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# 43. THE NEED OF OWNER-SPECIFIC POLICIES AND COMMUNICATIONS TO ADVANCE FOREST CONVERSION IN SMALL PINE PLANTATIONS

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The conversion of secondary conifer plantations into well-structured native broadleaf forests is a growing issue in both the academic and policy arenas of today. One crucial factor necessary for the implementation of any strategy or program is the readiness of countless small landowners to engage in forest conversion. This paper examines the emerging theme of forest conversion through presenting a recent study among small owners of pine plantations in Flanders (the northern part of Belgium). In order to capture the variety in ownership motivations relevant to decision-making, a typology of forest owners was built using a forest owner survey. Three types of owners were identified, named as the 'economist' (wood production and financial investment being the main goals), the 'recreationist' (personal amenities and relaxation considered most important), and the 'passive owner' (no clear motivations). Focus groups were subsequently used to examine those factors likely to influence small-scale forest owners' decision-making regarding forest conversion, and how these factors may vary between owner types. Generally, economists would favour a gradual forest conversion scenario (thinning and giving space to broadleaves), recreationists appear to be reluctant to change the forest scenery and passive owners tend to believe that forest conversion happens naturally without need for intervention. The research findings suggest that rapid conversion will not be a feasible option on private land. Policies and communications which could motivate small forest owners to engage in forest conversion include capacity (provide the knowledge, resources, or ability to make the decision towards forest conversion), learning (rely on the interaction between policy targets and policy-makers to determine the best way to address a problem) and symbolic tools (rely on the assumption that if a policy is viewed as consistent with the target population's values, it will be accepted and followed).

## INTRODUCTION

There is growing recognition in forest policies across Europe that the conversion of secondary conifer plantations into mixed broadleaved stands is an important step in the process towards sustainable forest management. Currently, the concept of forest conversion has broad support among experts in the field of environmental management, forestry, nature and landscape conservancy. An increasing number of studies highlight the potential of forest conversion as an effect-oriented measure in controlling forest degradation driven by disturbances and exogenous emissions, and in the conservation and improvement of species diversity (Von Wilpert *et al*. 2000, Spiecker 2003, Gartner and Reif 2004, De Schrijver *et al.* 2004). Although the benefits of forest conversion are widely acknowledged, there is little doubt that one crucial factor necessary for the implementation of any strategy is the readiness of private forest owners to engage in forest conversion. In particular, non-industrial private owners (NIPF) are being considered as an important player in the implementation of forestry programs. Hence, research on what could motivate private forest owners to play an effective part in strategies of forest conversion is critically important if the concept is to be promoted more widely.

It has been suggested in prior studies that owners will be attracted to programs which help them achieve their forest ownership goals or enhance their own particular values regarding forest management (Kline *et al.* 2000). In this context, there have been a remarkable number of efforts in creating forest owner typologies during the last few years (e.g. Boon *et al.* 2004, Bieling 2004, Serbruyns and Luyssaert 2006, Ingemarson *et al.* 2006). Most often, cluster analysis has been used to divide the owners into motivational categories, which in turn provides a framework upon which to base recommendations for initiating policies and communications that satisfy both the owners' personal goals and the requirements of the policy program in question.

The aim of the present research is twofold: (1) to develop a forest owner typology based on motivations of forest ownership, and describe the various owner types on key characteristics and (2) to uncover factors affecting owners' decision-making, in particular those factors that encourage

or constrain management measures favouring forest conversion, and how these factors might differ among different types of owners. The focus is on the owners of secondary pine plantations in Flanders in the north of Belgium. The overall purpose is to demonstrate how forest policies could motivate these private forest owners to engage in forest conversion.

## RESEARCH METHOD

### The Study Area and Sampling Method

Out of the total Flemish forest area of 146,000 ha, homogeneous pine plantations cover about one third. About 53% (44,820 ha) of the homogeneous pine plantations (22.7% Scots pine and 8% Corsican pine) in Flanders are privately owned (Verheyen *et al.* 2006). As a rough estimate, the average property area is only 1 ha. Recently, forest groups (cooperatives of private owners) have been introduced as a new instrument for advice and support, and as a platform of consultation between forest owners and government (Van Gossum *et al.* 2005, Van Gossum and De Maeyer 2006). So far the forest groups have been supportive in pest control (of Black Cherry), wood sales and in management plans. It is hoped that they will play an active role in promoting close-to-nature management, including the conversion of secondary pine plantations.

