lakes, rivers, river deltas

12.1%: rich fens, springs, lakes, rivers, river deltas, sea shores, meadows, rocky terrains

⁴The income tax increase varied from FIM 60 to FIM 1200 (FIM 1 ≈ US\$ 0.17, October 1999) depending on the conservation level: (60, 170, 280, 400 FIM) for the 3% increase level, (120, 340, 560, 800) for the 6% increase level, and (180, 510, 840, 1200) for the 9% increase level.

9. Do you agree or disagree with following statements.

		fully	quite	neither	quite	fully		
		1	2	3	4	5		
1	It was difficult to compare the pros and cons of the program.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
2	I am certain about my opinion of adjustment of nature conservation.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
3	It was very difficult to compare the alternatives.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
4	It is always important to compare costs and benefits when the level of nature conservation is under decision.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
5	Nature conservation may never be based on compulsory purchase of land even if the landowners were compensated.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
6	The nature conservation project has no meaning for me.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
7	Costs and benefits of nature conservation cannot be compared.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
8	Increasing income level is always more important than nature conservation	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
9	I do not have enough money for nature conservation.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree
10	Nature conservation is always more important than increasing income level.	agree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	disagree

Finally some questions on your background.

10. Year of birth? _____

11. Are you

- male
- female

12. What is your all-round education. Have you graduated from:

- high school
- elementary school
- lower elementary school
- none of the previous

13. What is your professional education. Have you graduated from

- vocational school
- vocational college
- college
- university
- none of the previous

14. Are you working in the field of

- forestry or timber industry
- environmental conservation
- another field

15. Which of the following best describes your living environment?

- urban area
- suburb
- rural municipality center
- other rural population center
- sparsely populated area
- I do not know

16. Household income before taxation?

- under 50 000 FIM/year
- 50 000-100 000 FIM/year
- 100 000-150 000 FIM/year
- 150 000-200 000 FIM/year
- 200 000-250 000 FIM/year
- 250 000-300 000 FIM/year
- 300 000-350 000 FIM/year
- 350 000-400 000 FIM/year
- over 400 000 FIM/year

17. Number of household members? _____ persons, of whom _____ are under 18 year of age.

18. Do you or your close relative own more than over 5 ha of forest land?

- Yes No

19. If you or your family members own land, are there any nature conservation reservations on your land?

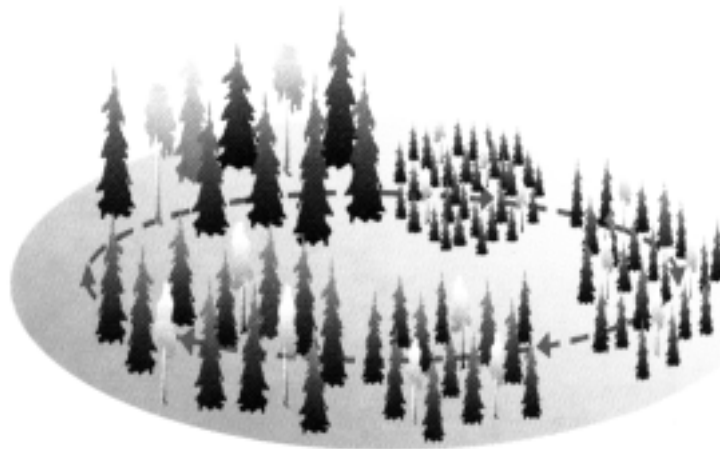
- Yes No I do not know

20. Date: _____ 1997

If you have questions or comments related to nature conservation you can write here.

Thank you for your time.

***Forest management in Finland
-What is your opinion?***



*Department of Forest Economics
University of Helsinki*

1998

1. How often have you been out in forests during the last month?

- 1 daily
- 2 several times per week
- 3 about once a week
- 4 several times a month
- 5 I have not been there during the last month

2. Which of the following things have you done at least once during the last 12 months?

- 1 walked in a forest
- 2 picked berries
- 3 picked mushrooms
- 4 fished
- 5 hunted
- 6 hiked
- 7 camped
- 8 worked in the forest during my leisure time
- 9 worked in my own forest for income
- 10 driven frequently (by car) in forest areas
- 11 been in a forest because of my work

- 12 I live close to a forest
- 13 my summer residence is close to a forest

- 14 I have obtained information about forest issues from the media
- 15 I have discussed forest issues with other people

- 16 I have not been a forest at all

3.* Assess how important you consider the following aspects related to Finnish forests.

