A resilience-based framework for evaluating joint forest management in Flanders

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Abstract

In this paper, an innovative policy scheme for sustainable forest management in Flanders is presented. This scheme favours a mechanism based on social learning and collaborative planning within joint forest management (JFM) organisations, the so-called "bosgroepen". In 2007 seventeen JFM organisations are operating in Flanders as non-profit organisations or as recognized pilot projects, each covering a region with 4000 to 10000 ha forest land. These organisations have been successful in involving private and public forest owners in self-organised collective management of the forest on a voluntary basis, within selected forestry complexes that are characterized by a very high degree of fragmentation.

Why was this innovative scheme successful ? And what are its shortcomings and possible limitations ? In order to answer this question, we adopt in this paper a resilience based framework for evaluation. The originality of the resilience based framework for evaluation resides in the focus on the reflexivity of the evaluation enterprise. Indeed, the resilience of certain social-ecological systems may not be desirable. Moreover, efforts to define resilience must be situated in the context of contested and evolving human interests. Because of this normative character of resilience, evaluation is both a retrospective tool that allows adjustment of management choices and a forward looking tool which provides direction to the adaptive experimentation process.

In this paper, we argue that the JFM organisations have been able to address the challenge of the transition to sustainable forestry, evaluate their governance mechanisms and analyse their limitations. In particular, we show that the recourse to a set of quantitative criteria and indicators as a management tool within the JFM organisation allows to have a precise view of the evolution of the processes of collaboration and social learning, which are crucial to building resilience in coupled social-ecological systems.

Key-Words: *forest groups, institutional economics, resilience, reflexive governance*

Introduction

In this paper we address the challenge of building resilience in coupled social-ecological systems through the lens of institutional analysis. The question of resilience of social-ecological systems, and the related problems of vulnerability and adaptability, has received renewed attention because of the increasingly converging dynamics of globalization and coupled dynamics of social and biophysical systems (Young *et al.*, 2006). On the one hand, the process of globalization has led to

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increased interconnectedness and interactions operating at various scales, which introduces new external constraints on the social-ecological systems and hence raises new concerns of adaptive capacity beyond conventional notions of risk, stability and control (p. 314). On the other hand, social and ecological systems are increasingly linked, through the extension of managed biophysical systems, such as agro-environmental landscapes or fragmented forest landscapes composed of small forest patches in urbanized areas. To cope with new external constraints, these systems have to understand and modulate the internal dynamics of structural change in the coupled social and ecological processes, beyond reactive adaptation to global change.

Resilience can be defined broadly speaking as "the capacity of a system to absorb and utilize or even benefit from perturbations and changes that attain it, and so to persist without a qualitative change in the system's structure" (Holling, 1973). As argued by Young *et al.*, this concept is different from the related concepts of adaptation and adaptability. While the latter refer to actual and future processes of structural change in response to external circumstances, the concept of resilience rather focuses on the internal dynamics that maintains the systems integrity. Hence, resilience addresses the problem of the "why and the how" of structural change and focuses on the interactive nature of a system and its dynamic social and ecological environment.

Resilience and adaptability in social systems differs from adaptive capacities in biophysical systems (Young *et al.*, p. 312). An important difference is the intentionality of actors in social systems and the ways this intentionality leads to the building of institutional devices that are supposed to cope with the new problems. Intentionality and institutional design *per se* is not enough to enhance the resilience of the social systems. When current beliefs (based on technical modernisation for instance) lead to institutional rules and behaviour that are ill-matched to the scale of the disturbances, things can continue to get worse rather than better – witness the debate about climate and biodiversity policy. Resilience of social systems will also require reflexive learning process that are able to generate a process of revision of beliefs in coping with the mismatches, discontinuities, nonlinearities and thresholds that are likely to be revealed as the process of substitution of biophysical by social systems unfolds.

This paper will analyse the role of institutional design and reflexive learning in building resilience through the question of dynamic institutional efficiency. A lot of work on institutions has focused on the design of well-adapted systems of rules, which best fit to the biophysical and social environment. In this static approach the goal is to look for the most optimal institutional design given a certain model of the transaction situation. For instance, from an institutional point of view, adaptive capacity can be build in long-term relational contracts (Williamson 1996) or cooperation enhanced by monitoring of free riding by an external monitor (Alchian & Demsetz 1972). However, there is also another important aspect of institutional analysis, which focuses on what has been called dynamic efficiency (Aoki 2001, North 2005, Eggertsson 2005, Dedeurwaerdere 2006, Brousseau 1999). Dynamic institutional efficiency focuses on enhancing the efficiency of the process of institutional change, which is the process of transition leading to a more optimal institutional configuration. Its focus is on the creation of incentives for knowledge

generation about new disruptive action possibilities – the cognitive dimension of the process of change – and the creation of mutually supportive dynamics between institutional change and the changes in the social and political domains – the social embedding of the process of change.