The distribution of pine plantations in Flanders is linked to sites with poor sandy soils that are naturally dominated by broadleaved species (birch and oak). In the two most important regions of pine on sandy soils, seven forest complexes were selected that mainly consisted of pine plantations: three in the Flemish Sand region and four in the Campine region. Each forest complex covered between 100 and 300 ha, and encompassed between 100 and 300 private properties.

A survey was conducted of forest owners in Flanders. The reference population consisted of 1003 individuals owning one or more plots of land registered as 'forest' in the national land register. A questionnaire was designed which encompassed socio-demographic characteristics, the location of the forest, ownership status, ownership motivations, and usage of forest services. The questionnaire was tested orally with 20 forest owners who did not belong to the reference population. Only a few small changes were needed. Questionnaires were sent to all 1003 owners by the end of October 2004, and a reminder was sent to non-respondents in November 2004. The response rate was 33.3%. After excluding owners of broadleaf forest from the sample, 276 usable questionnaires were retained for analysis.

### Deriving the Forest Owner Typology

The motivations for ownership as derived from the survey data were used to build a typology. Survey respondents were asked to rate on a five-point scale the importance of possible reasons for owning forestland (Table 1). First, respondents' importance ratings were analyzed using principal component analysis (PCA) (as described by Legendre and Legendre 1998) with Varimax rotation. The reliability of the PCA was evaluated using Carmines' theta $\theta = (N/N-1)*(1-1/\lambda 1)$ where N is the number of variables in the total PCA and $\lambda 1$ is the first eigenvalue (Carmines and Zeller 1979). The Carmines' theta must be greater than 0.70 for a reliable outcome. Only components with an eigenvalue greater than 1 were considered in the final model, because each of them explains more data variance than one of the original variables. Second, based on the principal component scores obtained from the PCA and following the methodology of Legendre and Legendre (1998), a K-means clustering analysis was performed to categorize respondents into distinct groups. Finally, logistic regression was performed to identify the explanatory variables describing characteristics of the forest owner: gender (dichotomous scale), age (three-point scale), work situation (three-point scale), inherited the forest (dichotomous scale); the forest property (three-point scale), distance of the forest from the home (three-point scale), frequency of forest visits (three-point scale); the owner's relation to government services and the forest group (dichotomous scales).

### Comparing 0wner Types in Relation to Forest Conversion

The cluster analysis identified three owner types, called 'economists', 'recreationists' and 'passive owners'. Two focus groups were organized for each owner type (one per region). The numbers of participants were 14 and 12 for the economists, 12 and 9 for the recreationists and 10 and 7 for the passive owners. The same topic list was used in all focus groups. Questioned items were attitudes in relation to forest conversion, social networks and institutional context influencing the owners' decision making, and main obstacles constraining owners from active forest management. All focus group interviews lasted for two hours. All focus groups were tape-recorded and transcribed, after which a computer-aided content analysis was performed using Nvivo (QSR-NUD*IST).

## RESULTS

Respondents were between 26 and 99 years old, with 75% older than 52 years, 50% older than 60 years and 25% older than 70 years. About 74% were male. About 44% had completed higher education (master or bachelor degree); 52% were retired and 35% were employed (mostly off-farm). The forest area of most owners was very small; 36% between 0–0.5 ha, 24% between 0.5–1 ha, 17% between 1–2 ha, 14% between 2–5 ha and only 9% larger than 5 ha. About 18% did have their residence in their forests; an additional 33% lived at a distance less than 5 km from their forest and 30% between 5 and 20 km. Only 28% had inherited the forest. The most important ownership motivations were enjoying the beauty of forests (78%), nature conservation (72%), personal recreation (59%), relaxation (58%), providing wildlife habitat (58%), family estate (53%), enjoying own forest (44%) and place to work (43%). The forest owners were interested in the following forest services: general information on forest management (77%), personal advice (66%), assistance with administrative work (35%) and 16% were even willing to eventually hand over the management of the forest to the government. About 83% had heard of the forest group and 69% had already contacted the forest group.

