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51

Biodiversity conservation in certified forests

EUROPEAN TROPICAL FOREST RESEARCH NETWORK

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tel.: +31 317 48 14 16
e-mail: etfrn@etfrn.org
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Biodiversity conservation in certified forests: an overview

RODERICK J. ZAGT, DOUGLAS SHEIL and FRANCIS E. (JACK) PUTZ

Understanding the impacts of forest certification

The loss and degradation of tropical forest have become issues of popular concern and political debate across the world. Logging was once seen as the root of the problem but over the last three decades that view has altered somewhat. Although the subject of logging remains contentious, and environmental NGOs are divided, there is some acceptance that even though timber production remains a threat to the long-term viability of tropical forest biodiversity, it may also make a positive contribution. The promotion of socially and ecologically sound forest management — through forest certification[1] — has changed the narrative. Certification is now widely advocated as a strategy to conserve the world's forests and the biodiversity they contain. Some consumers will pay a premium for products that promise "biodiversity friendly" forest management and some markets are closing to non-certified forest products.

Approximately 8% of global forest area has been certified under a variety of schemes (FAO 2009). One recent estimate suggests that approximately one quarter of global industrial roundwood now comes from certified forests (FAO 2009). Most of these advances have occurred outside the tropics: less than 2% of forest area in African, Asian and tropical American forests are certified. Most certified forests (82%) are large and managed by the private sector (ITTO 2008). Increasing the extent of certification in the tropics remains a goal for many organizations – including some international conservation NGOs. So far, so good, but many details remain uncertain.

Only a fraction of the rich practical experience with forest certification and its impacts on the conservation of biodiversity is documented publicly.[2] Even less has been published in academic journals. Among practitioners, forest managers, forestry NGOs, auditors, and certifiers there is a great deal of information and wisdom that increase our understanding of certification impacts. This ETFRN News provides a forum for some of those involved in certification, from academia and from the practice, to air their views on the role of

Roderick Zagt works as a programme coordinator at Tropenbos International, the Netherlands. **Douglas Sheil** is director of the Institute of Tropical Forest Conservation of Mbarara University of Science and Technology, Uganda and a research affiliate of CIFOR in Indonesia. **Jack Putz** is a professor at the Department of Biology, University of Florida, USA. They have all worked in ecological aspects of pure and applied research and are jointly motivated by an interest in developing practical science-based solutions for responsible forest management in the tropics.

certification in the conservation of tropical biodiversity. We publicized this newsletter by inviting manuscripts through an open call distributed through ETFRN, various list servers and professional networks. Authors were specifically challenged to address three key issues:

- Is forest certification a good conservation strategy in tropical forest?
- Are certified concessions better off in terms of biodiversity than those that are conventionally managed?
- Do we have the information required to provide a reliable answers to questions about the impacts of certification?

We asked authors to be as concrete and specific as possible in identifying challenges and solutions and to write for a general audience. In subsequent revisions we often challenged them to clarify or justify their statements, and suggested ways that arguments might be strengthened or focused, but we never vetoed any views that addressed the theme of the newsletter – thus the views embodied by these articles are those of the various authors, not the editors. Providing an outlet for this diversity of views was one of our goals.

The focus of this newsletter is the conservation of biodiversity associated with natural forests in the tropics. We primarily discuss the biodiversity impacts of improved management within certified forests. We did not limit contributors to experiences related to a single certification scheme or even forest management certification. We recognize the importance of other aspects of certification, including those related to working conditions, communities, indigenous people, and markets, but we address biodiversity as one of the principal rationales for certification.

We also developed an on-line survey to supplement the information brought together in the articles and to collect views about the topic. We publicized the survey through ETFRN, International Union for the Conservation of Nature, Food and Agriculture Organization, International Union of Forest Research Organizations and via colleagues and invited a wide range of professionals to respond. Some summary details are provided in Box 1 and Appendix 1.

Contributed articles

More than 15 years have passed since the first forest certificate was issued in tropical high forests; it should now be possible to evaluate the impacts of certification on biodiversity. Regulators and representatives of philanthropic groups, NGOs, and development agencies — which have contributed so much to improve forest management — also want to know whether certification is working for biodiversity. They are supported by more than three-quarters of the respondents (88%), who thought that greater emphasis on documenting the biodiversity benefits of certification was important or very important. The topic is the rationale of this issue of ETFRN News. It brings together 33 articles that discuss this topic from various perspectives.

Box 1. Response to the on-line survey

A total of 127 individuals contributed to the on-line survey (Appendix 1). Researchers constituted the largest group of respondents (40%); the other main groups were representatives of environmental organizations (18%), government employees (8%), forest managers, auditors/accreditors and consultants (4% each). More than a third of the respondents (39%) had direct experience with certification, either with large-scale operations (31%) or community forestry (20%; 12% with both). Strikingly, more than half of the respondents stated that they supported certification and another third were open-minded about it. Only 9% considered themselves sceptics.

All respondents recognized that forests managed for timber are not equivalent to undisturbed forest in terms of biodiversity, but there was some disagreement on the nature of the difference. While a majority (60%) thought that the biodiversity losses in certified forests were insignificant or acceptable, 40% thought them too high (17% considered these losses unavoidable while 23% judged them avoidable). Responses also varied concerning what certification should achieve in terms of biodiversity conservation. Nearly a third (30%) judged that certification should aim at conserving virtually all species at pre-harvesting levels of abundance, suggesting that logging should change nothing in the forest.[3] A significant number of respondents thought that forest management should focus on certain key species, instead of all species (also 30%) or ecological processes and functions (16%).

Certification standards

In evaluating the effects of management activities on biodiversity, it is important to first clarify how biodiversity is defined in practice and who decides what the focus should be. Karmann et al. (1.1) start by outlining how the Forest Stewardship Council (FSC) is structured, how standards for good management are developed and revised, and how the system is designed to facilitate improvement at local, national and global levels. They also review some of the biodiversity benefits of certification. As the FSC principles and the high conservation value (HCV) approach are central to a number of the contributions they are provided in appendices 2 and 3.

Lammerts van Bueren (1.2) argues that, despite a number of failings, the prevailing forest certification systems contribute to biodiversity conservation in various relatively obvious ways. He is concerned about the proliferation of certification schemes and associated standards that have sprung up for carbon storage and other services and emphasizes the need for clarity and consistency to ensure that biodiversity conservation requirements are not diluted.

The point of whose biodiversity concerns are addressed is the topic of Wiersum and Shrestha (1.3), who discuss how local values should be reflected in biodiversity criteria and indicators under forest certification schemes. Using examples from Nepal, they underline

the links between biodiversity and cultural diversity and emphasize the need to recognize both. The extent to which local preferences and values should be reflected in certification criteria and indicators remains contentious (see also Ball 3.4). Bleaney (3.3) and Armstrong (2.4) warn that unrealistically formulated and ambitious standards undermine auditing and, eventually, even interest in certification.

Monitoring: challenges and options

Respondents to our survey highlighted many practical problems with monitoring biodiversity in forests; contributions to section 2 consider some of these challenges. Gardner (2.1) describes the development of monitoring processes, starting with the why and what of effective monitoring. He stresses that monitoring should be viewed as the continually updated source of the information needed for effective management and sketches a few of the principles that can guide such a process. Mekembom (2.2) provides examples of the need for and uses of monitoring information in certified concessions in Cameroon and in concessions in the process of certification. Fry (2.3) compares monitoring by local and external experts on the basis of accuracy, costs, sustainability and cultural relevance. He cites numerous advantages of locally based or participatory monitoring, especially if procedures are developed in a participatory way and are culturally appropriate. De longh and Persoon (2.5) also advocate the various benefits of local monitoring; they believe that these approaches need to be more widely promoted and should eventually replace conventional methods. Armstrong's (2.4) contribution addresses how the certification system itself is subject to monitoring via audit; he seeks to demystify the process and identifies where the weaknesses lie. While he accepts the value of local involvement he strongly advocates the need to include those with auditing experience to ensure that systems remain sound and workable. Vantomme (2.6) suggests using certification of non-timber forest products (NTFPs) as a proxy for biodiversity monitoring. Interestingly, certification of NTFPs usually requires that populations of the species providing the product be sustained (e.g., Newton 2008), whereas current timber certification is focused on the more general goal of sustaining forest structures and functions (for more on NTFP certification, see Shanley et al. 2002).