I do not know

1	Taking care of forest scenery is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
2	Taking care of future forest growth is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
3	Maintaining diversified fauna is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
4	Maintaining diversified flora is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
5	Ease of hiking in the forest is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
6	Economic profitability of forestry is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
7	Intensifying forest administration is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
8	Management based on planning is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
9	Timber supply to the forest industry is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
10	Harmony between interest groups is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
11	The independent decision-making power of forest owners is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
12	Employment in forestry is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>
13	Compensating economic loss to forest owners is	slightly important	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	extremely important	<input type="checkbox"/>

* = attitude and belief items for half of the sample.

FOREST REGENERATION

The next part of the survey deals with cuttings that regenerate forests. Forests to be regenerated are rather old and the timber growth has slowed as they have aged. Forest regeneration consists of regeneration cutting and growing of new plants.

Regeneration cuttings in a particular site removes all or the majority of trees. After that a new generation of trees is allowed to grow. The soil is frequently prepared. Some seedling trees can be left in the area for a couple of years so that plants will germinate from their seeds. It is also possible to plant seedlings or seed the area.

Of the forests in Finland, less than 1% are regenerated annually. A forest owner decides to do regeneration cuttings in order to sell raw wood to the forest industry. Of the industrial raw wood, around three fourths is obtained from regeneration cuttings.

Before the growth of new stands the regeneration areas are seen as open spaces, where waste wood, crowns and branches can be found. Forest regeneration affects landscape, ground- and surface water, as well as flora and fauna. The environmental effects of regeneration cuttings depend on, for instance, the wildlife and decayed trees left in the area.

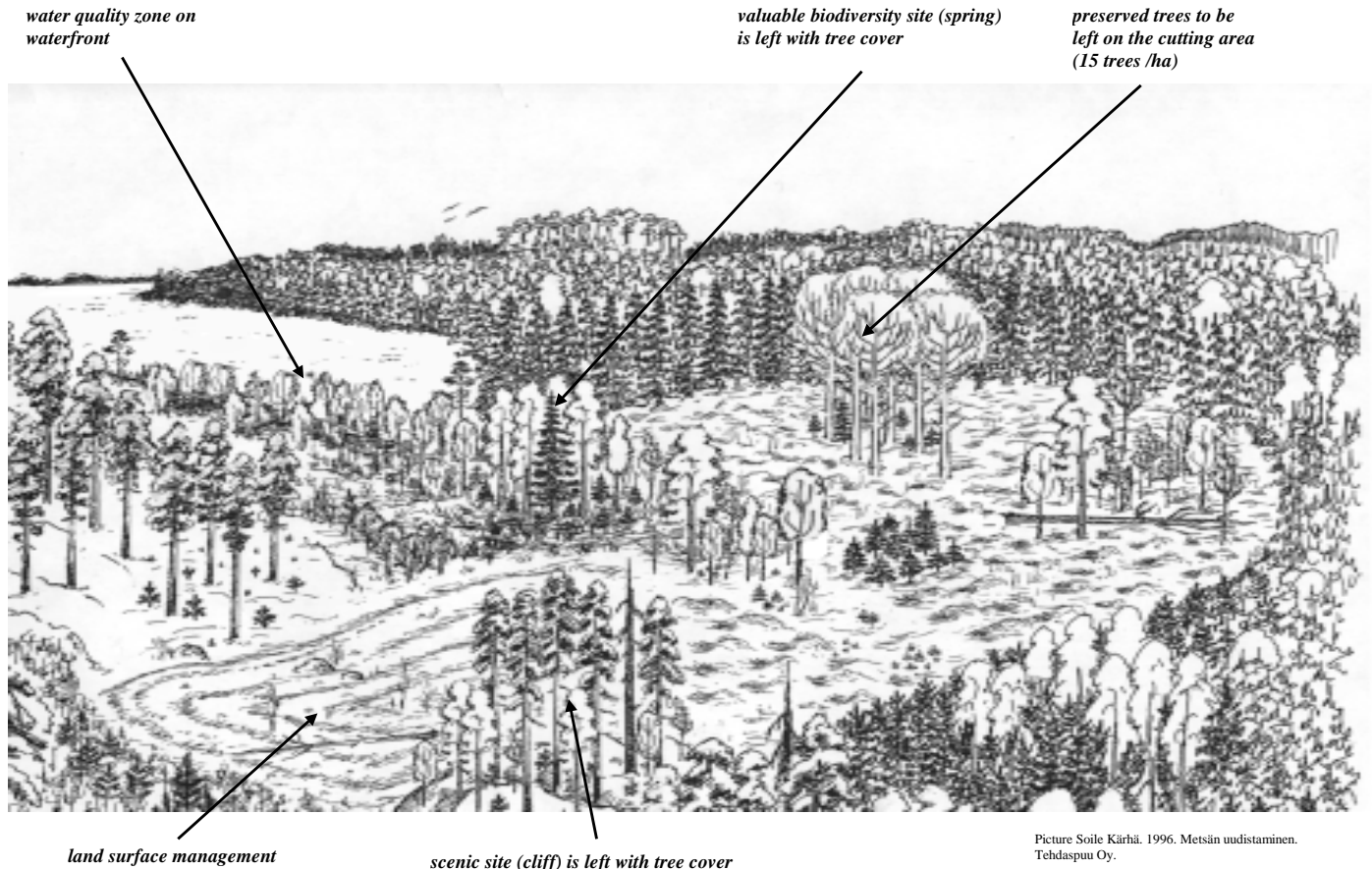
4. How often do you see forest regeneration areas?