### Forest Owner Typology

The principal component analysis condensed the 12 motivations into three principal components (PC), which explained 46% of the variation in importance ratings for forest ownership. The Carmines' theta of 0.72 indicates that the solution was reliable. The interpretation of the three components included only those variables with loadings exceeding 0.25 on the PC. Based on their loadings, the first PC describes a strong motivation for recreational values (personal values and amenities) (Table 1). PC2 and PC3 are both characterized by economic motivations for ownership. PC2 describes the 'traditional' motivation for production, e.g. wood to sell on the timber market as well as firewood for household consumption. PC3 describes financial or 'speculative' motivations for forest ownership.

**Table 1.** Loadings of the motivations on the three principal component axes (N = 276)

| Motivations for ownership | PC1 | PC2 | PC3 |
|---|---|---|---|
| Timber to sell | | 0.62 | |
| Forest is garden | 0.498 | | |
| Relaxation | 0.823 | | |
| Family estate | 0.342 | | |
| Personal recreation | 0.878 | | |
| Place to work | 0.675 | 0.269 | |
| Eventually sell at profit | | | 0.9 |
| Enjoy own forest | 0.627 | | |
| Recreation for others | | | |
| Providing wildlife habitat | 0.292 | | |
| Land investment | | 0.245 | 0.602 |
| Firewood | 0.285 | 0.879 | |
| Eigenvalue | 2.859 | 1.353 | 1.286 |
| Proportion of data variance explained | 24% | 11% | 11% |

The scores for individual owners on the four PCs were used to group the forest owners. The four-group solution of the cluster analysis allowed generalizing the motivations of the forest owners into four owner types without over-fitting the data (Table 2). The groups were named after the PC for which the higher score was obtained. The first group tended to score highly positive on the traditional (PC2) and speculative motivations (PC3) and was therefore labelled economists. It also scored slightly positive on the recreational motivation (PC1). The second group was labelled recreationists because of the highly positive score on recreational motivations (PC1). Recreationists score negatively on traditional (PC2) and speculative (PC3) motivations. Based on their negative scores on the recreational (PC1), traditional (PC2) and speculative motivations (PC3), the third group was labelled passive owners.

**Table 2.** Mean values of the cluster centres for the four-group solution (N = 276)

| Owner type | n | PC1 | PC2 | PC3 |
|---|---|---|---|---|
| Economist | 62 | 0.273 | 0.856 | 0.636 |
| Recreationist | 73 | 0.728 | -0.548 | -0.368 |
| Passive owner | 69 | -1.016 | -0.189 | -0.182 |
| F-value | | 183 | 69 | 28 |
| Significance | | 0.00 | 0.00 | 0.00 |

In order to make the classification recognizable, the four owner types were linked with a number of explanatory variables describing owner and property characteristics that are readily or easily available for forest policy bodies (Table 3). A typical economist lives at a distance of 5 to 20 km from the forest and is probably a person who is unemployed. Recreationists visit their forest, which was probably not inherited, on a daily basis. The recreationist is often a working person and is not yet retired. Finally, passive owners rarely visit their forest.

**Table 3.** Relationships between the owner type and the socio-demographic characteristics of the owners and their property calculated as regression coefficients (odds ratios) in a binomial logistic regression (N = 276)

| Variable | Binomial logistic regression model for each owner type | | |
|---|---|---|---|
| | Economist | Recreationist | Passive owner |
| Model significance | 0.033* | 0.000** | 0.003*** |
| Constant | 1.626 n.s. | -1.519 n.s. | -3.744* |
| Owner characteristics | | | |
| Gender (female)[a] | | 1.131 (3.716)* | |
| Age (56–75, retired owners) | -1.601 (0.202)* | 1.099 (3.001) n.s. | |
| Work situation | | | |
| Retired | | -1.351 (0.259)** | |
| Unemployed | 1.555 (4.737)* | | |
| Inherited the forest (none) | | 2.641 (14.024)* | |
| Property characteristics | | | |
| Distance to the forest (5–20 km) | 1.514 (4.543)* | | |
| Frequency of forest visits | | | |
| A few times a week/monthly | | -1.284 (0.277)* | |
| Never or almost never | | | 3.461 (31.841)** |

* $p<0.05$, ** $p<0.01$, n.s. = non-significant.
a. Only the variables which are included in the final model are presented

The relationship of forest owners to government services and the forest group was investigated (Table 4). A typical economist knows the regional forest group quite well. A recreationist would not make use of general information about forest management, nor tend to hand over the management to the government. The recreationist has probably heard of the forest group or has attended an information meeting. The passive owner is probably willing to hand over the forest management to government and has most often no contact with the regional forest group.