We will apply the question of institutional design for the governance of coupled social-ecological systems to the specific case of the provision of ecosystem services and the building of cooperation over small-scale forest products in human managed forest landscapes. The case of managed forest landscapes seems an appropriate test field for analyzing the contribution of dynamic efficiency. In managed forest landscapes, the slow evolution of the biophysical system is confronted to new rapidly evolving constraints such as the biodiversity crisis and global market pressures. The available options for mitigating the effects of these external shocks on the complex dynamics of the social and the ecological system are not well known and feasible action possibilities limited by the slow change in the beliefs of the actors in the actual social and political environment. To analyse the transition towards ecosystems management in these managed forest landscapes, we will focus on a specific case study which is the case of joint forest management (JFM) organisations in Flanders, where a specific model of dynamic efficiency has been implemented. We will analyze the contribution of JFM to the transition process from the point of view of the cognitive dimension of institutional dynamics, by focusing on the change in the framing of the sustainability debate, and from the point of view of the social embedding, by focusing on the change in the norms of cooperation between the different stakeholders involved in the provision of the forest ecosystems services and the organisation of selling of wood from small-scale forestry. In the first section of the paper, we present our case study by analyzing how Joint Forest Management (JFM) organisations in Flanders have been able to adapt to the specific constraints of human-ecological landscapes composed of small-scale forests with fragmented forest ownership. In the second section, we address the issue of the contribution of dynamic institutional efficiency. Next we analyse the mechanism of reflexive learning that played a role in organising the process experimentation with new beliefs of sustainability (section 2) and we focus on the social embedding of this process, by analysing the dynamics of the enforcement of the norms of cooperation between the different types of forest owners and the forest user groups (section 3). Finally, in the discussion sections we draw some implications of our analysis for the role of the forest group coordinator and the participants in the process of change (section 4) and for possible governance frameworks for addressing the collective action problems in complex forest landscapes (section 5).

1. Filling the gap in the forest management regime: the contribution of the forest groups

In Europe, forests have been virtually all altered by man to some extent, with the exception of the boreal zone on the European side of the Russian Federation and some scattered relics in mountainous areas of the Balkan, Alpine and Carpathian regions (Frank *et al.* 2005, p. 378). Moreover, the majority of forest owners own small forests in connected or fragmented forest landscapes and hence small forest owners are an important target group for any forest policy in Europe. This typical patchwork of forests has some peculiar characteristics such as low commercial value of the wood, diverse collective preferences and levels of understanding of sustainability and

high transaction costs in the monitoring of the management practices of the different actors.

In densely populated regions, such as Flanders, multifunctional forest management appears to be the most to hand means of extending the forest related services (Van Gossum and De Maeyer 2006). Since in Europe and the US non-industrial private forest (NIPF) owners own more than half of the forests (up to 70 % in Flanders), the promotion of multifunctional management depends strongly on the cooperation of NIPF owners. To encourage NIPF owners to adopt the government policy of multifunctional forest management, policy-makers have used a wide range of regulatory, economic and informational instruments. The NIPF owners tended not to support these instruments because the underlying ideas conflicted with their opinions, harvest rights were not protected and there was too much interference from the federal government (Brunson et al 1996). As indicated by the low support, more successful instruments should inform and educate the owner, allow wood trade, involve the owners of the neighbouring forest and be independent of government. Forest groups (forest cooperatives, forest owner associations or cooperative forest management arrangements) exhibit these characteristics and are used in more than 15 European countries (Kittredge 2005).

In the case of Flanders, forest groups have lead to quite impressive outcomes in a relatively short period. The overall region which is covered by the forest groups recognized in 2006 is an estimated 100.000 ha which amounts for 75% of the forest cover in Flanders (called hereafter the Joint Forest Management (JFM) organisations). Each of the JFM organisations focuses on sub-areas within these regions, where forest degradation is progressing most rapidly or where dispersed ownership is highest. It is not dealing with big public forests or, in principle, with private forests above 5ha. Managers of forests above 5 ha can be members of the JFM, because of the importance of developing a coherent approach for the whole area. However, the management activities itself have to be targeted in priority to the needs of the small forest owners (mostly between 0,5 and 1,5 ha). The main decision making body of the JFM is the general assembly of forest owners, assisted by a JFM coordinator and one administrative staff. All decisions on forest management, felling and negotiations with user organisations are taken by the general assembly, on the basis “one man, one vote”, independently of the forest surface of the owner. The JFMs also strive to a balanced membership amongst small public and private forest owners, requiring a majority of private forest owners in the general assembly.

A well-established JFM is the bosgroep Zuiderkempen, which operates in a landscape containing about 8000 ha of forest. Within this landscape a priority working area of 1134 ha of highly scattered forests has been selected for building cooperative forest services in the period 2003-2006. In the management plan for 2007-2010 another 801 ha is planned to be added to this working area. In the working area meetings with forest owners are organised, membership to the JFM organisation proposed and forest management plans discussed. As a result of this process, in total 513 ha private forest has been integrated in detailed common forest management plans (45 % of the working area), involving a total of 462 different small private forest owners (an estimated 30% of the total number of owners in the working area). Moreover, through the negotiation of access plans between the JFM organisation, user representatives and the local authorities, a total area of 342 ha

private forest has been opened up to different user groups (30 % of the working area). If similar results could be accomplished in the other JFM's in Flanders, then an expected total area of 5909 ha could be opened up for walking and recreation in the nearby future, which is more than the total area of the largest remaining public forest in Flanders.