- 1 daily or several times a week
- 2 several times a month
- 3 several times a year
- 4 almost never

5. Regeneration cuttings that I have seen have emerged

- 1 fully unexpectedly
- 2 quite unexpectedly
- 3 quite as expected
- 4 fully as expected
- 5 do not know

The effects of forest regeneration cuttings on vegetation, animals and scenery are dependent on the cutting method, such as leaving trees in the cutting area, management of valuable sites like lake banks and cliffs, or on the land surface management. The following picture illustrates these properties of the regeneration cutting area.



REGULATION AND INSTRUCTION IN FOREST REGENERATION

This questionnaire regards only regeneration cuttings in private forests. About 65% of the forest area in Finland belongs to private forest owners. On private forest lands the landowner makes the decisions on forest regeneration. Other citizens, purchasers of forest products, public authorities and civic organizations also propose various objectives for forest regeneration.

Objectives related to forest regeneration include:

- Timber production
- Nature conservation
- Consideration of forest scenery
- Suitability of forests for outdoor recreation

For the purpose of reconciling these objectives, regeneration of private forests are guided by recommendations, financial support and legislation. In recent years guidance and regulation have especially promoted biodiversity. However, currently the consideration of forest conservation and forest scenery is mostly voluntary; only conservation of valuable biodiversity sites is regulated by law.

In evaluating the regulation of forest regeneration it is important to know citizens' opinions on

- whether forest regeneration should be developed in a more environmentally oriented direction
- how much public funds could be used to finance environmentally oriented forestry

The following table presents an alternative (B) to the present forest regeneration practice (A). This alternative can be implemented by law or by mandatory regulation. For forest owners this will cause a loss of income, which will be compensated. Compensations are financed by an increase in the income tax of households. The proposed alternative will not affect employment or the supply of raw wood available for the forest industry in the near future.

Please familiarize yourself with the alternatives using the following table. There are justified reasons for supporting either of the alternatives.