Practical experiences and lessons from the field

The third section highlights practical certification experiences on industrial concessions and community forests, with examples from the Congo Basin, Borneo, Tanzania and the Peruvian Amazon. All of the examples report qualified successes, including controls on hunting in the Republic of Congo (Poulsen and Clark 3.1; also addressed by Christophersen, Belair and Nasi. 6.2), and processes to improve forest management in Cameroon (Wanders 3.2). Bleaney (3.3) identifies commitment among forest managers, institutionalization of good practices within forest management processes, and the involvement of local communities as key criteria for making certification work for conservation. Ball (3.4) and Rodríguez and Cubas (3.5) debate the extent to which local and traditional communities in Tanzania and Peru manage their forests responsibly. In both cases, community certification was clearly a long and drawn-out process – not because of concerns about management and impacts on biodiversity, but due to the requirements imposed on communities by the certification process itself.

The next three articles highlight challenges in two countries with disproportionate shares of forest-based biodiversity: Brazil and Indonesia. Schulze et al. (3.6) point out, based on their experiences in Amazonian Brazil, how a lack of auditor training (a concern also raised by Bleaney 3.3) and rapid turnover in auditors result in incomplete and inconsistent application of biodiversity indicators. They call for a simple standard that creates incentives for implementing best practices (such as reduced-impact logging, or RIL) known to have relatively large biodiversity and forest management benefits instead of complex standards that cover every conceivable impact of forest management. They also emphasize the need to sustainably manage individual timber species, a topic that seems to have been overlooked as the concept of sustainable forest management has been revised and politicized. Van Assen (3.7) questions the impact of certification on biodiversity conservation in Indonesia. He contrasts the two leading forest certification initiatives, the SmartWood Programme of the Rainforest Alliance (which audits principally for FSC) and the Sustainable Natural Production Forest Management (SNPFM) scheme of the Indonesian Ecolabel Institute (LEI). He sees a lack of information and transparency, as well as institutional entanglements within the certification movement, as major contributors to the lack of success of certification in Indonesia. Setyawati (3.8), also writing about Indonesia, is somewhat pessimistic about what certification can do in the absence of effective biodiversity conservation policies outside strictly protected areas. She also notes the growing pressure on forests whose customary ownership is not officially recognized.

Biodiversity benefits of certification

Articles in section 4 consider the benefits of certification for biodiversity conservation, the available evidence and the need for evaluation and documentation. Cashore and Vandenberg (4.6) announce a new initiative to respond to the increasing pressure for rigorous independent testing of the assumptions and impacts of certification. Ahead of this initiative, the articles in this section generally demonstrate research-supported evidence of certification's conservation benefits.

In an indirect approach to measuring forest management unit (FMU) performance in the area of biodiversity conservation, Peña-Claros and Bongers (4.5) followed corrective action requests (CARs). They were able to demonstrate that the number of issues related to biodiversity decreased from the first to the second main evaluation, suggesting that FMUs were able to address the initial problems identified in their management of biodiversity.

Price (4.1) describes the experiences of The Nature Conservancy (TNC) in natural forest management in Bolivia and plantation management in Brazil's Atlantic Forest Region. The latter case showed one clear biodiversity benefit: certified plantation operations conserved substantially more fragments of natural forest than is typical in the region. In a certified forest concession in Amazonian Peru, Brotto et al. (4.2) report that quantitative faunal surveys that commenced prior to certification revealed substantial benefits and served to build in-house monitoring capacity.

One challenge in assessing the biodiversity impacts of certified forest management in a rigorous comparative manner is selecting the appropriate baseline (van Kuijk, Putz and Zagt 2009). In an overview of the effects of certified forest management on populations of great apes, van Kreveld and Roerhorst (4.3) chose logged but uncertified forests for comparison and reported substantial benefits from certified forests. In regions where "to log or not to log" is not the question (i.e., establishment of strictly protected areas is not a viable option), their vision of biodiversity conservation through landscape mosaics of certified logging areas and strict protected areas is eminently practical.

High Conservation Value Forests and plantations

Section 5 includes two articles on High Conservation Value Forests (HCVFs) and two on plantations; three of the four articles address spatial aspects of biodiversity conservation. HCVFs have emerged as a way to define and delineate areas requiring special management attention due to their high conservation values (Appendix 3), while responsible plantation management requires the definition and management of areas of remnant natural forest. In his paper on HCVFs, Stewart (5.1) concentrates on the continuing evolution and clarification of the concept in the context of certified production forests and on its adoption by proponents of responsible palm oil, soy and sugarcane production. Mostacedo and Quevedo (5.2) provide evidence from Bolivia of the effectiveness of HCVFs in maintaining biodiversity, but stress the continuing need for collaboration between researchers and managers so that the benefits can be maximized. Many articles elsewhere in this volume (e.g., Bleaney 3.3) echo these sentiments; the HCVF concept is useful and even important for biodiversity conservation, but it is hard to implement by forest managers and occasionally leads to formulaic but ill-conceived application (van Assen 3.7).

Menne (5.3) is concerned about the negative consequences of certified plantations. He argues that their history of replacing native vegetation plantations precludes them from being the source of products from "responsibly managed forests." He cites a litany of environmental and social problems associated with plantations, with a focus on southern Africa (for more about the controversies surrounding plantations, see Paquette and Messier 2010). In a contrasting example, Lamb (5.4) discusses a case in Malaysia in which a company was refused certification because it had converted 38% of a badly degraded natural forest into an exotic timber plantation, leaving the remainder, mostly in riparian areas and on steep slopes, to recover naturally. He argues that the conservation benefits of this project were sufficient to warrant certification despite the recent replacement of some forest by plantation.

Beyond current concepts

The final section of the issue takes certification into new territory, sometimes beyond the forest boundary. Entenmann (6.1) compares the ways in which biodiversity priorities are accommodated in certified Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD+) pilot projects. Christophersen, Belair and Nasi (6.2) focus on how forestry operations can exacerbate the bushmeat crisis and how certification can help alleviate this critical biodiversity threat, a topic also discussed by Poulsen and Clark (3.1). Slik (6.3) discusses the biodiversity drawbacks of salvage logging

of burned forests in Borneo (for more on salvage logging see also Lindenmayer, Burton and Franklin 2008). Sayer et al. (6.4) describe the links between the ITTO-IUCN Guidelines for Biodiversity Conservation in Tropical Production Forests and forest certification. Their principal message is that governments and other stakeholders, not just concession owners, can and should make a contribution to improving the conservation value of forest managed for timber production. Pirard (6.5) provides a critical evaluation of the main costs and obstacles related to implementing these guidelines, based on rapid assessments in a number of locations across the tropics. Clearly, good management tends to cost more than poor management, but the actual numbers are frustratingly hard to determine. Taking a much broader perspective, Ghazoul (6.6) recommends extending certification to landscape-level mosaics of forests and lands under other uses and to the various products they provide.

Reflections on the effects of certification on biodiversity in tropical forests

A range of conclusions and cross-cutting issues emerge from the various articles and the responses to the on-line survey.

Does certification conserve biodiversity?

The analyses and judgments reported in this issue of ETFRN News (see also van Kuijk, Putz and Zagt 2009; Peña-Claros, Blommerde and Bongers 2009; Newsom 2009) suggest that certification has helped reduce biodiversity loss in the tropics. Although more than half (58%) of our survey respondents agreed or strongly agreed that certification had helped reduce biodiversity loss in the tropics, they also suggest that this conclusion is qualified.

For the almost 20% who disagreed or disagreed strongly, the most common reason was the limited area of certified natural forest in the tropics, which remains too small to make a meaningful contribution to conservation. Few respondents dispute that it contributed to direct species conservation in those natural forest operations that have been certified (62% agreed), and to improved forest management practices (82%), but many also noted that certification does not equal conservation (cf. Bleaney 3.3) and had not helped to reduce deforestation rates.[4] Many of the survey respondents felt that the positive direct effects on biodiversity of some practices required by certification were obvious (better by "orders of magnitude than uncertified logged forests," according to one of the respondents). They considered the protection of streamside buffer zones and other set-asides, as well as HCVF management and the use of RIL techniques, as most effective.[5] Overall, certification remains a conservation strategy valued and advocated by several conservation NGOs (see, e.g., Price 4.1; White 4.4 and van Kreveld and Roerhorst 4.3).