Why was this innovative scheme successful, in a policy field where the command and control and economic incentive policies that were already in place from 1990 to 1996, were not able to produce the expected outcomes? The failure of the transition to sustainable forest management cannot be explained by an insufficient level of economic incentives such as cost-share policies (Serbruyns and Luyssaert 2006). For example, as pointed out by an in depth study of forest conversion which includes the BZK working area, the economic incentive scheme covers more than the costs and the lost revenue of forest conversion to the forest owner (Verheyen et al 2006, p. 73). For instance, the lost revenue is estimated to be between 45 and 96 Euro's/ha/year for conversion from a Corsican pine stand to pedunculate oak under a rotation period of 77 years (*Ibid.*, p. 71), while the direct subsidies are around 150 euro per ha yearly. Nevertheless, between 1990 and 1999 only 200 to 250 owners per year applied and received the reforestation subsidy, while only 133 ha and 317 ha respectively applied and received the subsidy for forest management plans and for opening up their land for private use (Serbruyns and Luyssaerts 2006, p. 287). Second, from an ecological point of view, the 1990 Forest Decree was already based on the detailed set of criteria and indicators for multifunctional forest use and management, which have been agreed upon in the Pan European Forestry process, where both forest interests and nature movements were represented. Hence it seems that the issue at stake here is not the lack of economic incentive policies or inappropriate legal concepts from an ecological point of view.

From the point of view of the building of cost-effective institutions, the main benefit of the JFM institution is its contribution to lowering the transaction costs of the forest owners in their negotiation with the administration, the other owners and user groups. First, felling of trees in private forests requires obtaining a permit, which is quite burdensome for small owners. The joint management plans established by the JFM organisation allow asking one common permit for a whole set of private owners in a cost-effective way. Hence, the JFM is in the first place a way to go beyond the ineffective command and control regulation for felling permits that has been put in place in the mid 1980ies and which has lead to the neglect of the forest by the small private forest owners, instead of leading to more sustainable forestry. Second, JFM facilitates the negotiation of forest access plans with the different use groups and the local administration through organising collective dialogue. The resulting clarification of access and use rights is a win-win situation both for the owners and the users, because it saves them numerous case by case discussions on the access and use rights in each individual forest patch.

2. The institutional dynamics of change in beliefs

Analysing decentralized forest management through JFM organisations from a static transaction cost perspective only reveals one part of its role in the forest management regime. Indeed, there is also another important aspect of institutional analysis, which focuses on the creation of incentives for permanent adaptation and

innovation through processes of social learning and normative change. In this second section, we analyze a first important aspect of dynamic efficiency, which is related to the dynamics of change in beliefs. In the third section, we will turn to the building of normative change.

2.1. Evaluating the progress of the learning process on the cognitive frames

The methodology adopted by the JFM institution in Flanders is based on a process of gradual change in understanding by the different stakeholders, from a nature-centred approach of biodiversity to an ecosystem services (and hence human-centred) approach (cf. table 1). Three components are crucial to this process as it is described in the vision document of the JFM groups. First, the project starts from the interests and needs of the forest owners, rather than their position and discourse in regards to nature conservation. Second, the JFM group organizes a learning process on the definition of the sustainability targets. Third, the design of the learning process itself is evaluated at regular intervals by the participants to adapt it to the local circumstances and stakes at hand.

Other nature associations	JFM
Nature is central Tough approach (recourse to expropriation) Short term tangible results needed Work of experts Focus on surface of nature reserves	Multifunctionality / human being is central Soft approach (respect for ownership) Long term gradual process Involvement of all stakeholders Focus on building support

TABLE 1. Comparison of the core beliefs of the JFM approach to other nature associations in Flanders (Bosgroepen, 2005, section 2.2.2.).

The use of indicators by the JFM organisation provides a useful yardstick to measure the progress of the learning process. Indeed, we can compare these indicators, which are the result of a collective learning process within the organisation to the set of formal targets in the legislation on “criteria for sustainable forest management” (CSFM). The formal targets, which came out of the Pan European forestry process and have been adopted by the Flemish government, are compulsory – wherever relevant – for all private forests > 5ha, for all public forests and for all forests in the Flemish ecological network. There adoption is voluntary for the private forests < 5ha, but they are considered to be the official reference standards to be used by the JFM organisations. In practice, however, both for the public and private forests compliance with the CSFM criteria is still extremely weak (Research Institute for Nature and Forests 2006, p. 30).

The “gap” that we can measure between the legal standards (the CSFM criteria) and the indicators is not a gap between “expert based” preferences – as revealed in the legal standards – and so-called “subjective” preferences of the individual forest owner. The latter, measured for instance though field surveys, are only a poor indicator of the behaviour of the forest owners involved in the collective management organisation. Indeed, the individual preferences are transformed through the learning process in the collective management organisation and the resulting common indicators reflect the resulting collective preferences of individuals as members of a

collective organisation. The gap we measure hence is a gap between beliefs expressed in the government targets and the translation of these beliefs to agreed standards by the stakeholders involved in the local collective management organisation.

JFM has been conceived by its initiators as a gradual process where (1) management objectives are confronted to the perceptions of opportunities by forest owners and where (2) the generated information is used to adapt the operational objectives of the JFM organisation. The JFM organisation receives support by the government, as long as the operational objectives, formulated through a clear set of indicators, are met and if the indicators show a progress in moving towards the government targets. It is this basic constraint that forced the JFM organisation in a process of evaluation of the limits of the use of the government targets. This has lead both to an awareness of the limits of its own representation of sustainability as revealed by the confrontation with the broader normative standards of the CSFM criteria, and a better understanding by the policy makers of the limits of their system of CSFM criteria as a general policy tool that aims to cover both small and large forest owners.