**Table 4.** Relationships between the owner type and the governmental services and the forest group calculated as regression coefficients (odds ratios) in a binomial logistic regression (N = 276)

| Variable | Binomial logistic regression model for each owner type | | |
|---|---|---|---|
| | Economists | Recreationists | Passive owner |
| Model significance | 0.061 n.s. | 0.002** | 0.000** |
| Constant | -7.136 n.s. | -8.599 n.s. | -19.500 n.s. |
| Government services: | | | |
| Ever used subsidies for the forest (none)[a] | | | -3.658 (0.026)* |
| Would make use of general information on forest management (none) | | 2.108 (8.234)** | |
| Would eventually hand over the management of the forest to government (none) | | 3.191 (24.316)** | -3.022 (0.049) |
| Forest group: | | | |
| Ever heard of the forest group (none) | | | 2.526 (12.508)** |
| Ever had contact with the forest group (none) | -2.557 (0.078)* | | |
| Ever attended information meeting (none) | | -1.664 (0.189)* | |

* p<0.05, ** p<0.01, n.s. = non-significant.
a. Only the variables which are included in the final model are presented

**Comparing Owners Types in Relation to Forest Conversion**

From the focus group discussions, it was found that in general *economists* displayed a positive attitude to forest conversion. Many of them carry out – often with the help of the forest group – management measures that favour conversion, including thinning, giving space to broadleaves and even planting broadleaves into thinned stands. In addition, it is remarkable how they tend to think in terms of costs and benefits, for example they appreciate the collective wood sales organized by the forest group because the earnings are likely to compensate the costs of the thinning. Overall, conversion was seen as a gradual process (thinning and giving space to broadleaves), but it was noticed with regret that spontaneously growing broadleaves have very poor form. By contrast, *recreationists* showed a rather negative attitude towards conversion for several reasons. Some of them rather preferred to observe what happens without interfering in the forest. Only where some problems occur (e.g. illness of trees) they would consider undertaking a thinning. They were also reluctant to change the forest scenery, even through thinning. In cases where forest conversion became necessary for some reason, some would prefer clear-cutting rather than gradual conversion through thinning. That is because they know from past experience that trees may grow crooked when searching for light between the remaining conifers. *Passive owners* were more neutral. Their forest is often a burden and they are not really interested in it. They often leave their forests unmanaged. Those having their forest in the Campine region had some experience with thinning (organized by the forest group). They opposed the idea of forest conversion through clear-cutting because, in their view, people would enjoy the effects only after two generations. They also believed that forest conversion happens naturally and it is not necessary to put effort into conversion.

Overall, the owners want to be free to manage their forest in any way they choose. In this respect, many of them expressed profound distrust of government, nature activists and green party members. Instead, the regional forest groups were highly appreciated. In particular, *economists* were strongly influenced by their views, which has much to do with the feeling that the forest group takes their opinion seriously and they themselves can take the final decisions. They believe (and much appreciate) that the forest group works independently from government. *Recreationists* tend to ask the advice of the forest group and/or nature associations, and often compare the different opinions. *Passive* owners prefer to find any information on their own at the time they need it and would consider a wider array of sources (forest group, local authority, tree expert).

Furthermore, they were divided about the usefulness of the forest group (They believe that the forest group is not 'neutral')

The focus group interviews revealed also a wide array of barriers to forest management. Frequently mentioned in all of the groups were aging, lack of knowledge, high costs of tree pruning, and inappropriate and unclear legislation. Equally important, however, were the many problems that distract the owners' attention from the management work, in particular littering, damage and vandalism caused by an increasing number of forest visitors. Interestingly, the owners also presented solutions for their problems. Recurring demands were made for appropriate control of public access, clearer legislation, raising subsidies and reducing costs. For *economists,* better road access to their property was also important. *Passive owners* prefer more information on how to solve the problems caused by increasing recreation. They think of cleaning-up actions and facilities for owners, such as free access to local waste collection sites. *Recreationists* were not thinking actively about practical solutions; they believed that liberalizing legislation (including acknowledging the owners' opinion) would be most helpful.