When asked whether forest certification was generally a critical instrument for biodiversity conservation in tropical forests, however, less than half (46%) of respondents agreed; others thought it was generally ineffective or inefficient due to its high transaction costs. In the words of Ghazoul (6.6), we may be "fiddling while Rome is burning." Respondents frequently mentioned the threat of illegal logging and other activities, but saw these as lesser risks, perhaps because the FMUs in question have

relatively secure boundaries. Many respondents noted a range of threats to tropical forests and their biodiversity which certification in its current form can do little if anything to address: conversion to agro-industrial plantations, climate change, even the global financial system — as well as several other direct and indirect factors beyond the boundaries of the FMU. Several authors, including Schulze (3.6, alluding to the vast areas of concessions that will be granted in Brazil in the near future) and van Assen (3.7) doubt the ability of forest certification to catalyse high-quality forest management at the scale required to make a significant contribution to biodiversity conservation.

Towards credible assessment of certification impacts

Most survey respondents considered it important to prove the effects of certification on biodiversity. The lack of verified conclusions about certification's biodiversity benefits is due to the dearth of rigorous, systematic and independently collected information. This is noted in several of the articles in this issue, by some of the survey respondents and in the literature. The paucity of quantitative studies on the effects of certification or effective forest management practices such as RIL, compared to conventionally logged forests, has been lamented in the literature; only 25 such studies were cited by van Kuijk, Putz and Zagt (2009). This problem is not unique to forestry, but affects the evaluation of the effectiveness of sustainable certification schemes in general (Blackman and Rivera 2010). This ETFRN issue has yielded some additional cases.[6] Still, many authors refer to the same few experiences, such as the great apes study (van Kreveld and Roerhorst 4.3; White 4.4) and Wildlife Conservation Society's (WCS's) experiences in the Republic of Congo (Poulsen and Clark 3.1; White 4.4; Christophersen, Belair and Nasi 6.2), suggesting that the quantitative basis for demonstrating certification effects is not broad.

When asked for ideas on how to clarify the impact of forest certification on biodiversity, many survey respondents suggested conducting studies comparing certified and non-certified forest operations. This effort clearly goes beyond the usual forest management responsibilities of certified operations if it requires the assessment of pre-certification biodiversity and biodiversity trends in another, conventionally managed, forest. Where certification systems claim that, "Implementing sustainable forest management … ensures that forests remain the most biodiverse terrestrial ecosystems on the planet…" (PEFC 2010), it is no more than logical that, "Measuring the impacts of certification on sustainable forest management has now become a priority…" (FSC 2010). Certification systems and their certifying bodies should take an active interest in and commit themselves to such studies. International organizations, funding agencies and professional foresters and researchers organizations concerned about biodiversity can also help formulate a comprehensive research approach to assessing the effectiveness of certification. Cashore and Vandenbergh (4.6) observe that to maintain the credibility of forest certification and justify the levels of effort and financial support by businesses, NGOs and government agencies, it is necessary to know to what extent these systems are achieving sustainability objectives and how to improve their performance. Karmann et al. (1.1) on behalf of FSC extend a clear invitation to researchers to study impacts.

Given the challenges and cost of credible large-scale studies, they will likely remain scarce. What are the priorities? Carefully constructed comparative studies across continents, management regimes and forest types — focusing on selected, clear and interpretable biodiversity indicators — will help detect the broad impacts of certification, but will not provide all the practical answers required by forest managers or conservationists. Additional studies will be needed to better understand the relationships between specific certification-required management practices and selected biodiversity parameters. There needs to be some agreement on the key questions: which management practices, what biodiversity indicators. Entenmann (6.1) suggests combining straightforward indicators with more elaborate indicators that are expensive but potentially able to describe more complex ecological processes. Simpler, more operational standards that are clear on biodiversity objectives and targets and the scale at which these must be measured would help (and would also assist with auditing of standard compliance; cf. Armstrong 2.4).

Ultimately, the important issue is what a "sustainably managed" forest looks like in terms of biodiversity and whether additional improvements can be made. The long-term effects of logging are still poorly known, certainly in certified operations (van Kuijk, Putz and Zagt 2009), and many tropical forestry operations take place in relatively intact forests. Current management prescriptions remain guesses — educated guesses perhaps, but guesses nonetheless. It is unknown to what extent production forests can maintain high levels of forest biodiversity in the long run, which species they will contain and under what conditions.

Monitoring of management impacts is a challenge

Monitoring flora and fauna is one way to measure certification impacts, at least within certified forests. However, the opinions on the usefulness of current monitoring programmes required by certifiers are divided. CARs related to monitoring were common among FMUs (Peña-Claros and Bongers 4.5) and the majority (81%) of respondents agreed that the quality of monitoring programmes should be improved. Only 45% of the respondents considered the data generated from monitoring programmes to be very useful, while the 48% thought they were somewhat useful. When asked about the main problems associated with monitoring, respondents indicated that monitoring efforts suffered from inadequate baseline information, insufficient investment of resources and poor implementation.[7] The adequacy of statistical designs and the involvement of experts were among the least important concerns identified by respondents.[8]

Several strategies were suggested to improve monitoring quality. Survey respondents called for more research, specifically, that directly involving forest managers and forest owners. Peña-Claros and Bongers (4.5) call for partnerships for long-term biodiversity monitoring programmes between forest operators and universities and specialized institutions; some of the contributions in this issue demonstrate the usefulness of this approach (e.g., Poulsen and Clark 3.1). Respondents suggested simplifying and standardizing monitoring protocols and involving local communities. In some cases, cost-cutting seems to dominate the reasoning, but many contend that the quality of local monitoring is equal or superior to monitoring by qualified experts (Fry 2.3). The

importance of developing good relations with the communities in and around concession areas is an important lesson (Bleaney 3.3), but requires time and new skills on the part of many forest managers (Wanders 3.2). In community forests, monitoring requirements test the capacities of local people, as related by Ball (3.4), and Rodríguez and Cubas (3.5). Improving biodiversity monitoring without excessive costs remains a challenge (see below).

Accommodating local and global biodiversity values in High Conservation Value Forests

The importance of local people is evident in applying the concept of HCVFs (Principle 9 of FSC; see appendices 2 and 3). Many authors in this volume identify HCVFs as a key mechanism to protect biodiversity (e.g., Stewart 5.1; Mostacedo 5.2 and Bleaney 3.3). The application of this principle leaves scope for local elaboration, negotiation and agreement and for a major contribution through the participation of various stakeholders, including local people. Principle 9 appears well suited to the on-line survey respondents who favour flexible certification standards to suit local needs (45%), or some limited flexibility in interpreting global biodiversity standards (37%), and also those who see local people and local NGOs (along with experts)[9] as the most important stakeholders in setting biodiversity objectives in certified forests.

Local negotiation of biodiversity objectives allows scope for accommodating different perceptions regarding which biodiversity to value. The extent to which the preferences of distant consumers should trump those of local stakeholders remains unresolved, however. Wiersum and Shrestha (1.3) advocate that local standards, by local people, mirror local perceptions of biodiversity, with an emphasis on the need to conserve functional diversity (such as provisioning, regulating and cultural ecosystem services). This emphasis differs from that of many biologists or conservationists, who emphasize species and their intrinsic or even charismatic values. Diversity in perceptions could potentially be reconciled by negotiating local standards, and by negotiating HCVs at the local level.

Are partnerships critical for achieving biodiversity objectives?

Many of the articles illustrate the importance of partnerships between forest managers (whether concessionaires or communities), researchers and conservation NGOs in overcoming the challenges related to achieving biodiversity objectives within certified forests. This may reflect the prevalence of researchers and conservationists among our authors, but also suggests the extent of the challenges associated with effectively addressing biodiversity concerns in forest management. Lasting partnerships between forest managers and conservation NGOs (Poulsen and Clark 3.1; Bleaney 3.3), peer groups such as WWF's Global Forest & Trade Network (GFTN; White 4.4 and Rodríguez and Cubas 3.5), consultants (Wanders 3.2), or community development NGOs (Ball 3.4) may be critical conditions for preparing FMUs for certification and ensuring that biodiversity conservation is an integral component of forest management. As mentioned above, partnerships with universities and NGOs may be required to implement high-quality monitoring programmes. If this is the case, it raises the question of the extent to which the financial and human capacity of NGOs limits the rate of certification in the tropics.

Can REDD abate the cost of improving biodiversity management practices?