The CSFM are a clear expression of what the concept of multifunctional forest management would look like in the ideal case. It defines clear targets organized around 6 main sets of criteria of sustainable forestry. Each set of criteria is measured through a set of legally specified indicators, leading in total to a set of 24 criteria and 52 indicators:

1. Criteria for the implementation of the existing legislation
2. Criteria for the maintaining of the social and cultural functions of the forest
3. Criteria for the maintaining of the economic and productive functions of the forest
4. Criteria for contribution to the protection of the environment
5. Criteria for the contribution to biodiversity conservation
6. Criteria for monitoring and planning of the forest management

To analyse the gap between these sets of legal criteria and the indicators and targets elaborated in the JFM organisation, we can use the available data of the “Bosgroep Zuiderkempen” (BZK), which is considered a reference case by the Flemish government and which is a case where the learning process for the translation of the CSFM criteria has already been going on for a fairly long period (from 1999 to 2006). The subsidies to the JFM by the Flemish government are conditioned by the adoption, at regular periods in time, of a management plan with clear indicators. Once adopted by the JFM organisation, these operational targets have to be implemented within the timeframe of the management plan. The comparison between the legal criteria and indicators and the operational targets results in a matrix of correspondences and gaps. In the following, we will use this matrix to analyze: (a) what has been learned in the JFM organisation (self-evaluation) (b) what are the remaining challenges in the learning process? We use here the indicators and targets adopted by the General Assembly of BZK for their operational management plan 2007-2012.

The main lessons drawn from this matrix are :

(1) Correspondences between CSFM and BZK: mainly within the criteria set 2 (social and cultural functions) and 6 (monitoring and planning) ; some indicators of criteria set 3 (economic functions) and 5 (forest diversity)
(2) Gaps between CSFM and BZK: no clear reference in BZK to criteria set 4 (environmental services) and very few to criteria set 5 (forest diversity)

The main sustainability indicators and targets that have been adopted by the forest owners' organisation concern the social and cultural functions of the forests and the protection of habitat (forest borders and heath landscapes). A clear target of 690ha forest area with selective access of the population to the forest (35 % of the extended working area) and an information and reporting system of the local population's wishes has been put into place (target audience 350/year). Forest management measures for fragile or biodiversity rich habitats have been planned with the use of detailed GIS maps (Geographical Information System), for an area of 150ha/year. Further action for combating invasive species (American bird cherry / *prunus serotina*) will be pursued in the priority working area. These sustainability targets set by the forest owners are the result of awareness building and discussion and negotiation around experimental test cases.

The comparison also reveals some important gaps. For instance, it is interesting to see that tree diversity as such is not taken over as an explicit measure of sustainability by the forest owners. Beyond the habitat protection we mentioned before, most of the indicators within the forest biodiversity category (criteria 5) are not taken into account. Also the indicators for contribution to environmental protection (set of criteria 4) do not appear in the targets of the management plan.

What kind of limitations does this comparison reveal from a dynamic institutional perspective? First, from the ecological perspective, JFM has clearly shown a gap between the expert build criteria for sustainable forestry and the way that these criteria can be coherently applied in concrete action settings. This gap is shown to be a permanent critical challenge for the JFM organisation. The decentralisation of the decision making power on the real management decisions has allowed to build an effective context for the translation of some of the sustainability indicators. The selling of timber, resulting from the joint management, is of course an important driver for the activities of the forest groups – albeit also with direct impact on more healthy forests, but this is balanced with a concern for other eco-services such as clear targets for access agreements and combating invasive species.

Second, the comparison also shows some of the remaining challenges to be tackled by the forestry group. In particular, the conservation of tree species diversity, beyond the direct social, cultural and economic roles of the forest, remains a difficult issue. A new pilot project will start this year, in order to develop a different methodology for "limited sustainable forest management plans", which includes a concern for tree diversity. The forest legislation has created a frame for the development of these plans, but, again, very few of these have been implemented. The pilot project will reconsider the basic concepts of these plans with the stakeholders in the field.

In summary, from a static perspective the use of indicators allows to create a flexible framework for implementing the forest legislation and for coordinating and monitoring the use of different subsidy and economic incentives from different authorities (both

regional and European). From a dynamic perspective, the legal framework leaves the different forest groups room to build their own operational management plan by selecting the set of indicators that they consider most relevant for their own forest landscape. As such the use of indicators allows a process of internal self-evaluation around feasible and evolving targets in the collective management organisation and a process of feedback to the government, leading to the design of new incentives schemes or adjustment of its policy.

2.2. Learning by mutual monitoring

Our hypothesis is that the productive learning in the forest groups has been made possible through this use of the criteria and indicators as a flexible and open-ended monitoring device. The conditions for the use of monitoring as a learning device in open ended situations have been studied in more detail by Charles Sabel, both in the context of firm behaviour, in the so-called non-standard firm, and in the context of public policy, in so-called deliberative polyarchies. Because of our interest in the origin of cooperative learning between non-industrial private forest owners in the forest groups, we will mainly focus here on the theory of the non-standard firm. In his approach, Sabel highlights two conditions for open-ended learning: first, the role of practical incentives for promoting the exploration of “disruptive possibilities” (Dorf and Sabel 1998, p. 286) and, second, a set of institutional rules that define the engagement in the cooperative enterprise. First, to establish initial product designs and production methods, firms turn to benchmarking: exacting survey of current or promising products and processes which identifies those products and processes superior to those the company presently uses, yet are within its capacity to emulate and eventually surpass. Benchmarking allows thus a comparative evaluation with possible improvements and as such provides an incentive to disrupt the current routines and representations of possible outcomes. Further incentives for promoting the exploration of disruptive possibilities are simultaneous engineering based on the initial benchmarking and correction of errors revealed by the new action possibilities. Second, beyond these practical incentives, generating collaboration and change in the non-standard firm also depends on an institutional context which defines a set of rules of engagement of the actors in the joint enterprise. These rules require mutual monitoring of each participant’s contribution, information sharing and the mutual assessment of each participant’s reliability in relation to the joint activity.

