Cluster organization in forestry: Supporting information and knowledge transfer in the practice, science and policy of sustainable forest management

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Abstract

Although one major function of forest policy is supporting sustainable forest management (SFM) research, implementation and evaluation, the capacity of traditional forest policy systems for integrating and optimizing all aspects of SFM seems to be limited. In addition to the different value systems and often competing interests of forestry stakeholders, limited or ineffective communication and cooperation between practitioners, scientists and politicians makes it difficult to identify and solve key problems.

Cluster organization in forestry - the integrated view of all branches of forest and wood-processing industries - can support information and knowledge transfer across practice, science and policy. Cluster analysis can provide relevant information on important socio-economic and political aspects of SFM at different levels. Cluster management allows the effective and target-oriented transfer of information among all stakeholders in a participatory and reciprocal way, providing valuable input in the policy process. Through this transfer, scientists and practitioners can provide policy makers with the information they need to support SFM in a meaningful way.

Results from an extensive study of the forest and wood-processing industries cluster in the State of North-Rhine/Westphalia, Germany are used to demonstrate the application of the cluster concept and consequent improvements in science and policy interaction in the field of forestry.

Keywords

Forest and wood-processing industry clusters, cluster concept in forestry, information and knowledge transfer, case study, State level

1 Introduction

One major function of forest policy is supporting sustainable forest management (SFM) research, implementation and evaluation (Krott 2001). The current definition of SFM is highly complex, and traditional forest policy systems seem limited in their capacity for integrating and optimizing all aspects of SFM seems limited. The different and often competing dimensions of SFM mean that stakeholders in the forest policy arena apply different value systems and often have competing interests (ibid.). The forest policy system can solve these land use disputes to only a limited extent, particularly when constrained by decreasing Government resources. The transfer of relevant information and knowledge from science and industry to policy makers therefore deserves more consideration as a field of research. The complex nature of international SFM standards and the dynamics of global markets for wood products require fast and efficient information and knowledge transfer. However, the policy priorities of more traditional forestry administrations may not necessarily reflect either the actual needs of forest stakeholders or the most recent scientific outcomes. Both ineffective
communication and limited cooperation between practitioners, scientists and politicians are major shortcomings under such policy and management conditions. These information and knowledge transfer deficiencies also make it difficult to identify and solve key policy problems, such as appropriate assessment and effective communication of the socio-economic importance of forestry.

This paper introduces cluster organization - the integrated view of all branches of forest and wood-processing industries - as a suitable approach for improving communication and cooperation among the various stakeholders in forestry and supporting information and knowledge transfer across practice, science and policy in the field of SFM. The potential of the concept is illustrated with results from an ongoing case study of the forest and wood-processing industries cluster of the State of North-Rhine/Westphalia in Germany.

2 Method

2.1 Methods

The general scientific background for the concept of forest and wood-processing industry clusters was formulated primarily by Porter (1998) in the context of general economics. Although extensive literature is available for various industry branches (Armstrong & Taylor 2000; Brenner 2002; Maier & Tödtling 2002; Scherer & Bieger 2003; Schiele 2003; Sölvell et al. 2003), the general scientific background for cluster organization in forestry is very limited.

A relatively broad definition of the forest and wood-processing industry cluster was developed for the European Union (EU) by the European Commission (Kommission der Europäischen Gemeinschaften 1999; Bundesrat 2001). The concept of forest and wood-processing industry clusters has seen further development in recent years, and a modified and extended cluster definition integrates all industry branches relevant to the field of forestry.

The method of cluster analysis allows cluster structures to be identified at different spatial scales. It includes data collection, analysis and assessment concerning all relevant aspects of forest resources, forest management and the utilization of timber and non-timber products. Cluster management can contribute to the sustainable development of forestry-based regions by supporting the optimization of economic performance within a cluster (Schulte 2003a,b; Mrosek & Schulte 2004; Mrosek et al., 2005; Schulte & Mrosek, under review). To improve information and knowledge transfer within the cluster, a transfer concept was developed and tested within both cluster analysis and management. The transfer concept was based on methods of general communication science (e.g. stakeholder participation, public relations, marketing), but also supported by methods specific to the general cluster concept, including corporate networking and cooperation (Howaldt et al., 2001; Stahl & Schreiber, 2004).