Improving monitoring and implementing biodiversity-friendly measures — including respecting zones that will not be logged — come at a significant cost to forest managers: 47% of respondents who had an opinion about it disagreed or disagreed strongly that compliance with such measures was easy and 62% found it costly. The financial cost of certification is rarely discussed in the articles in this issue (but see Pirard 6.5, who identifies a number of challenges in clarifying these costs), but authors stress the differences between indirect and direct costs (Durst et al. 2006). Although direct costs (which include forest management, chain-of-custody and annual monitoring audits) can be substantial, the indirect costs of improving forest management practices often far exceed them, particularly in developing countries. Partly because direct and indirect costs are often not differentiated, the per-unit area costs of certification vary hugely (US$0.10–24.70/ha for initial certification, according to Chen, Innes and Tikina 2010). Much, perhaps most, certification of small and community-owned forests in the tropics has been heavily subsidised. Support has been given through training and planning, development of monitoring programmes and documentation of forest management activities and through various other processes such as the clarification of land titles.

Most of the survey respondents who mentioned REDD+ and other payment for ecosystem services (PES) schemes saw these as opportunities for forest managers to obtain the resources needed to pay for improvements in management practices and subsidize certification. Others argued that forest managers would be better off focusing on timber and traditional forest management. Lammerts van Bueren (1.2), for example, warns against the dilution of biodiversity requirements in what he terms use-oriented standards, whereby biodiversity conservation is not a primary objective of certification. Such a process could lead to increasing areas certified under REDD+ or similar schemes, but with lower standards for biodiversity conservation. Entenmann (6.1) reviews the ways in which several use-oriented standards (namely, on forest carbon storage in REDD+ pilot projects) assess and monitor biodiversity in the project area, noting a wide variety in the provisions for biodiversity targets. Yet it is clear that many of the requirements for sustainable forest management and REDD+ are compatible. The case presented by Brotto et al. (4.2) demonstrates how forest certification could be a stepping stone to carbon certification. They show that the certification process can improve skills and capacity; the certified concession that they write about was the first in Peru to capture REDD+ payments, with its initial 40,000 tons of CO2-e priced at $7 per ton. Given the region's accelerating deforestation, PES such as carbon sequestration — in addition to market access and fair prices for certified timber — may be needed to keep forests standing and to invest in biodiversity conservation in managed forests.

Is there a future for certification in conserving tropical forest biodiversity?

Most authors and respondents agree that certification helps to conserve forest biodiversity within certified forests. In order to realize its potential across the vast tropical forest biome, certification must do several things:

- Certification must increase its suitability for tropical forests and their managers. In spite of encouraging recent developments, e.g., in the Congo Basin, few tropical

forests are certified. Weak governance, including lack of enforcement of national forest policies and disputed land tenure, remain major obstacles (Wanders 3.2; Setyawati 3.8). Most tropical countries lack the trained workforce needed to develop and implement good forest management plans, or to monitor them once in force. Forest-based communities in the tropics generally require significant support to achieve certification.

- Certification must deal with the new realities of tropical forest landscapes. Increasingly, large areas of forest are devolved to the control of local communities (Sunderlin, Hatcher and Liddle 2008), and more forests have become part of intensely managed landscape mosaics that still hold substantial biodiversity. It is vital to understand how to make certification worthwhile for community and smallholder producers in landscape mosaics. Ghazoul (6.6) offers a vision of a scheme of various small-scale actors working together in landscapes producing certified timber along with other certified products. If certification targets only large industrial forestry operations, it will miss the chance to alleviate poverty and conserve biodiversity in those forests that sustain most of the world's remaining biodiversity.
- Certification must seize the opportunities offered by REDD+ and climate funds. Proponents of forest certification should clarify the significance and preparedness of certified operations and well-managed forests for carbon storage. Certification schemes should take an active part in the quickly evolving field of standards for carbon and other forest services, and biodiversity concerns should be an integral part of these developments.

More than 15 years after the first tropical high forest was certified, we are convinced that the process is beneficial. This is despite the wide range of opinions on the biodiversity conservation gains. Most authors and survey respondents share this conviction. Forest certification has certainly done more to improve tropical forestry than any other intervention with similar intentions (e.g., the Tropical Forestry Action Plan, the Montreal Process and the ITTO's many outstanding efforts). At the same time, we are unable to quantify the full extent of these benefits. There is a general consensus on the need to gather more evidence, and several initiatives are already underway. While threats to tropical forest and their biodiversity persist, there is a diversified and strengthening response. The area of tropical forests protected in national parks or managed by indigenous people is increasing; there is an increasing willingness and effectiveness to apply trade instruments against illegal logging and species; and concern about climate change has seen efforts to place standing forests at the heart of international environmental policy. In this complex landscape of instruments and actors, forest certification stands out as a well-known, flexible, market-based, multi-stakeholder approach. It is not without faults and problems, but once its benefits can be better quantified, and the mechanisms by which these are achieved are better understood, forest certification looks set to remain an important driver of good forest management for the next 15 years.

Endnotes

1. In this introduction, we use the word "certification" to describe the implementation of forest management practices that are consistent with and certified against one of the recognized forest management standards. It is acknowledged that forest certification is a procedure to provide assurance of conformance to a certain quality, and can also be seen as a marketing instrument.
2. FSC (2009); van Kuijk, Putz and Zagt (2009); Newsom (2009); and Peña-Claros, Blommerde and Bongers (2009) discuss forest certification impacts from a variety of perspectives. There are several books on forest certification (e.g., Viana et al. 1996; Vogt et al. 2000; Nussbaum and Simula 2005); in addition, Auld, Gulbrandsen and McDermott (2008) provide a thorough overview of the development and impacts of forest certification schemes.
3. Understandably, respondents who held this opinion were much more critical about impacts than others; 36% thought that losses tended to be too high and avoidable (compared to 14% of the remaining respondents), and relatively few (39%) found that losses were insignificant or acceptable, versus 62% of other respondents.
4. In the survey, 36% disagreed or disagreed strongly that certification had an effect on deforestation rates, and only 31% agreed. See Auld, Gulbrandsen and McDermott (2008) for a discussion.
5. They scored 3.91–4.11 on a scale of 1 to 5 of increasing effectiveness for biodiversity conservation.
6. This includes the cases of great apes and other wildlife in Republic of Congo (Poulsen and Clark 3.1; van Kreveld and Roerhorst 4.3); orangutans in Borneo (Bleaney 3.3 and van Kreveld and Roerhorst 4.3); birds and herpetofauna in Bolivia and forest remnants in Brazil (Price 4.1).
7. These scored 4.07 (inadequate baseline information, ranked 1); 4.04 (inadequate resources invested, ranked 2); and 3.91 (poor implementation quality, ranked 3) on a scale from 1 to 5.
8. These scored 3.38 and 3.45, respectively, on the same scale (ranked 13 and 15 out of 15 potential problems).
9. Ideally, according to respondents, experts should be most important in setting biodiversity conservation objectives (score 4.34 on a scale of importance of 1 to 5), followed by local people (4.19) and local NGOs (3.88). In practice, the order is local people (4.24) and experts (4.23) followed by local NGOs (3.96). Both in practice and in theory, timber consumers rank lowest by far in determining biodiversity objectives (2.97–3.37) among 10 identified stakeholder groups.

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Section 1

Certification standards

Photo credits
p.1 Log tracking in Kutai, East Kalimantan, Indonesia. Douglas Sheil
p.3 Gunung Lumut Protection Forest, Indonesia. Jan van der Ploeg, Leiden University
p.7 Logging truck, Gunung Lumut Protection Forest, Indonesia. Jan van der Ploeg, Leiden University
p.11 Felled Greenheart tree *(Chlorocardium rodiei)* in Guyana. Marieke Wit, Tropenbos International
p.20 Chepang indigenous people, Nepal. UNDP/GEF/Small Grants Programme, Nepal
p.23 Wild foods used by the Chepang people, Nepal. UNDP/GEF/Small Grants Programme, Nepal

1.1 The Forest Stewardship Council and biodiversity

MARION KARMANN, ANDRE DE FREITAS
and HANS-JOACHIM DROSTE

Setting the standard for the protection of biodiversity in managed forests

The mission of the Forest Stewardship Council (FSC) is to promote socially beneficial, economically viable and environmentally appropriate forest management. The goal is to help ensure that the harvest of timber and non-timber forest products maintains the forest's biodiversity, productivity and ecological processes. FSC applies multi-stakeholder processes to develop the tools for third-party forest management (FM) certification and incentives for FM to conform to a set of global sustainable forestry standards. Independent certification bodies audit forestry operations (forest management units or FMUs) for compliance with these standards, and certify those who pass the test. The FSC certificate allows certified operations to differentiate their products from those of others.