Based on these two conditions, the practical incentives and the rules of engagement, we can expect increased productive learning in the forest groups to occur when the monitoring process generates (1) a process of joint investigation and comparative evaluation of disruptive possibilities and (2) a process of mutual comparison to verify the reliability of the outcomes proposed by different groups. In the cases where these conditions are realized, one expects a broadening of the set of possible productive action strategies beyond the current routines and representations of the organisation.

The critical element in this process is the change in beliefs and the identification of the specific impact on the management practices in the provision of ecosystems goods and services. Based on the pragmatist model of Sabel, we can distinguish between two different types of successful learning processes: first, incremental learning processes, which have lead to improved outcomes, but remained within the current representation of the problem situation and second, disruptive learning

processes, which have lead to improved outcomes through the recourse to benchmarking and mutual monitoring of action possibilities that go beyond the given representations of the forest group. An example of the first type of learning is the adjustment of the level of direct and indirect subsidies to the forest owners in the framework of the 1990 Forest Decree, but without reconsidering the basic premises of the economic incentive politics. An example of the second type is the disruptive learning within the 1996 pilot project, which lead to the establishment of the first forest group, and which was based on the idea of the need of cooperative learning beyond the economic incentive politics (cf. figure 1).

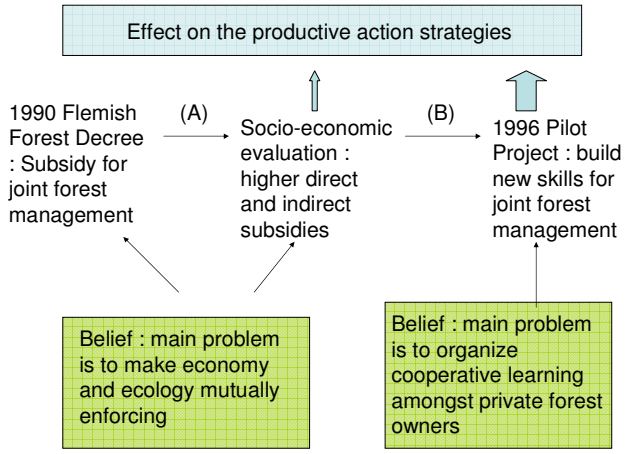

FIGURE 1. Learning within a given belief (A), as in the socio-economic evaluation of the impact of the new forest policy (cf. Verheyen 2006), and learning within a disruptive belief (B), leading to the experimentation with a new institutional device.

Within the BZK forest group, both incremental and disruptive learning was organised in the process of drafting and evaluating the operational targets for the adopted criteria and indicators. The main belief is the same as the 1996 pilot project, which is the need for organizing cooperative learning amongst private forest owners in the so-called participatory hierarchies. Incremental learning within the frame of this belief played a role for instance in the choice of the focus on small owners in the drafting of the joint forest management plans. An experiment was organised in 2006 with the outsourcing of the drafting of the management plan to an independent consultant in the case of larger forest owners (Bosgroep Zuiderkempen 2006). This experiment produced some positive outcomes and further experiments will be organised to improve this possible partnership with independent consultants for dealing with large private forest owners. This adjustment in the focus of the core activities of the forest group on small owners is situated within an attempt to diminish the transaction costs in the organisation of the cooperative learning.

Disruptive learning played an important role in the further development of the implementation of the concept of the forest groups, especially after the adaptation of the Forest Decree in 1999 (personal communication, 2007b). An important new belief that emerged was the idea that the main problem that remained unaddressed was not so much further improvement of the efficiency of the cooperative learning, but the creation of a sense of responsibility of the private forest owners for the common natural heritage through “bringing the owners back to their forests”. From the

perspective of this new belief, the selling of wood for instance should not be part of the core activities of the forest group, but rather be outsourced to a forest cooperative, as it is focused on an economic activity without implications on the change in the attitudes towards the common heritage. The experiment with the outsourcing is still ongoing, as two other forest groups joined in 2007 with BZK in the creation of the first forest cooperative as a distinct organisation for the selling of small forest wood products. On the other hand, this new belief lead to the experimentation with an increased involvement of forest groups in the eradication of invasive species and thinning activities, because these are new occasions to involve the forest owners in the management of their own forest land.

The learning processes in the forest groups have been able to generate both innovation in strategies and diversification of representations within and between the forest groups. Some of these experiments have lead to a change in action strategies and operational targets approved by the general assembly. Other resulted in the rejection of the new proposed action strategies, because they did not lead to improved outcomes. All these changes were not just the result of communication process in the context of existing beliefs, such as in the static approach, but the result of a process of experimentation which aims at broadening the set of workable strategies and objectives considered by the forest group.

3. The institutional dynamics of change in social norms

However, the results of these learning processes have not been uniform over all the components of the multifunctional forestry and, moreover, some of the failures cannot be explained by the absence of the conditions for organizing joint experimentation in the JFM organisations. In particular, important components which impact on the broader user communities of the forest ecosystems services, such as for issues of access to the forests for recreation or for biodiversity, have not lead to significant improvements compared to the situation that prevailed before the creation of the forest groups.

As stated in the introduction, the institutional dynamics, in situations of open-ended learning, not only depend on the opening of new perspective within a certain domain (the cognitive aspect of the mechanism of change), but also depends on the building of social cooperation based on the new beliefs (the social embedding).