The NRW forest and wood-processing industries cluster case study used to illustrate the potential of the concept is currently the only example of a large scale cluster analysis in forestry within Germany (although other studies at different spatial levels are in progress) (Mrosek et al., 2005). This study, which took place from November 2001 to January 2003, applied the modified and extended EU definition of the forest and wood-processing industries cluster and cluster analysis and management methods (Schulte 2003a,b; Schulte & Mrosek, under review). Data collection involved specific business surveys, expert interviews, and general statistics from Government institutions and industry associations.

2.2 Case study area

North-Rhine/Westphalia (Nordrhein-Westfalen (NRW)) is one of 16 States (Länder) in the Federal Republic of Germany. Located in the western central part of Germany, it borders the Netherlands and Belgium and covers an area of 34,082 km². With about 18 million citizens, NRW is the most heavily populated state in Germany. Accounting for 22% of the German Gross Domestic Product (466.9 billion EUR in 2004), NRW is also a region of major
economic importance within Germany and the EU (Landesamt für Datenverarbeitung und Statistik NRW 2003).

Forest land (915,800 ha) covers 27% of the total land area in NRW. 52.7% of the forest consists of deciduous stand types and corresponding tree species; the remaining 47.3% are coniferous stand types and tree species. Forest land ownership is dominated by private forest owners (64%), followed by Municipal (20%), State (13%) and Federal (3%) forest ownership, respectively. Concerning forest productivity, the merchantable timber volume (under bark) is 221 m$^3$/ha on average and 194.4 million m$^3$ in total. The current total annual timber harvest is 3.9 million m$^3$.

NRW is characterized by a high concentration of wood-processing industries across both primary and secondary levels, and all types of wood processing. The concentration of the wood furniture industry in NRW is of nationwide and international relevance.

3 Results

3.1 Conceptual framework for forest and wood-processing industry clusters

The concept of forest and wood-processing industry clusters includes the identification of all industry branches and associated individual companies, as well as related institutions. Within the cluster, these companies and institutions should be linked to each other by a close relationship to forest resources, spatial clustering and high connectivity to each other (Mrosek & Schulte, 2004; Mrosek et al., 2005). Figure 1 shows the main branches of the forest and wood-processing industries cluster in NRW.

The overall goal of the cluster concept is to generally support all industry branches, their individual companies and related institutions. The main objective is to optimize production and value-addition processes both within and between industry branches. A secondary objective is to support forestry stakeholders in developing an improved self-image for their industries and facilitate more effective communications with policy makers, media and the general public.

The two main components of the cluster concept are cluster analysis and cluster management. Cluster analysis can provide relevant information on important socio-economic and political aspects of SFM at different spatial scales, from local to international levels. Although the strategies and tools for cluster management can be diverse (e.g. corporate networking to improve communication and cooperation, coordinated marketing and public relations campaigns, mobilizing political support including the provision of funding), this paper focuses on information and knowledge transfer. Information transfer within the cluster should be participatory and reciprocal to support an effective and target-oriented transfer of information among stakeholders and provide valuable input in the policy process. More specifically, scientists and practitioners can provide the information that policy makers require to support SFM in a meaningful way.

Figure 2 shows the transfer concept of the forest and wood-processing industry cluster. The cluster-based transfer platform for communication and cooperation (e.g. in the form of networks or forums) provides the basis for input into the cluster analysis (e.g. through stakeholder panels or expert interviews). In this way, cluster related information and knowledge (concerning the socio-economic importance of forestry) is created. This information then provides the basis for cluster management, which can take the form of recommendations to industry and policy decision-makers, public relation activities or environmental education efforts. Once the transfer platform is established and the relevant information becomes available, increased communication and stakeholder cooperation can take place. In a reciprocal process of information and knowledge transfer, the stakeholders of the cluster serve a dual role as target and dialogue groups at the same time.
3.2 Case study of the NRW forest and wood-processing industry cluster

The suitability of the forest and wood-processing industry clusters concept is further demonstrated by the NRW case study results (Schulte 2003a,b; Schulte & Mrosek, under review).