The introduction of a new approach to multi-stakeholder processes is one of FSC's most important contributions to global forest management.

FSC's approach is based on bringing together many different actors and interests in consultation processes within one forum to develop consent-based solutions for good FM. FSC's standards are widely accepted among a broad cross-section of stakeholders as being consistent with the principles of good forest stewardship. This makes the FSC logo a powerful incentive for timber traders to demand products from responsibly managed forests and for forest managers to continue to improve their management. As of April 2010, 130 million hectares (ha) of forest in about 80 countries were managed and independently certified against FSC standards: of this total, 3 million ha are classified as plantations in tropical and subtropical regions and 14.5 million ha are natural/mixed forest in tropical and subtropical regions.

FSC members' roles and responsibilities

The introduction of a new approach to multi-stakeholder processes is one of FSC's most important contributions to global forest management. FSC welcomes almost any stakeholder in forestry to become a member of the FSC on international or national level (there

Marion Karmann, **Andre de Freitas** and **Hans-Joachim Droste** work for FSC to promote responsible forest management. They all have academic and professional forestry backgrounds and worked for several years in different positions for FSC and in FSC-related business.

are individual and organizational members). Following the spirit of the UNCED conference in Rio, FSC membership is organized into three chambers (environmental, social and economic), each with equal voting powers.

The participation and involvement of the private sector and of social and environmental organizations is key to the implementation and impact of FSC's standards. The chamber structure balances voting power between different interests and between Northern and Southern countries. FSC's members have individual and collective rights and responsibilities, and act collectively as the FSC General Assembly (GA). FSC invites stakeholders to interact in processes of developing and implementing FSC standards on three levels: global, national and local.

Global level

At FSC GAs, members determine the future goals and activities of FSC through motions; for example, the decision that the scope of FSC should include the certification of industrial plantations. In 2010 the members' most important activity is the review of FSC's core document: the international standard for forest management with its ten Principles and Criteria (P&C) (FSC 1996).

National level

The P&C need to be adapted at the national or sub-national level in order to reflect the diverse legal, social and geographical conditions of forests in different parts of the world. This adaptation happens through the addition of specific indicators, which make the standard applicable at the FMU level.[1]

Local level

Public consultations are part of each FM certification process. FSC members and other stakeholders can at any time observe and comment on forest certification processes and decisions.

Development of standards

The experts who draft or revise FSC national standards are nominated by FSC members. They represent the different chambers' interests in a balanced way. The draft standards go through a public consultation process before they are submitted to FSC for final adjustments and approval. Often, FSC is able to bring together people with diverse backgrounds and interests, who normally would not talk or work jointly, to discuss issues of forest management, ecology and community sustainability. The development process for an approved national FM standard reflects years of negotiations among environmental, timber trade, human rights and labour interests.

In FSC's national and international initiatives environmental groups (such as WWF, Greenpeace, and FERN) are well organized and can better present their interests in forest management than, for example, individual representatives of social interests. This does not mean, however, that environmental interests and biodiversity criteria dominate other aspects of responsible FM. The chamber system is designed to ensure that all interests are equally considered. National standard-setting initiatives are usually most effective when

these processes have the space and flexibility to allow healthy relationships among the stakeholders to develop.

Composition and implementation of standards

In conducting forest audits, FSC-accredited certification bodies (CB) do not certify that an FMU has achieved sustainability, nor do they require or imply that uniform sets of FM prescriptions be implemented; they certify that the FMU is managed in conformity with FSC's P&C. The criteria strive for, among other things, minimal environmental impacts through ecologically sound silviculture practices. To demonstrate this, and to be granted the FSC certificate, forest managers usually have to change their management practices to respond to FSC requirements.

Any deficiencies are published in certification reports and formally addressed through corrective actions requests (CARs), either major or minor, which have to be rectified by a certain time. Forest management is audited at least once a year by multi-disciplinary teams; when certain deficiencies occur, more frequent audits are required. Major CARs related to any single criterion will normally disqualify an operation from certification, or will lead to decertification. It does not matter if a CAR is related to economic, social or environmental mismanagement; each has the same relevance to certification.

Most of the requirements relating to biodiversity protection and enhancement in managed forests are addressed in the criteria of Principle 6 (Environmental Impact)[2] and Principle 9 (Maintenance of High Conservation Value Forests).[3] Criteria in Principle 8 (Monitoring) require biodiversity to be monitored. Principles 1 to 4 relate to indigenous people and local community rights and respect for laws and regulations.[4]

Although FSC is proud of the strong social requirements embedded in its P&C, analysts have summarized that "at their heart, it appears the FSC's guidelines are geared to preserve natural systems while allowing for careful harvest" (Fernholz 2010).

P&C review and generic indicators

The revision of the P&C is a crucial process for FSC. The P&C provide the basis for 30 national FSC-approved Forest Stewardship Standards and several Generic Standards of CBs. Any changes to the P&C will have a direct effect on each of the 1,000 certified FMUs in 82 countries, and on how responsible FM is interpreted by FSC's members at the national level. It is crucial that the multi-stakeholder concept is fully implemented to ensure that no single interest dominates the others and that the P&C truly reflects the values, views and objectives of its members and stakeholders.

Two drafts of the P&C, developed by the elected P&C Review Working Group, and based on stakeholder comments, have been sent out for public consultation; the final draft[5] will presumably be submitted to the FSC membership in late 2010. The P&C review is conducted in line with ISO 59 requirements and with the ISEAL Alliance's code of good practice, the international reference for setting voluntary social and environmental standards. Within the context of the P&C review biodiversity criteria have been given due weight and

commented upon by the environmental chamber. Final information about revised or new ecological criteria can be given only after the P&C are approved (presumably in 2011).

After the new version of the P&C is approved, a set of generic indicators will be elaborated. These will provide the baseline for the adapted indicators to be developed by CBs and through the relevant national standards, thus increasing transparency and consistency in certification decisions between different CBs and in different parts of the world. This will enhance the credibility of the FSC certification scheme as a whole. One of FSC's important tasks for FSC in 2011 is consultation of its members on the adapted set of generic indicators.

FSC concepts

High conservation values

FSC developed the concept of high conservation value forests (HCVFs) as an area of forest required to maintain or enhance a HCV and to be managed according to the precautionary principle. The term was formally included in the P&C in 1999 as Principle 9. HCVF attributes are listed in Appendix 3.

The implementation of HCVF is required not only in Principle 9 for certified FM, but also for uncertified material that is added to products with the "FSC Mixed Sources" label,[6] a concept now also widely applied in other sectors.

Intact Forest Landscape

The concept of Intact Forest Landscapes (IFLs) was developed following the lead of Greenpeace. An IFL is an unbroken expanse of a forest ecosystem without significant human activity, large enough that all native biodiversity, including viable populations of most if not all wide-ranging species, could be maintained. HCV2 of the HCVF concept ("large landscape-level forests where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance;" see Appendix 3) is analogous to that of IFLs. Some national FSC standards (e.g., Canada, Russia) require IFL mapping. FSC is holding discussions with major environmental NGOs and other stakeholders on how to include the IFL concept in other national standards.

Certification of conservation

In the beginning, FSC focused on FMUs that harvest wood. However, today increasing areas of forest are being allocated to forest conservation and protection; coupled with new international financing for ecosystem services such as forest carbon. This is expected to continue and accelerate. Managers of conservation and protected areas and their donors have an interest in independent auditing of these areas to strict standards to ensure that natural values are being maintained and that funding is achieving the desired outcomes. FSC is currently redesigning its approach to certification to include the full range of ecosystem services and non-timber forest products. In addition, FSC has a project with the Global Environmental Fund (GEF) to demonstrating the utility of certifying additional ecosystem services — including biodiversity conservation and watershed protection.