The main progress in building new norms of cooperation in the forest groups has been achieved by creating cooperation between the nature associations on the one hand and the forest owners on the other. Indeed, these two groups have traditionally very different positions, the first favouring for instance buy back policies of forest to non-profit organisations or to government, allowing to implement a strict biodiversity protection policy, and the second favouring economic incentives and market mechanisms. A second case where cooperative learning has been built is in the involvement of passive forest owners in the forest group. The main divisions amongst social groups as revealed by sociological analysis amongst forest owners in Flanders is between active exploitation (owners in involved in use and management) / active use (owners involved in use, not in management) / passive ownership (ownership only for investment or from heritage) of the forest (Verheyen *et al.* 2006). The active

exploitant is most concerned by his forest and inclined to participate in the forest management plans; the passive the least.

Amongst these different groups of forest owners, only between 3% and 13 % had initially a positive attitude towards collaborative forest management. This situation corresponds to the one that prevailed between 1990 and 1999, where no Joint Forest Management organisation existed (except for the pilot project). Self-organised forest groupings could already apply for subsidies, but with very low success rates (mainly the environmentalists and the active forest owners). If no social learning would be organised, the JFM would at best represent the active forest exploitant and some public forest owners who own small forests, which would mean a membership rate of around 10 % in the BZK priority areas. Through the creation of the forest groups the average involvement rate is between 17,34 % (in the initial phase) and 41,76 % (after some years) in the selected focus working areas (boscomplexen). The BZK organisation hence was able to involve part of the active users and passive owners in the activities of the joint forest management.

From the point of view of governance theory, the contribution of the new social groups to forest governance can be modelled as a situation where cooperation is build through a combination of instrumental trust, based on reciprocity and enforced by increased transparency and means of verification, and social trust, based on symbols (languages, rituals, gestures, etc.) and enforced by creating respect and esteem (Tyler 1998). To build trust with the government and amongst the forest owners, the forest groups have focused both on instrumental and social trust, the former by enhancing verification of reciprocity through the C&I process, and the latter by enforcing the social identities of the forest owners, through generating respect for the owners' ideas and interests and bringing owners back to their forest and stimulating a sense of forest stewardship (Bosgroepen 2005).

The main characteristic of the methodology used in the JFM organisation for rebuilding trust is that all the actors are considered and treated from the perspective of forest owners and forest managers. Indeed, that is the common thread in the way in which nature associations and private owners are brought together or the way cooperation is build between active forest owners and recreationists. However, in these activities, no new action identity is built by the different owners around the concept of multifunctional management. Instead, the old identities are simply reproduced within the new framework. Hence, the limit of this methodology for building social trust is that it is incapable to point to the need of a more profound transformation of the identity of the forest groups, in relation to the remaining challenges for addressing the issues raised by the users of the forest related ecosystems services and the building of cooperation with the local communities.

However, within the forest groups, there is also a second approach, which takes into account the limits of this first approach and attempts to address the challenge of broadening cooperative learning wit the users as a "third party", without subordinating this cooperation to the current identity of the forest groups understood as representing forest managers. Indications for such a second approach are clearly present in initiatives such as the experiment with the access negotiations in the Bosgroep Zuiderkempen and the integration of the complaints of the local population in the working of the forest groups (Bosgroepen Zuiderkempen 2006). This is also

reflected in some position statements by the forest groups, on the cultural and social values of the forests, the concern frequently expressed about the remaining gap between the interests of the nature associations on the one hand and the inhabitants and the forest owners on the other (Bosgroep Zuiderkempen 2006 p. 6; Bosgroepen 2005, section 2.2.1.). For example, the report on the mission of the forest groups state: "the forest manager, in the use and management of his forest, has to consider the social and cultural interests of the inhabitants and the broader region. This implies the recognition of his social responsibility". Moreover, in the forest group BZK, systematic inquiries are held into the needs for access agreements, recreation in private forests and adjustment to social and cultural values of the forest (Bosgroep Zuiderkempen 2006, p. 28). Hence, instead of the reproduction of the old social identities, within the context of a new cognitive frame, as is the case in the first approach, this second reading allows to identify a more profound transformation that is going on in the same time, which is a more fundamental transformation of the identity of the forest group as the basis of the cooperative orientation that conditions further productive learning.

By addressing the reconstruction of the collective identity of the forest groups through experimenting with the association of the forest user groups to its activities, the initiative of BZK is able to address the failure of the static approach to institutional design to take into account the interaction with the changes in the social domain. The BZK has been one of the few forest groups to explicitly design experiments for developing new methodologies beyond the issues identified by the main forest owner groups. Due to the success of this limited experiment, BZK plans to launching a second experiment, in the period 2007-2012, for developing a methodology addressing the problem of enriching the structure of the forest landscape (Perrings and Touza-Montero 2004; Van Gossum et al. 2005), which has also shown to lead to defensive reactions both of the forest owners and the inhabitants (personal communication 2007a).

4. The role of the forest group coordinator and the members' behaviour in the process of change

The hypothesis of this paper is that joint forest management can address some of the collective action problems that are encountered in the management of forest complexes with multiple small owners. The two key type of incentive problems that we discussed in this paper are the coordination over the provision of ecosystem services and the cooperation between owners and intermediaries in the building of a market for small-scale forestry. The different explanations of the positive role of the forest groups in addressing these problems point to a differentiated role of the forest group coordinator and the member's behaviour in the process of transition towards sustainable forest management. In this brief discussion section, we use our analysis of the governance mechanisms to evaluate the role of these two players in the process of change.