FOREST REGENERATION CUTTING ALTERNATIVES	<i>Alternative A</i> (present practice)	<i>Alternative B</i>
<p>Amount of trees to be left on the cutting area</p> <ul style="list-style-type: none"> Trees are left to decay on the cutting area. They are not seed trees which will be removed later. Preserved trees will increase the amount of decaying wood, which is necessary for many endangered species living in old growth forests. The relationship between the amount of decaying wood and endangered species is not well known. Preserved trees also have an effect on forest scenery. 	<p>15 trees per hectare</p> <p>(hectare = 100 m x 100 m)</p>	<p>35 trees per hectare</p>
<p>Valuable biodiversity sites^{b)}</p> <ul style="list-style-type: none"> These include creek banks, spruce mires, precipices. Preserving sites and their surroundings will contribute to the survival of many endangered animal and plant species. Preserving these sites will also affect scenery 	<p>existing sites are conserved</p>	<p>existing sites are conserved and sites are restored after timber production</p>
<p>Share of large (over 5 ha) cutting areas^{b)}</p> <ul style="list-style-type: none"> The area of cutting affects the forest scenery. 	<p>4%</p>	<p>0%</p>
<p>Adequate scenery consideration^{b)}</p> <ul style="list-style-type: none"> About 40% of forest regeneration areas are located on sites which have scenic importance, or near population areas or roads Well designed trimming of the cutting area and selection of trees to be left and their location are essential aspects in scenery considerations. 	<p>in 80% of cutting areas</p>	<p>in all cutting areas</p>
<p>Adequate water quality zones^{b)}</p> <ul style="list-style-type: none"> Water quality zones on waterfronts reduce nutrient load and eutrophication of waters. Water quality zones should be 10-20 m wide. Forest management on waterfronts has an effect on scenery. 	<p>in 80% of cutting areas</p>	<p>in all cutting areas</p>
<p>Ruts of land surface management^{b)}</p> <ul style="list-style-type: none"> Currently about 23% of land surface management affects soil layers more deeply. Land surface management has an effect on scenery and forest accessibility. Intensive land surface management increases nutrient load on waters. 	<p>visible 10-20 years</p>	<p>disappear in two or three years</p>
<p>Cutting potential</p> <ul style="list-style-type: none"> Preserved trees reduce the area producing timber and thus forest growth as well. To ensure the sufficiency of timber, cuttings could be increased in both alternatives. The use of timber is sustainable when cuttings and forest growth balance each other out in the long-term. 	<p>14% more than actual use</p>	<p>12% more than actual use</p>
<p>Increase in the annual tax of your household 1999</p>	<p>no change</p>	<p>tax increase of FIM 100^{a)}</p>

a) Bid levels were FIM 100, 700, 1300, 1900, 2500 in the limited and in the extensive programs.

b) Attributes which were presented to only those respondents who valued the extensive program.

6.* Evaluate the forest regeneration practices presented in alternative A on the previous page with the help of the following statements. Please mark, whether you agree or disagree, and how much, with each statement (one mark per row).

Alternative A (present practice) ...										
		fully disagree	7	6	5	4	3	2	1	fully agree
1	...reduces scenic beauty.	fully disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	fully agree
2	...guarantees future growth.	fully disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	fully agree
3	...diminishes fauna diversity.	fully disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	fully agree
4	...diminishes flora diversity.	fully disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	fully agree
5	...hinders hiking in the forest.	fully disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	fully agree
6	...is economically efficient.	fully disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	fully agree

7.* Evaluate forest regeneration cuttings in alternative A (page 7).

	Very	7	6	5	4	3	2	1	Very
Forest regeneration cutting as currently practiced is (present practice, A)	useful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	useless
	pleasant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	unpleasant

(one mark per row)

8.* Evaluate the forest regeneration practices presented in alternative B on page 7 with the help of the following statements. Mark whether you agree or disagree, and how much, with each statement (one mark per row).

Alternative B ...										
1	...reduces scenic beauty.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	...guarantees future growth.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	...diminishes fauna diversity.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	...diminishes flora diversity.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5	...hinders hiking in the forest.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	...is economically efficient.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

9.* Evaluate forest regeneration cuttings according to the alternative practice (B) (page 7).

Forest regeneration cutting according to the alternative practice (B) is	Very	7	6	5	4	3	2	1	Very
	useful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	useless
	pleasant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	unpleasant

(one mark per row)

10.* Evaluate positive and negative viewpoints in alternative B.

1	Evaluate the positive sides of alternative B; how positive did you consider them?	very positive	7	6	5	4	3	2	1	very slightly positive
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Evaluate the negative sides of alternative B; how negative did you consider them?	very slightly negative	7	6	5	4	3	2	1	very negative
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

11.* Evaluate the implementation of alternative B using the following statements. Mark whether you agree or disagree, and how much, with each statement (one mark per row).

Regulation of forest regeneration...										
1	... increases administration.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	... increases management based on planning.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	... reduces timber supply to the forest industry.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	... increases conflicts between interest groups.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5	...narrows the decision-making power of forest owners.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	...increases unemployment.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7	...has a negative effect on the finances of forest owners.	fully disagree	7	6	5	4	3	2	1	fully agree
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

12.* Evaluate the implementation of alternative B for the purpose to regulate forest regeneration.