FSC's impact assessment

The underlying assumption of FSC is that each hectare certified to its standards brings us closer to socially and environmentally responsible management of the world's forests. For FSC and for independent researchers the analysis of certification reports enables the indirect assessment of FSC's impact on the ground. CARs can reveal where a change or adaptation of management practices is required to comply with the FSC standard. A recent analysis of CARs in tropical FMUs (Peña-Claros, Blommerde and Bongers 2009) confirmed the trend noted by other researchers (WWF 2005; IPAM 2006; Hughell and Butterfield 2008, Newsom 2009): the 8 to 12 most common failures to comply with FSC requirements (including the safety of forest workers, development of management plans and strategies for the protection of rare species) account for about half of all the challenges for forest managers to comply with FSC.[7]

Other researchers have used more direct approaches to assess certification outcomes and impacts; for example, on aspects of biodiversity in FMUs before and after certification, or the effects of reduced-impact logging (RIL) on species richness, abundance and composition. Although FSC supports researchers with access to information, for reasons of scientific objectivity it does not directly commission research. This allows researchers to arrive independently at their conclusions. More work is required to demonstrate impact. FSC is implementing a set of impact indicators to be monitored during certification processes, including some relevant to biodiversity context (e.g., reflecting the management of HCVF areas, monitoring invasive species). In cooperation with ISEAL, FSC is developing a code for impact assessment, to be applied by all ISEAL members.

FSC standards are reviewed regularly, and any insight into the strengths and weaknesses of its processes can be used to improve quality. The organization offers access to a broad network of partners and internal expertise.

Extracts of independent research

Forestry does affect ecosystems

Cutting trees, driving machines in the forest and hunting all affect biodiversity, soil and water. FSC standards require that management plans and activities use a precautionary approach, and monitor and minimize negative impacts. Reviewing academic papers and NGO analyses reveals evidence that FSC certification is often a catalyst for substantial changes to diverse aspects of forest management, rather than a means of rewarding operations that are already conducting excellent practices (FSC 2009).

Ecological integrity maintained

In many certified operations worldwide FSC requirements have brought improvements to aquatic and riparian areas, identification and protection of HCVFs and threatened and endangered species. The PT Sumalindo Lestari Jaya II in Indonesia classified some 50,000

ha to be managed according to FSC guidelines for HCVF. The Ndola Pine Plantations Limited in Zambia has set aside HCVF areas as conservation corridors where non-commercial tree species have been allowed to regenerate (Newsom and Hewitt, 2005).

FSC-certified FMUs need to implement RIL practices. In the Brazilian Amazon FMUs have been studied to evaluate the short-term effect of RIL on species richness, abundance and composition of native Amazonian fauna six months after logging. The researchers concluded that overall, RIL had a relatively positive effect on fauna. The lower species loss in RIL forests compared to other types of land use in Amazonia highlights the value of the technique for conservation purposes (IPAM 2006).

HCVF and control of hunting

WWF's study on great apes and logging (Van Kreveld and Roerhorst 2009) concludes that although vast protected areas such as national parks and reserves offer ideal habitats for gorilla, orangutans and other apes, FSC-certified forests can be useful supplements to such protected areas. They can also form corridors between individual and isolated great ape habitats. Since many apes live in logging concessions, their continued existence depends to a great extent on how well they can survive in managed forests. In contrast to other types of logging, forestry in accordance with FSC supports the preservation of adequate living conditions for great apes. FSC requires hunting and logging to be strictly controlled, and demands the maintenance or enhancement of HCVFs that serve as a critical habitat for rare and threatened species. For great apes, this means, for example, that fruit trees – an important food source – are maintained (van Kreveld and Roerhorst 2009; also see article 4.3 in this issue).

The CB SmartWood is responsible for about half of the approximately 1,000 FSC forest management certificates. In 2005 Rainforest Alliance analyzed the certificates issued by SmartWood globally, covering natural, semi-natural forests and plantations, and found that 62% of the forest operations were required to improve their management of sensitive sites and HCVFs. The identification, conservation and protection of these areas were the central focus of the conditions granted with the FSC certificate. Consultation of stakeholders about sensitive sites and HCVFs was required of many operations, as was the expansion of inventory, monitoring and mapping activities to include these features. In 2009 a new evaluation showed that certified forestry operations designated 16% of their total forest area as strict reserves. On average, certified operations designated 22,000 hectares, or 22% of their total area, as HCVF (Newsom 2005, 2009).

Set-asides of natural forests by plantation companies

In an analysis of all 2008 SmartWood FSC-certificates, Rainforest Alliance found that FMUs with a higher percentage of plantation area tended to have significantly larger strict reserve areas. They assumed that this trend could in part be due to FSC Principle 10.5, which requires that a proportion of plantation forest area be restored to natural forest cover (Newsom 2009). Under Principle 10.9, plantations established in areas converted from natural forests after November 1994 do not qualify for certification. Principle 6.10 prohibits forest conversion to plantations or non-forest land uses. With these require-

ments at least some remnants of tropical forests are conserved — or if managed, then in an appropriate way — and not converted into (FSC certified) plantations.

Less deforestation, fewer wildfires in Guatemala

In the Maya Biosphere Reserve, in an area of tropical forest in Guatemala's northern Petén region, Hughell and Butterfield (2008) found significantly less deforestation and incidence of wildfires within the FSC-certified concessions than in the remaining multiple-use zone and lands designated for strict protection. In FSC-certified areas under management the deforestation rate was 20 times lower than in other concessions. In addition, areas devastated by fires decreased steadily from 6.5% (1998) to 0.1% (2007), while fires affected 7–20% of the surrounding forest concessions.

For more information

FSC welcomes any interest on the part of researchers in conducting impact assessments of processes related to FSC certification. Among its research priorities are how FSC contributes to avoided deforestation bordering agricultural areas, and how large-scale plantation managers are implementing the protection and connection of set-aside areas of natural forests remnants. This is a call to researchers to get in touch with FSC to identify meaningful topics for applied research. An exchange of research papers would also contribute to the development of a database on FSC's impacts. For this and further information please contact M.karmann@fsc.org.

Endnotes

1. NI members approve the set of national indicators at their GAs.
2. In summary, the biodiversity requirements of Principle 6 are that the management of a FSC certified FMU: is aware of the impact of FM on the ecosystem and of rare, threatened and endangered species (birds, plants, reptiles, etc.) and of its impact on these species; is protecting these species and their habitats; controls inappropriate hunting or collecting of animals and plants; maintains the "natural functions" of the forest, such as ensuring that FM allows a balance of trees of different ages, and that there is still a natural range of species and types of vegetation present; and sets aside conservation and protection areas.
3. Principle 9 requires: "Management activities in HCVF shall maintain or enhance the attributes which define such forests. Decisions regarding HCVF shall always be considered in the context of a precautionary approach."
4. The principles and criteria are outlined at www.fsc.org.
5. See FSC-STD-01-001 V5-0 D4-0.
6. FSC has strict requirements for controlling uncertified material. It must comply with FSC Controlled Wood (CW) standards and be independently verified before it is mixed with material coming from FSC-certified FMUs. FSC-CW includes a balanced consideration of key social and environmental issues, such as including the HCVF concept and excluding products from illegal logging. This is particularly important for uncertified material from countries where forest legislation and governance are weak, or where socially and environmentally unacceptable practices, such as forest conversion or violation of human rights, are legal.
7. See also article 4.5 in this issue.

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1.2 Forest-related standards and certification schemes

ERIK LAMMERTS VAN BUEREN

Does certification protect biodiversity?

Based on the recent literature (Peña-Claros, Blommerde and Bongers 2009) and personal experience, the answer to the question whether forest biodiversity is better off in certified forests would best be stated as: "Yes, but...." Standards and auditing show ambiguity, and certification is not the way to stop the conversion of natural forests.

Positive effects of certification

Prevailing forest certification systems (Table 1) such as that of the Forest Stewardship Council (FSC) and those endorsed by the Programme for the Endorsement of Forest Certification Schemes (PEFC) strengthen the conservation of biodiversity in various ways:

- They support the enforcement of legislation pertaining to biodiversity by requiring compliance. In most tropical countries, forest legislation is poorly enforced outside certified forests.
- They require the effects of management activities to be monitored and the results to be fed back into planning and forest management practices.
- They are instrumental in identifying areas within the Forest Management Unit (FMU) that will be left alone, including the protection of riparian buffers, improved management of High Conservation Value Forests (HCVFs) and improved management of threatened and endangered species.
- They require that interventions prevent avoidable damage to the ecosystem by implementing reduced-impact logging (RIL) technologies.

