

Bosland: Application of the Ecosystem Services Concept in a New Style of Forest Management

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Pieter Vangansbeke is a PhD candidate at Ghent University in collaboration with and funded by the Flemish Institute for Technological Research (VITO). His research focusses on system and process innovation of forest management in Bosland. System innovation is elaborated by introducing the ecosystem services concept in a sustainability analysis of biomass harvesting. The final research goal is to develop an operational framework for forest management supported by multiple stakeholders that simultaneously optimizes biomass harvest and other ecosystem services.



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Kris Verheyen is professor in Forest Ecology and Management at Ghent University. His PhD research focused on the recovery of herb layer vegetation in secondary forest (2002; KU Leuven). In October 2004, he became head of the Forest & Nature Lab. Since then, his research interests developed around the study of the impact of multiple global change drivers on (plant) communities, the research on the importance of biodiversity for ecosystem functioning and applied research aimed at the optimization of ecosystem management for ecosystem service delivery.

BOSLAND

Bosland (literally forestland) is a statutory partnership clustering several forests with a previously fragmented management in Flanders (Belgium). The project covers the area of two municipalities (Hechtel-Eksel and Overpelt) and a town (Lommel) in the northwest part of Limburg Province, all together about 22,000 ha (Figure 41-1). Currently, the project is managed by six partners: the four different owners (the two municipalities, the town, and the Agency for Forest and Nature Management of the Flemish region—Agentschap voor Natuur en Bos, ANB) and two main stakeholders (Regionaal Landschap Lage Kempen (RLLK), a local organization for landscape conservation and Tourisme Limburg (TL), a provincial organization promoting tourism).

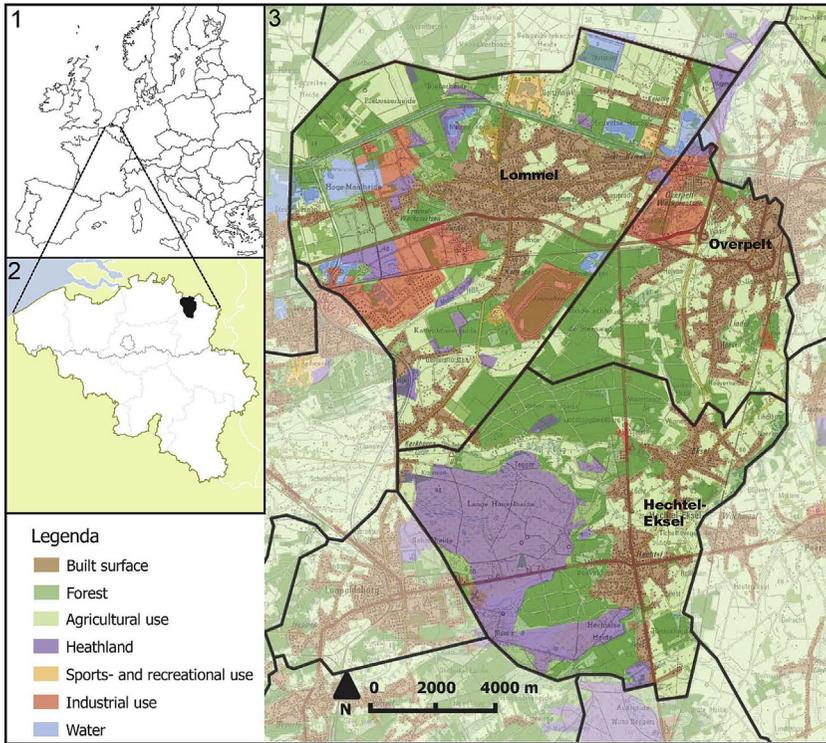


FIGURE 41-1 Situation of the project in Belgium and in Europe (1 and 2) and a land-use map of Bosland (3). The core area of Bosland consists of forests that used to be managed by the different owners and are now managed together.

Bosland lies on the border of the Campine Plateau, and most soils are characteristically sandy and nutrient-poor. Until the middle of the 19th century, Bosland was mainly covered by an extensive heathland. Gradually, afforestation with conifers took place. Approximately 17,000 ha of the Bosland area consists of rural space, containing 10,000 ha of nature and forest area. Public forests cover more than 4500 ha, with Scots pine (*Pinus sylvestris*) and Corsican pine (*Pinus nigra var. corsicana*) as the main tree species [1]. Bosland is an important area for wood production, with an annual harvest of about 25,000m³ wood. Tourism also plays a major role: no less than 1.12 million overnight stays of 279,708 different visitors were booked in the Bosland-area in 2010. Besides its role in biomass production and recreation, Bosland being one of the few large forest areas in a highly urbanized region plays a vital role in maintaining and supporting biodiversity. Different habitats and species that occur in Bosland are rare on a Flemish and even on a European scale. Protected species include European nightjar (*Caprimulgus europaeus*), smooth snake (*Coronella austriaca*), and ladybird spider (*Eresus sandaliatus*). In addition, Bosland provides several other ecosystem services that are not yet quantified and marketed. Typical

examples are regulating services such as climate and local air quality regulation, pollination, and biological control.