Previously presented regulation of forest regeneration is	very harmful	7	6	5	4	3	2	1	very beneficial
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(one mark per row)	to be supported strongly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	to be opposed strongly

13.* Evaluate your participation in forest conservation expenses.

The participation of my household in forest conservation expenses via taxation is	very possible	7	6	5	4	3	2	1	very impossible
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
(one mark on <i>each</i> row)	to be opposed strongly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	to be supported strongly

(Please go through the alternatives presented on page 7 once more)*. Choose which of the alternatives presented in the preceding table you support. Do consider that alternative B includes FIM 100 tax increase for your household.

14. I support alternative

- A
- B

15. The tax increase presented in the previous question was FIM 100. What would be the maximum tax increase that you could accept and still support alternative B?
 _____ FIM

16. If alternative B had not caused expenses to your household, would you have supported it?

- yes
- no

17. Evaluate the choice in question 14 with the help of the following questions.

1	Was it easy or difficult to choose between the alternatives?	very difficult	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	very easy
2	How confident are you about your choice?	very confident	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	not at all confident
3	Did you have enough necessary information for your choice?	very little information	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	very much information
4	Are you satisfied with your choice?	not at all satisfied	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	very satisfied

18. Do you agree or disagree with the following statements?

1	The implementation of alternative B is always more important for me than an increase in my income.	fully disagree	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	fully agree
---	--	----------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------

2	Environmental benefits related to forest regeneration cuttings and monetary expenses cannot be compared at all.	fully disagree	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	fully agree
---	---	----------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------

3	An increase in my income is always more important for me to than the implementation of alternative B.	fully disagree	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	fully agree
---	---	----------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------

4	I cannot afford to pay for the implementation of alternative B.	fully disagree	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	fully agree
---	---	----------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------

5	Forest owners will change forest regeneration cutting methods voluntarily because only timber that is produced with environmentally oriented methods will be bought.	fully disagree	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	fully agree
---	--	----------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------

6	I am satisfied with current forest regeneration practice.	fully disagree	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	fully agree
---	---	----------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------

7	Forest regeneration cuttings are insignificant to me.	fully disagree	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	fully agree
---	---	----------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------

8	If alternative B is used in forest regeneration cuttings, forest owners should be compensated for all extra expenses.	fully disagree	7 <input type="checkbox"/>	6 <input type="checkbox"/>	5 <input type="checkbox"/>	4 <input type="checkbox"/>	3 <input type="checkbox"/>	2 <input type="checkbox"/>	1 <input type="checkbox"/>	fully agree
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19. Gender

- 1 female
- 2 male

20. Year of birth? _____

21. Education

- 1 lower elementary school
- 2 elementary school
- 3 vocational school
- 4 high school
- 5 vocational college
- 6 college or university
- 7 other education

22. Occupation (Pensioners and previous occupation of unemployed)

- 1 Farmer
- 2 Entrepreneur
- 3 Upper-level employee
- 4 Lower-level employee
- 5 Manual worker
- 6 Other occupation

23. Are you currently employed?

- 1 Yes
- 2 No

24. What is your field of occupation?

- 1 forestry or timber industry
- 2 field related to environmental conservation
- 3 another field

25. Household income before taxation?

- 1 under 50 000 FIM/year
- 2 50 000-100 000 FIM/year
- 3 100 000-150 000 FIM/year
- 4 150 000-200 000 FIM/year
- 5 200 000-250 000 FIM/year
- 6 250 000-300 000 FIM/year
- 7 300 000-350 000 FIM/year
- 8 350 000-400 000 FIM/year
- 9 over 400 000 FIM/year

26. Number of household members?

_____ persons, of whom _____ are under 18 year of age

27. What is your living environment?

- 1 rural center
- 2 sparsely populated area
- 3 city or town

28. What province do you live in?

- 1 Province of Southern Finland
- 2 Province of Western Finland
- 3 Province of Eastern Finland
- 4 Province of Oulu
- 5 Province of Lapland

29. Do you belong to any environmental organization?

- 1 Yes
- 2 No

30. Do you or any of your household members own forest (land area over 5 ha)?

- 1 Yes, about _____ ha, (if joint ownership, the share of your household)
- 2 No, skip the following question

31. How do you evaluate the importance of the forest for your economy?

- 1 not important
- 2 somewhat important
- 3 quite important
- 4 very important

If you have questions or comments related to nature conservation you can write them on the following lines.

THANK YOU FOR YOUR ANSWERS!