MONITORING SHOULD BE DIRECTED AT THE IMPACT OF HARVESTING ON BIODIVERSITY AND CHANGES IN SPECIES COMPOSITION.

Recent research (Peña-Claros, Blommerde and Bongers 2009) shows "that FMUs being evaluated nowadays have fewer issues raised (corrective action requests or CARs) than FMUs evaluated in the past. This result suggests that FMUs now have higher working standards than in the past" (Peña-Claros, Blommerde and Bongers: 56). However, a lack of

Erik Lammerts van Bueren is the Director of ISAFOR. He works as a consultant on forest policy and management, focusing on development of standards for sustainable forest management and assessment of the quality and reliability of certification systems related to forests. He is a member of the Board of Experts of the Keurhout hallmark and the Timber Procurement Assessment Committee in the Netherlands.

rigour in assessments could also result in fewer CARs. Further analysis will be required to better understand this finding.

Ambiguity

At the same time, certification standards are ambiguous and raise false expectations about the conservation of biodiversity. The decision to harvest timber or NTFPs means that human-induced changes in biodiversity will occur, at least in terms of relative abundance and, in the case of timber production, of forest structure.

Research (van Kuijk, Putz and Zagt 2009) further showed that several factors hamper the ability to assess the effects of certified forest management on biodiversity:

- limited knowledge of biodiversity, species and their interactions, and variations in species' responses to changes in the ecosystem;
- poor articulation of biodiversity objectives and incorporation of these objectives into management activities. For instance, in the SmartWood generic standard, Indicator 6.3.3 requires forest managers to maintain, enhance or restore forest composition (i.e., species numbers and diversity) and structure (Rainforest Alliance/SmartWood 2005). This is either so strict as to be impractical, or if put into practice, provides no guidance to forest managers in terms of species and acceptable reference levels.
- Limited knowledge of prevailing biodiversity and lack of long-term checks and observations. This allows room for a wide range of interpretations by auditors, who tend to rely more on the evaluation of process indicators (prescribing how an intervention must be executed) than on outcome indicators that describe the state of the ecosystem or specific elements of it.

Not a land-use tool

Importantly, forest certification plays virtually no role in the combat against the most important threat to biodiversity: the conversion of natural forests. The scope of forest certification is forest management: certification is not a tool for land-use planning at a landscape scale beyond the FMU.

Most forest certification systems allow conversion within a certified FMU to a limited extent, albeit under certain conditions. For example, FSC sets clear limits on conversion. No more than 0.5% of a certified FMU can be converted each year, no more than 5% in total. PEFC uses more general phrasing: "Forest management practices shall safeguard the quantity and the quality of the forest resources in the medium and long term..." (PEOLG Criterion 1.2 a). Certification systems allow a certificate to be withdrawn when conversion exceeds the justified allowable part of the certified FMU. Although that in itself does not stop conversion, there seems to be scope for certification systems to be more proactive, as is suggested in this paper.

Source-oriented and use-oriented standards

Most of the relevant certification standards are geared to assess and reward responsible forest management practices. Certification standards are requirements (defined by principles, criteria and indicators) for sustaining one or more societal functions on a

specific land type. A societal function is defined here as a service, such as CO_2 storage, water supply, recreation or the delivery and application of raw materials such as fuelwood for energy and timber for construction. Although wood may potentially be used in many ways, each of these uses is classified as a separate societal function.

Over the past years, an increasing number of certification systems (Table 1) have been developed that focus on a particular societal function of the forest. These use-oriented systems are often complementary to or partly overlap with source-oriented systems, which focus on the forest. These two approaches will lead to significantly different impacts on the conservation of biodiversity, as illustrated by their objectives with respect to biodiversity.

Table 1. Certification systems relevant to forest management

Source-oriented standards	
Legal forest management/ legal wood	SGS: Timber Legality and Traceability system (TLTV) (VLO and VLC)
	Smart Wood: Legal Origin (LO) and Legal Compliance (LC)
	Origin and legality of timber/*Origine et légalité des bois* (OLB)
	FSC: Controlled Wood (CW)
	EU Forest Law Enforcement Governance and Trade action plan (FLEGT)
Sustainable forest management/ sustainably produced wood	FSC
	PEFC International and national systems endorsed by PEFC
	ISO Environmental management system
	RIL standard, Tropical Forest Foundation (USA)
Use-oriented standards	
Sustainable biomass	Criteria for Sustainable Bioenergy use on a global scale (Germany)
	Round-table for Sustainable Biofuels
	Round-table for Sustainable Palm Oil (RSPO)
	Testing Framework for sustainable biomass (Cramer criteria, Netherlands)
CO_2 storage	Clean Development Mechanism (CDM A/R)
	Gold standard (GS)
	Voluntary Carbon Standard (VCS)
	Chicago climate exchange (CCX)
	Voluntary Offset Standard (VOS)
	Climate, Community and Biodiversity Standards (CCBS)
	Plan Vivo

Note: not exhaustive

Box 1. Source-oriented and use-oriented standards

The primary objective of source-oriented standards is to maintain or sustain the integrity of the ecosystem and its potential societal functions. The conservation of biodiversity is part of its primary objective. In contrast, use-oriented standards have one specific function as their primary objective, such as the sequestration of carbon. Use-oriented standards support the conservation of biodiversity only so far as is necessary to sustain the specified function. Based on ethical grounds, they may add further requirements for conservation of biodiversity as a complementary objective. The minimum requirement for a land-use system to sustainably deliver a service or product is that the required ecological production basis for that service or product is being maintained.

Biodiversity in source-oriented standards

Source-oriented standards typically address biodiversity through one general criterion and a series of more detailed criteria. The general criterion is usually formulated in terms of maintaining biodiversity and/or ecological functions and values. It is complemented by a requirement for legal compliance; auditors need to know the content of legislation in order to assess compliance.

In standards that focus on conserving biodiversity, these more detailed criteria generally cover two dimensions: spatial and quality.

Spatial dimension

The spatial dimension separates zones of intervention and non-intervention. The spatial component comprises criteria to identify and protect areas with in an FMU, such as habitats for rare and endangered species, representative samples of ecosystems and HCV areas. These areas are left undisturbed and biodiversity evolves without any direct intervention. Without these areas there will be little chance to maintain the full range of biodiversity in the FMU. The larger the no-go area, the greater the chance that no side effects will occur.

Quality dimension

Criteria that address the quality dimension are developed to minimize the impact of the intervention on biodiversity. Criteria and/or indicators directed at the quality of the intervention include the use of chemicals, exotic species and RIL technologies. Often, these criteria and indicators do not directly assess changes in biodiversity; instead, they assess the management activities leading to these changes (Table 2).

Table 2. Examples of biodiversity criteria in source-oriented standards

FSC	PEFC
Overall requirement to conserve biodiversity	
Criterion 6.3: Ecological functions and values shall be maintained including genetic, species, and ecosystem diversity	Criterion 4.1.a: Forest management planning should aim to maintain, conserve and enhance biodiversity on ecosystem, species and genetic level and, where appropriate, diversity at landscape level
Spatial component of standards	
Criterion 6.2: Protect habitats of rare, threatened species	Criterion 1.2.a: Forest management practices shall the quantity and the quality of the forests…
Criterion 6.4: Representative samples of ecosystems shall be protected	Criterion 4.1.b: Forest management planning should include representative forest ecosystems… habitats of threatened and endangered species
Principle 9: Maintenance of HCVFs	Criterion 4.2.i: Special key biotopes should be protected
Quality intervention criteria	
6.2: Protect rare and threatened species 6.5: Guidelines to minimize damage 6.6: Avoid use chemical pesticides 6.9: Use of exotic species shall be carefully controlled	4.2.a: Natural regeneration 4.2.b: Exotic species use shall be evaluated 4.2.c: Forest management shall promote diversity of horizontal and vertical structures and of species

Biodiversity in use-oriented standards

Certification systems that are oriented to one particular product or service — for example, biomass for energy or CO_2 storage — tend to exclude areas from production based on their biodiversity values. They do not always address biodiversity within productive areas once the production site has been identified.

For example, the main focus of biodiversity-related criteria in standards for sustainable biomass is often the exclusion of land types for production, e.g., areas with HCVs. The EC Directive on Renewable Energy (2009)[1] excludes as being unsustainable biomass from primary forests and areas designated by law to protect nature, but has no restrictions on interventions in the areas where biomass production is allowed.