A NEW WAY OF FOREST MANAGEMENT

Traditional land-use planning and management strategies are not well-equipped to deal with the systemic nature of the sustainability problems facing society today. In the past decade however, new research and policy fields have emerged that are explicitly based on systems thinking, complexity, and uncertainty in which the intrinsic features of the societal system such as dynamics, interdependence, and actor-networks are taken into account. In this interface between substance (management of ecosystem services) and process (shaping/guiding the transition process; also referred to as transition management), the innovation potential can be harvested fully: by means of shaping a new discourse with a higher ambition level that is co-created by the involved stakeholders to fuel legitimacy, empowerment, and local identity. It is in this light that the Bosland case is an interesting and promising frontrunner in finding new approaches to forest management.

To analyze the Bosland project, we used a learning history-like approach [2, 3]. We executed a literature study on all available policy documents, mainly forest management plans, reports of participatory events, envisioning studies, and the resulting master plan. Based on this material, we reconstructed the development of the project. This history was discussed with several key stakeholders in the project development in semistructured interviews. Both sources of information were finally combined to perform a transition analysis on Bosland. Although the project was not explicitly set up as a transition experiment as such, our analysis identified many typical characteristics of transition experiments as defined in transition literature. Transition experiments typically have a socially broad context, a long-term timeframe and goal, a systemic approach, and a learning process that questions the underlying rules of the regime [4]. Moreover, our analysis showed that the Bosland case differs from the traditional forest management regime in three specific features, as follows.

1. Shifting the incumbent paradigm towards coherence

Bosland reflects a distinctive paradigm shift from management of isolated forest patches by different owners to collaborative, more systemic management across various owners on a landscape scale (management for coherence). The triggering device for this shift was the legislation on extensive forest management plans that stimulated new forms of collaboration to lighten the workload, with a strong focus on co-creation. The traditional top-down approach was abandoned, and the involved parties are now collaborating as equals, resulting in what might be called an interactive democracy [5].

2. Connecting long-term visions to short-term actions

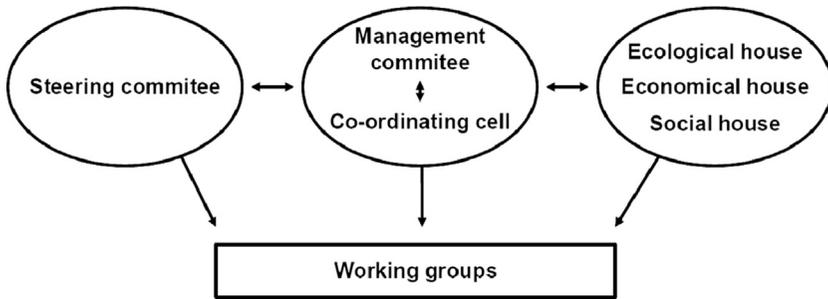


FIGURE 41-2 Management structure of the Bosland project, with the Bosland parliament as a participatory sounding board, on the right.

Bosland started off with the development of an overarching long term vision for the forest land; assembling all forest fragments of the entire region and underpinned by an extensive inventory of both the forest fragments and the accompanying social needs of the involved stakeholders. Because of the evolution of the Bosland project and the entry of two non-profit organizations in the partnership, the long term vision has been updated and widened to a master plan for the whole region. Based on this updated vision, supported by all partners, operational and strategic goals were determined. These strategic goals form the basis of further concrete planning and are elaborated in the master plan. In general, the short-term action agenda is based on the long-term vision.

3. Focusing on participation

The initiators of Bosland recognized that building legitimacy and empowering societal actors is essential in the transition to more sustainable forest management. During the two envisioning processes, several events took place to involve a wide diversity of stakeholders; this involvement was later anchored in “the Bosland parliament,” consisting of three equal “participative houses,” each of them oriented to a specific pillar of sustainable forest management: an ecological, a social, and an economical house (Figure 41-2). This innovative participatory approach allows stakeholders to be more actively involved in forest management.