Preference of forest type was not questioned explicitly in the focus group interviews. Nevertheless, the topic was dealt with in relation to attitudes. Whether or not owners stated they prefer conifer trees often follows from a multitude of considerations. Aesthetics were extremely important, but it was remarkable that any appreciation of beauty was linked to full-grown trees, for instance, an old pine tree (including the pine cones!) or a line of large beech trees. In contrast, young trees were spoken of with worry and condemnation, for instance, little crooked broadleaves fighting for light in residual stands. Furthermore, *recreationists* and *passive owners* had the impression that conifers are part of cultural heritage and, therefore, must not disappear. Although most of them liked broadleaf species, *economists* believed that spontaneously growing trees would hinder access to the forest. This is not to say, however, that conifers are always the best choice. Several owners – *economists* and *recreationists* – had learned from experience that conifers are more susceptible to diseases and therefore should be replaced by broadleaves.

## DISCUSSION AND CONCLUSIONS

The study attempted to identify what factors are critically important for encouraging small forest owners to engage in conversion management. The starting point was the recognition of the evolving heterogeneity of forest ownership and the subsequent need to tailor policies and communications more clearly to the various types of forest owners. Overall, the findings of this study can assist practical attempts to advance forest conversion in privately owned pine plantations.

In terms of motivational categories of owners, for the *economist,* the forest must be profitable, both in a productive way (timber and firewood) and as a financial investment. For the *recreationist*, personal amenities and relaxation are of utmost importance. The *passive owner* has no clear motivations for ownership. Prior studies have reported the existence of recreational owners (Marty *et al*. 1998, Karpinnen 1998, Mutz *et al.* 2002). Passive owners are also described by Ingemarson *et al.* 2006 and Salmon *et al.* 2006.

Overall, the owner types differ in their attitude towards forest conversion. Generally, the economists would favour a gradual forest conversion scenario, the recreationists appear to be reluctant to change the forest scenery and the passive owners rather believe that forest conversion happens spontaneously. Moreover, passive owners and recreationists often consider pine forests being a part of local heritage. Thus rapid conversion scenarios will be not a feasible option on private land.

The forest owners want to manage their forest in any way they choose. Nevertheless, they appear to be influenced by several sources of information. Economists, in particular, take the opinion of the forest group into account. Furthermore, owners are typically faced with a wide range of practical problems, which distract them from the actual management work.

These findings imply that policies should move attention from rule-led to more attitude-addressing approaches such as using 'empowerment tools' (Schaaf and Broussard 2006). Examples are capacity, learning and symbolic or hortatory tools. Hortatory tools rely on the assumption that if a policy is viewed as consistent with the target population's values and beliefs, it will be accepted and followed (Schneider and Ingram 1990). For example, it was found that owners' decision-making is largely bound up with aesthetic evaluation and forest health, hence, any conversion scenario promoted should pay attention to the effects on forest scenery. Capacity tools provide the knowledge, resources, or ability to make the decision, which is assumed to be the desired behaviour if the appropriate information is available. Symbolic and hortatory tools

recognize the role that values and beliefs play in the decision to engage in the desired action, and rely on the assumption that if a policy is viewed as consistent with the target population's values, it will be accepted and followed (Schneider and Ingram 1990). Learning tools rely on the interaction between policy targets and policy-makers to determine the best way to address a problem (Schneider and Ingram 1990).

Finally, it must be acknowledged that preferences and attitudes diverge and develop along with perceptions of problems and solutions, and as such are open to reconstruction and change (Van Herzele 2004). This implies that the results of this study must be interpreted as open-ended. For example, many owners (most often 'economists') have started thinning only recently, after being convinced by the coordinator of the forest group. It is likely that in the near future there will be a further increase of owners engaged in thinning, including other types of owners. Moreover, where the coordinator of the forest group is presently the most important 'change agent' in the owner's social environment, other forest owners will have an increasing influence. Indeed, the forest group may enlarge the social world of the individual forest owner by offering a setting in which owners can learn from one another (see also Reich 1990). As such, policy ideas, including forest conversion, may become grounded in day-to-day realities and owners' interpretations rather than abstract conversion scenarios designed by experts.

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