Definition of the forest and wood-processing industry cluster of NRW

Applying the EU cluster definition, the forest and wood-processing industry cluster of NRW is comprised of four main categories, which are summarized in Table 1.

Socio-economic profile of the NRW forest and wood-processing industry cluster

With 260,000 employees (~ 4.5% of total employment in NRW) and an annual revenue of ~ 35 billion EUR (Ministerium für Umwelt und Naturschutz, Landwirtschaft und Verbraucherschutz des Landes Nordrhein-Westfalen 2003b; Schulte 2003a,b), the cluster is highly significant for the regional economy and employment market. These numbers become even more significant when compared to important industry branches traditionally associated with the highly industrialized region of NRW. The forest and wood-processing industry cluster outpaces employment by selected industry branches such as finances and insurance (225,000 employees), electronics (195,000 employees) and chemicals (132,000 employees). In terms of annual revenue, the forest and wood-processing industry cluster creates revenue...
comparable to the traditionally important mechanical engineering industry (35 billion EUR). It even has a dominant position relative to other important high technology branches such as the car manufacturing industry (29 billion EUR) and the metalworking industry (28 billion EUR).

Table 1 Primary categories in the forest and wood-processing cluster of NRW (modified from Schulte 2003a,b; Schulte & Mrosek, under review).

<table>
<thead>
<tr>
<th>Cluster Category</th>
<th>Industry Branches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry</td>
<td>Forestry companies and forestry consultants</td>
</tr>
<tr>
<td>Wood-processing industry (primary wood processing)</td>
<td>Sawmill, veneer, wood-based panel, and other roundwood processing industries</td>
</tr>
<tr>
<td>Wood manufacturing (secondary wood processing)</td>
<td>Furniture, woodcraft, wood construction, wood-based packaging, and other specialized wood processing industries</td>
</tr>
<tr>
<td>Other wood-based industries</td>
<td>Pulp and paper, printing and publishing, fuel wood; also, timber trade and ancillary wood product industries (not considered in this study)</td>
</tr>
</tbody>
</table>

Figure 2 The transfer concept of the forest and wood-processing industry cluster in NRW.

Table 1 Primary categories in the forest and wood-processing cluster of NRW (modified from Schulte 2003a,b; Schulte & Mrosek, under review).

**Improved information and knowledge transfer within the forest and wood-processing industry cluster of NRW**

In NRW, the general public has traditionally failed to recognize the significant role of the forest and wood-processing industry. In terms of marketing and interaction with policy makers, even members and representatives of the forestry and wood-processing industry
cluster underestimated the importance of their own profession and did not present their cluster effectively. Consequently, the forest and the wood-processing industry were not represented to their best advantage in the policy process and received only limited political support. Based on the new information available from the cluster analysis and cluster management efforts, the stakeholders reviewed their own position in the State economy and started to develop a more appropriate self-image. When this new information was presented within focused and multi-media based public relation strategies, the forest and wood-processing industry cluster of NRW received high level media - and policy - attention. For example, the results of the research project were presented in the form of several hundred newspaper articles, several radio broadcasting and a few television shows, as well as through numerous personal presentations at conferences and special events. As an outcome of these research results and the recommendations made to decision-makers in policy, industry and society, selected industry branches and regions of great importance to forestry received political support. Follow-up initiatives were also initiated and additional research activities were launched. For example, based on the positive experiences at the State level, two cluster studies for Municipalities within NRW (the Municipality of Steinfurt and the City of Arnsberg) are currently underway (Anon. 2005) and regional initiatives are in preparation.

4 Conclusions

The economics literature, experiences from selected international examples in forestry, and the results of the NRW forestry case study presented within this paper all suggest that the forest and wood-processing industry cluster concept is suitable for optimizing self-organization of different industry branches, and improving communication and cooperation among various stakeholders. In addition to developing a more appropriate self-image for the forest and wood-processing industry, it supports more effective and successful communication with policy, media and the general public. From the perspective of cluster analysis and management, the transfer platform for communication and cooperation is key to successful information and knowledge transfer between practice, science and policy in the field of SFM. Therefore, in addition to traditional forest policy approaches, the concept of forest and wood-processing industry clusters can be used to support the implementation of SFM and sustainable development in rural areas.

Reference