Summary of the case study on valuation of the forest ecosystem services

Title of the valuation study: **Forest owners' willingness to accept compensation for voluntary conservation: A contingent valuation approach**

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Objectives of the study

Currently, around 2.5% of Norwegian productive forests are conserved in protected areas. The aim is to expand this level to 4.6 - 10% under lowest social conflicts possible. This could be realized by voluntary conservation programs.

The authors conducted a contingent valuation (CV) survey of private forest owners in Norway to analyse the factors determining willingness to accept (WTA) and to derive the mean WTA. In addition, the relationship between the cumulative enrolled area and the WTA levels should be reflected using conceptual supply curves.

The main objective of the study was to gain knowledge of the factors that determine WTA. This information can be utilized by the government to conserve more or biologically better forest land for the same conservation budget. Furthermore, the mean WTA per hectare is also useful as a basis for deriving ballpark measures of the costs of various conservation targets. Hence, the results of the survey could be important for the understanding of forest owner preferences and the costs of voluntary forest conservation schemes.

Scope of the study

The ecosystem services valuated in the study were provisioning services (timber and non-timber products) and habitat services (biodiversity). The geographical scope covered by the survey was national for Norway with a special focus on the 10 counties of the southern part of the country.

Valuation method(s) applied

Out of the government forest tax records in ten counties, 2007 forest owners with properties larger than 25ha were randomly chosen. These respondents received a questionnaire and a cover letter online. Additionally, an analysis of non-response bias was conducted by a **telephone survey**.

The written survey design consisted of a **contingent valuation** with four main sections (forest property with biodiversity- and parcel-characteristics, income-generating activities, voluntary conservation and WTA). A brief scenario description of the voluntary program was included. A subsample of respondents received a slightly different wording of the information, suggesting a public tendering process (auction) instead of the standard voluntary conservation process.

An **open-ended WTA question** was used, asking about the minimum compensation per five dekar as an annual payment aided by a payment card. The WTA section closed with questions about how respondents came up with the WTA response, why (not) they were willing to participate in the program and attitude and opinion questions about voluntary conservation and alternative instruments. In addition, the survey data was merged with **forest tax records** that contained some basic information. Thus, the utility of forest amenities (timber and non-timber products) to the NIPF owners was converted into the owner's compensation claim (WTA). Afterwards, the WTA was correlated with a subset of owner characteristics, plot/resource conditions, and a subset of market drivers.

Further analysis was conducted using an **econometric modelling approach**. Hence, **two regression models** were developed. Model 1 was a **reduced model**, where only forest-, plot- and forest owner characteristics were included. Whereas Model 2 was the **full model** including all explanatory variables of the survey. In order to get a **ballpark estimate** of the costs to reach different protection targets (4.6% or 10% of the total area of Norway), the authors calculated the mean WTA from the two models. Finally, based on the reduced Model 1 data, **conceptual supply curves** were derived.

Key results

- The WTA was negatively related to the size of the forest holding and absentee ownership. Contrarily, the WTA was positively related to the share of the forest classified as productive.

- Costs of reaching conservation goals could be saved by targeting small and relatively less productive forests and absentee owners first. Nevertheless, 48% of the interrogated forest owners were not willing to participate in voluntary conservation programmes at all, irrespective of the amount of compensation payment.

- The deadwood variable and indication of biodiversity hotspot area on the land were not significant. Authorities hence might be able to enrol forests with such features without having to pay a higher amount to the owners.

- Reaching a **level of 4.6% (10%) protected area of forests** in Norway through the establishment of voluntary conservation programmes would yield **annual costs of NOK 279 million (NOK 999 million).**

- The **overall mean WTA was NOK 1800/year/ha**. WTA for forest conservation was consistent across income categories. Further, forest owners do not state significantly different WTA when faced with a public auction format. The WTA and expected cumulative enrolled forest area for forests of low and high productivity is shown in Table 1 [1 NOK=0.11 €].

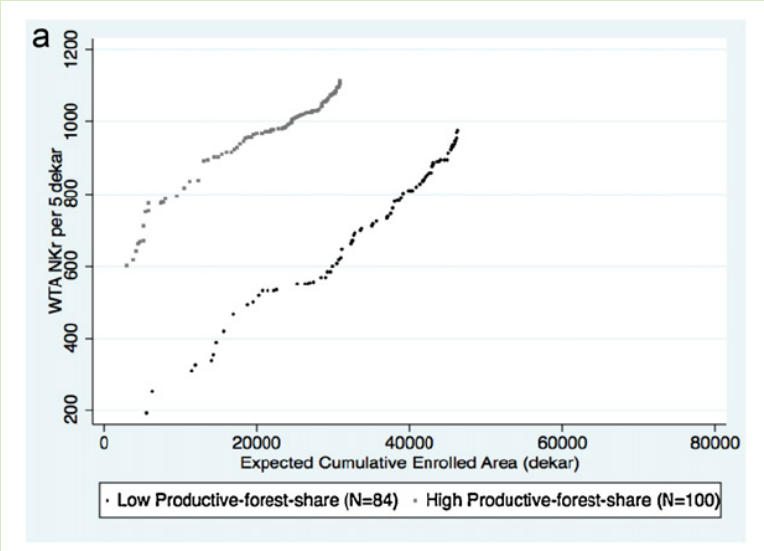

Figure 1 WTA and expected cumulative enrolled forest area for forest Indicated as having low and high productive forest shares

Note: the cut-off point for high and low was set at 80%, which is the median of the sample