In our analysis we contrasted three different models of the role of the forest group. We distinguished between the role of the forest group in diminishing the transaction costs for gathering information and implementing economic incentive policies (section 1); generating change in beliefs (section 2) and generating change in social norms (section 3). In the first model, the role of the forest coordinator can be understood as

an external monitor of the team work, as developed in several game theoretic approaches of free riding in teams (Alchian & Demsetz 1972; Holmstrom 1982). Indeed, the operation of the forest groups is characterized by organizing joint information processing between the owners and the forest administration on the one hand and amongst the forest owners on the other. The role of the forest group coordinator is to organize these joint processes in an efficient way, especially through his contribution to the drafting of the joint forest management plans and the coordination of the wood selling activities. In this first model, the role of the participants in the forest group is restricted to their contribution of information to the management and coordination process.

Some aspects of the transaction cost model are clearly relevant for the understanding of the functioning of the forest group, when it is considered as a well established organisation that reveals, and coordinates amongst, existing interests and beliefs of the forest owners in regards to the different non monetary values of the forest landscapes. However, it is insufficient for understanding the actual process of transition to sustainable forestry where interest, beliefs and possible action outcomes are not yet well established. It is in these complementary processes of change in beliefs and norms that the active role of the forest group members is a key issue.

First of all, in the process of change in beliefs, the members of the forest group play an important role, both through their political representation in the general assembly of the JFM organisation and through their participation to different activities of the forest group. First, through their representation in the JFM, they have an impact on the process of experimentation with new beliefs, so that the experimentation with new action strategies can go beyond the ideas promoted by the forest group coordinator and the forest administration. Important initiatives, such as the experiment with drafting forest management plans for larger forest owners by the forest group, are clearly driven by the participants in the forest group. Second, through their participation to the organisation of demonstration and information activities in the forest, they can show to other forest owners the feasibility of certain management practices, such as combating invasive species or protection of forest boarders, and raise awareness for the cultural functions of the forest.

The members also play a key role in the process of change in social and normative motivations. First, the different activities organized in the forests increase the opportunity for face to face communication amongst different categories of forest owners and between the forest owners and forest user groups. The former has played a role for example in building trust between forest owners and nature groups managing adjacent nature reserve. As we have seen, this has lead to the formulation of a common social identity as forest managers and stewards of different forest related values. However, the participants' behaviour also played a role in some important blocking of the process of change, because of their lack of motivation to go beyond this new role and address other social values such as the recreational use of the forest and forest species diversity.

Because of this important role of the participants in the process of change in beliefs and norms, the role of the forest coordinator also has to go beyond his role as a monitor of team work. Our analysis has shown two other important roles of the forest

group coordinator: his role as a political entrepreneur, who organizes a process of experimentation with new beliefs, and his role as a trusted intermediary.

First, political entrepreneurship has been at the heart of the JFM organisations from the very beginning. The 1994 pilot project received early recognition as an instance where new ways of dealing with forest management could be experimented. The main contribution of this political entrepreneurship of the first forest group coordinator was to show the feasibility of combining economic and environmental objectives, by organizing collective selling of the wood that was generated by the management activities. Hence he has played a key role in initiating strategies for building a market in small-scale forest products, which went well beyond the original intent of the 1990 Forest Decree on multifunctional forestry and which did not exist before the operation of the forest groups. The new 1999 forest law was mainly inspired by the lessons that were learned from this project. This sequence of experimentation and change in the policy framework has been re-iterated in the subsequent development of the forest groups.

Second, our analysis also indicates a role of the forest coordinator as trusted intermediary in building renewed confidence of forest owner in the government's forest policy. An important question in this context is to further analyse the role of the forest coordinator in building trust by enhancing the social status of the forest owners, through the discourse on stewardship that has been used as a key concept by the coordinators (Bosgroepen 2005), and through addressing the forest owners as equal partners in the learning process. Indeed, throughout the process of change, a clear division of tasks was established: the control function of compliance with government regulation remained with the executive bodies such as the forest administration, the forest rangers and the local authorities, while the social learning was the task of the JFM management institution.

5. Possible governance frameworks

The case of joint forest management organisation is an important example of the recourse to decentralized networks in environmental governance. These networks can be characterized by an attempt to take into account the increasing importance of NGOs, the private sector, scientific networks and international institutions in the performance of various functions of governance (Haas 2004; Ostrom 2001; Reinicke and Deng 2000; Hajer and Wagenaar 2003). The aim of network governance is to create a synergy between different competences and sources of knowledge in order to deal with complex and interlinked problems. In this perspective, governance is accomplished through decentralized networks of private and public collective actors associated to international, national and regional institutions.

Recent reforms in environmental governance worldwide show some important efforts which recognize the need for devolution of decision making to new actor networks and a correlative need for a new role of the state authorities in their support to processes of social learning and building of adaptive competences, beyond their traditional role of regulation of network externalities. This approach seems especially appropriate in cases of local environmental goods, with local and global impacts, but with low direct global ecological interdependencies. In those cases the mobilisation of new types of non-state collective actors in different functions of governance has

proven to be a necessary complement to the state's regulation and economic incentive politics.