APPLICATION OF THE ECOSYSTEM SERVICES CONCEPT IN BOSLAND

4. Ecosystem services in the long-term vision

One of the strategic goals for Bosland, written down in the master plan, is the sustainable management of ecosystems to deliver goods and services to society. This explication of the ecosystem services concept in the overarching long-term vision is a first step in implementation. It implies an ambition to maximize the provisioning (wood and biomass provision, but also other forest-related products) and regulating services. A point of particular

interest in the vision is quantification of regulating services and communication of these values in educational infrastructure. The ecosystem services concept will therefore also be used here as a communication tool to increase local support.

Strengthening biodiversity on a species, habitat, and landscape level as a supporting service is a separate strategic goal. This goal is underpinned by an earlier elaboration of a long-term ecological vision for the separate forests and for the total area in relation to the adjacent forest and nature areas. Another separate pillar of the long-term vision for Bosland is recreation as the main cultural service. The project wants to attract local visitors and tourists by developing recreational infrastructure, specific recreational products, and a univocal touristic communication.

5. Striving for equilibrium between ecosystem services in real-life management
Translation of the long-term vision to actual management plans is one of the spearheads of the Bosland project. Forest managers use the long-term vision as a means of giving direction to short- and medium-term action. They develop trajectories leading from the current situation to the desired state (vision) and have set targets along the way to implement these targets in management plans on a shorter term. The management plan of each larger part of Bosland aims for a balanced four-leaf clover of supporting, regulating, provisioning and cultural services.

Applying this multifunctional forest management sometimes leads to tensions between the different stakeholders. To unite, for example, a wood harvest operation with the several forms of recreation (hiking, mountain biking, horseback riding, among others) with the supporting function for biodiversity sometimes seems an impossible mission. However, with a smart prioritization and zonation within the larger Bosland parts, forest managers do succeed in combining services at a landscape level. To track down and to resolve the existing frustrations of certain stakeholders, meetings of the Bosland parliament are organized and stakeholders are brought together in discussion walks whenever a larger management choice is taken. This increases mutual understanding between stakeholders, builds reflective capacity, and increases the appreciation for the different tasks of the forest managers who often operate as mediators.

6. Research on ecosystem services in Bosland

As mentioned earlier in this section, the quantification and valuation of ecosystem services present a fundamental challenge, and so several collaborations with scientific institutes have been set up.

A long-term projection for wood provision has been developed in collaboration with K. U. Leuven. This unique project combines actual data of standing stock with growth data based on a field survey and a soil map to predict future harvest volumes and standing stocks under different management scenarios for the next 60 years. These scenarios were

analyzed with a multicriteria analysis and brought back to a stakeholder group, uniting forest managers and wood purchasers who decided on the final scenario that is currently being used as a basis for the forest management plans [6].

In 2013, the FORBIO-site was set up in the heart of Bosland. On this experimental site of eight ha, the main tree species for wood production of Bosland have been planted in different plots. These plots have four different grades of tree species diversity, varying from monocultures up to four species mixtures. The differences between ecosystem service delivery of monocultures and mixed plots are monitored throughout the stand development [7]. The results can be used in future forest management in and outside Bosland. The FORBIO experiment has two other sites in Belgium and is part of TreeDivNet, the largest biodiversity experiment in the world, which groups similar experiments around the globe.

A rising demand for biomass, mainly for renewable energy production purposes, could lead to higher harvesting rates in Bosland. This could impact other ecosystem services, such as maintenance of soil fertility, carbon sequestration and storage, habitats for species, recreation, and tourism among others. These different ecosystem services are currently quantified, and possible trade-offs and synergies are determined in a study by Ghent University and the Flemish Institute for Technological Research (VITO) [8].

Bosland also hosts top-level biodiversity research. Tracing Nature vzw tags European nightjars with a radio transmitter to determine habitat preferences and social patterns. Use of this device has led to unique insights into conservation of the species and the related habitat. Based on this research, forest managers are already applying measures to increase the habitat of the nightjars [9].

CONCLUSION

To evolve toward ES-based and actor-supported forest management, a new style of forest management needs to be adopted. The Bosland project has introduced several necessary innovations in this respect. A strong focus on (i) coherence on a landscape scale, (ii) long-term envisioning, and (iii) stakeholder participation makes the introduction of the ecosystem services concept in forest management possible. Today the concept is in use on different scales in Bosland: (i) as a leitmotiv to express the long-term vision and as a communication tool to increase local support; (ii) as a target for setting up multifunctional forest management plans; and (iii) as a guideline for the development of targeted research programs. Bosland can thus be considered a frontrunner that is exploring a new style of forest management and new roles: based on co-creation with and co-ownership of stakeholders and a focus on a more systemic, ecosystem services-based approach.

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