As we have seen, the involvement of new collective actors in the performance of functions of governance and the new role of the state in the facilitation of the network dynamics also plays an important role in the governance of small-scale forestry in fragmented forest landscapes. Indeed the provision of ecosystem services and the organisation of the wood selling in the fragmented forest landscape require coordinating amongst both state and non-state collective actors and private forest owners. However, the boundaries of many local or regional and/or national political entities institutions do not always match the boundaries of the environmental problems in the ecological landscapes. That's why in some cases, new collective entities with specific decision making power have been created for addressing the collective action problems.

In the field of natural resource management in human dominated ecological landscapes, such as the forest landscapes, two forms of network governance have emerged. The first is based on the creation of new collective entities and the second on the coordination between existing constituencies and collective actors. In order to situate the case of JFM in the broader discussion on new modes of governance, we briefly give some salient examples of each of these forms.

The new regional natural resource management approach in Australia is a clear example of the first approach and shows some important similarities with the case of JFM in Flanders. In this ambitious new governance experiment that is taking place, fifty six regional natural resource management bodies have been created (Gunningham 2008). These bodies generally comprise a mix of community, rural and other stakeholders and have formal office holders and responsibility for undertaking consultation, planning and priority setting. In the approach, provision is made to enable each region to develop their own regional plan and regional investment strategy for addressing management challenges within parameters set nationally. These activities are coupled with monitoring, evaluation and oversight by the regional bodies themselves and by State lead steering committees. Crucially, these bodies are aware that should they depart substantially from the parameters laid down by the Federal Government, they risk losing their funding, dissolution and replacement by a new entity. A more far reaching from of network governance can be found in cases where the history of state intervention is less prominent. A clear-cut example is the case of Ground Water Management in Los Angeles Metropolitan Area (Ostrom 2008). Here a water association composed of cities, industrial users and farmers was able to gradually build a local public economy around the allocation and management of groundwater rights. In a similar way as the cases of new environmental governance, this process also received some support from the government to facilitate the interaction amongst the different water producers, here through the appointment of a watermaster which played an important role in making reliable information available, and also lead to the establishment of new regional entity, the Water Replenishment District. However, an important difference with the Australian case and the case of Forest management in Flanders lies in the compliance measures. While in the latter cases these are subject to performance indicators, such as the criteria and indicators, and other controls imposed by the State, in the case of the water association,

compliance measures have been established in a decentralized manner in a process which involves both public sector, private-for-profit and civil society organisations.

A second set of cases focuses on the coordination and cooperation between existing constituencies, without delegating new decision making powers on resource management to regional collective entities. An interesting case in the field of small-scale forestry, which combines a lot of features of this second form of network governance, is the case of the New Forest in South England (Rydin and Falleth 2006). New Forest comprises a landscape of 37.500 ha, with a mixture of forest land and heath land surrounded by large urban areas. Traditional users of the heat land, the so-called commoners with grazing rights for about 5000-6000 animals, are represented in an existing collective entity (the Court of Verderers), while the timber interests and the conservation interests are represented by government agencies and nature associations respectively. Two networks for establishing collective action in this area have been created, the first a consultative panel, with 70 member organisations, including town and parish councils, NGOs, government agencies and local interest groups, and the second a more formal committee, the New Forest Committee, with nine members organisations, all of which have an already existing statutory role in the management of New Forest. It is composed of the commoners' organisation (the Court of Verderers), four local authorities who have authority over one part of the ecological region and four government agencies involved in the New Forest. The consultative panel has performed a useful function in raising issues for further attention, such as the declining economic viability of the grazing in the heath land and the conflict between landscape conservation by the commoners and timber and tourism interests. However, it is the New Forest Committee that was the key network for promoting collective action. It was created in 1990 with central government support and has been able to establish concrete projects based in partnerships between the different actors, such as the development of a Forest Friendly Farming Accreditation Scheme funded under a European project, and to draft a New Forest Strategy published in 2003 based on intensive public consultation.

These brief examples are of course only illustrations amongst many and show the wide variety of potential forms of network governance in the field of management of human dominated ecological landscapes. However, they all point to the importance of the networks in creating normative and cognitive change and the new role of the government in facilitating the network dynamics. A crucial issue is to develop more empirical research, which would allow specifying the conditions under which different forms of network governance may succeed in accomplishing these functions and whether such conditions can be affirmatively created.

6. Conclusion

In this paper, we analyzed the contribution of dynamic institutional efficiency to enhancing the overall resilience in the particular case of the governance of fragmented forest landscapes. Through the analysis of the specific case of joint forest management organisation in Flanders, we attempted to evaluate the contribution of dynamic efficiency to the provision of forest related ecoservices and to the enhancement of the resilience of the coupled social-ecological system.

We have shown the role played by three different institutional models, which are the command and control regulation, the participatory hierarchies and learning by mutual monitoring. As shown by our analysis, the combination of joint information processing in participatory hierarchies and open-ended experimentation through learning by monitoring has allowed to move beyond the insufficiencies of the command and control policy of the first phase of the implementation of the 1990 Flemish forest decree. In particular, the use of a legally defined set of criteria and indicators as a flexible and open-ended monitoring device has shown to be an effective mechanism for generating continuous improvement.

Second, from the point of view of the contribution to the provision of global and local ecosystems services, we evaluated the contribution of dynamic efficiency to the adaptation of the forest management practices. We have shown that open-ended and disruptive learning allowed to integrate important non-market values such as the landscape diversity, mainly spatial externalities (through the joint forest management plans) and species diversity (through the combating of invasive species), in the forest management practices. However, the adaptation to new social demands such as recreation in private forests remains a difficult issue in the highly urbanized forest landscapes in Flanders.

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