Criteria addressing the quality of the intervention within production area are rarely if ever formulated. In the Dutch standard for sustainable biomass,[2] biodiversity within the production unit is addressed by the requirement that good practices will be applied to take into account ecological corridors and to prevent ecological degradation as much as

possible. Some standards that focus on CO_2 fixation have very general if any biodiversity requirements. Other standards find their basis in a source-oriented approach that includes specific requirements for CO_2 storage (Table 3).

Table 3. Examples of biodiversity criteria in use-oriented standards

Testing framework for sustainable biomass (Netherlands)	Principle 4 Biodiversity; Biomass production must not affect protected or vulnerable biodiversity and will, where possible, have to strengthen biodiversity. Biomass production must not take place in: ▪ 4.2.1 recently cultivated areas that were gazetted protected areas ▪ 4.3.1 recently cultivated areas that have been recognized as HCV ▪ 4.4.1 if biomass production takes place in recently cultivated areas (after 1 January 2007) room will be given to set-aside areas (at least 10%) ▪ 4.4.2 if biomass production takes place in recently cultivated areas it has to be indicated: how fragmentation is discouraged; if ecological corridors are applied; if restoration of degraded areas is involved ▪ 4.5.1 good practices will be applied on and around the biomass production unit for the strengthening of biodiversity to take into account ecological corridors and to prevent disintegration as much as possible
Spatial restrictions defining non-production areas	Very few requirements for the management of biodiversity in existing forests
Voluntary Carbon Standard (VCS)	VCS is basically a calculation standard for CO_2 emission reductions and CO_2 sequestration. It has no biodiversity requirements.
Climate Community and Biodiversity Standard (CCBS)	CCBS has a mix of spatial and quality intervention criteria: B1. The project must generate net positive impacts on biodiversity within the project zone, measured against baseline conditions (i.e., development without the project) The project should maintain or enhance any High Conservation Values present in the project zone Use of non-native species must be justified. B3. The project proponents must quantify and document the changes in biodiversity resulting from the project activities (within and outside the project boundaries)

Proliferation of standards

Different standards impose unequal requirements on the management of the source — the forest — depending on what product or service is being delivered. The ongoing proliferation of standards, and the combination of different standards, can cause unintended and undesired consequences:

- distortion of competition between products and/or product uses, for example, lower sustainability requirements for fuelwood than for timber for pulp and paper or construction; this means that fuelwood could be subject to less restrictive

management requirements than wood for the pulp and paper industry, giving it an advantage in the market;
- the risk that management will focus too much on a single function, such as CO_2 storage, while disregarding other forest functions and other aspects of sustainability;
- higher transaction costs for producers as a result of having to meet many standards; and
- confusion among producers and consumers.

Table 4 highlights the complex context in which sustainability standards are developing.

Table 4. Context for sustainability standards

Function		Source	
		Single source	**Various sources**
Function = service, or product specific application of raw material.	Single function	1) Energy generation *Natural forest*	2) Energy generation *Natural forest, plantation, shelterbelt, natural short vegetation, agriculture*
	Multiple functions	3) Energy generation, timber for construction, paper, CO_2 storage, water supply, recreation, employment *Natural forest*	4) Energy generation, timber for construction, paper, CO_2 storage, water supply, recreation, employment *Natural forest, plantation, shelterbelt, natural short vegetation, agriculture*

Source (in italics); in 4) not every source can fulfill all the social functions given as examples.

FSC and PEFC focused initially on the production of timber in natural and semi-natural forests, which would place them in segment 1. Since they claim to certify responsible forest management, irrespective the function of the forest, however, segment 3 seems the best way to describe these systems, even though FSC has included in its standard one specific principle for the management of plantations.

Nowadays, government increasingly sets the standard for public and private demands for sustainably produced products by formulating procurement policies. Politicians and other policy-makers should therefore provide guidance on the further development of standards. It is important that they answer several policy questions.

Should the same sustainability requirements be established for all sources that deliver the same societal function (insofar as the requirements are relevant to the type of source)?
- In the case of raw materials for energy generation such as wood, rapeseed or palm oil, the associated sources, to which comparable sustainability requirements would apply, would then be forest or timber plantations, agricultural land, or oil palm plantations.

Should the same sustainability requirements be established for different functions delivered by one type of source?

- In the case of natural forest, the multiple functions to which comparable sustainability requirements would apply would then include production of wood for energy generation, timber for construction, CO_2 storage, water supply, biodiversity and recreation.
- In the case of natural forest, when raw material potentially serves different functions, the various uses of wood (for which the same sustainability requirements would apply) would then include energy generation, construction and paper.

Conclusions

In order to assess the impact of certification on biodiversity, apart from the attention that must be paid to the proliferation of standards, there is still much to do in enhancing our knowledge of biodiversity. The challenge is to demonstrate evidence of relationships between certified management practices and biodiversity. Systematic research is needed to understand species responses to management practices.

Recommendations

Monitoring should be directed at the impact of harvesting on biodiversity and changes in species composition. Partnerships between forest management companies and research institutions are highly recommended, particularly for monitoring.

Standards should be more explicit in what they mean by "conserving biological diversity" and for what purpose.

Standards should require that the forest management plan contain clearly articulated biodiversity objectives and a translation of these objectives into management activities.

Policy-makers should establish fair and equivalent sustainability requirements for different products and for products from different sources. This means that the requirements of use-oriented standards would become more consistent with those of forest-oriented standards.

Certification systems should discourage major conversion within FMUs in several ways:

- requiring assurance that no major conversion will occur within ten years of certification — to that end, certification bodies should develop indicators that provide sufficient assurance of this;
- withdrawing certificates from FMUs when a larger part than that allowed has been converted into a plantation or agricultural use; and
- banning the issuance of new certificates, for a period of ten years, to the remaining part of any FMU that has violated conversion requirements.

Endnotes

1. Directive 2009/30/EC of the European Parliament and of the European Council, 23 April 2009.
2. The Dutch testing framework for sustainable biomass; Final report from the project group "Sustainable production of biomass," February 2007.

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1.3 Biocultural diversity in community forestry in Nepal

FREERK WIERSUM and KUMUD SHRESTHA

Introduction

According to the Convention on Biological Diversity, it is important to respect, preserve, and maintain the knowledge, innovations, and practices related to biodiversity of indigenous and traditional communities. The recognition of the importance of local values and knowledge of biodiversity is reflected in the gradual expansion of the concept of biodiversity to include biocultural diversity.

Traditionally, biodiversity was defined in ecological terms as involving ecosystem, species and genetic levels. The UNEP Global Environmental Outlook Report 2007 describes biodiversity as also encompassing human cultural diversity, which has impacts on the diversity of non-human species, genes and ecosystems. This acknowledges the intersection of biological diversity and cultural diversity (Pretty et al. 2009).

Local values of forests are reflected not only in technical practices of forest use and conservation, but in social practices of participation and benefit-sharing.

The linkages between biodiversity and cultural diversity have been further formalized in the concept of biocultural diversity. According to UNESCO, biocultural diversity concerns the sum of the world's differences regarding biological diversity at all its levels, cultural diversity in all its manifestations and their interactions (Persic and Martin 2008). It encompasses the variability among social and cultural groups in the representations, value systems and cultural practices concerning different biological organisms at the levels of ecosystems, species and genes.

Certification standards for biocultural diversity

Most forest certification schemes recognize the need to conserve both biodiversity and cultural diversity. For instance, the Forest Stewardship Council (FSC) certification system explicitly includes respect for indigenous peoples and community rights (FSC Principles 2

Freerk Wiersum is with the Forest and Nature Conservation Policy group, Wageningen University, the Netherlands, and **Kumud Shrestha** is with FSC Nepal, Kathmandu, Nepal. Both authors are interested in the linkages between biodiversity and cultural diversity and the experiences of local communities in identifying culturally-inspired standards for biodiversity conservation.

and 3) and for the ecological impacts on biodiversity of forest product harvesting (Principle 6). The standards related to socio-cultural aspects recognize issues such as the maintenance of legal and customary tenure or use rights of indigenous people and local communities (Principle 2.2); the maintenance of control by indigenous peoples over forest management on their lands and territories (Principle 3.1); and the protection of sites of special cultural, ecological, economic or religious significance (Principle 3.3). The standards related to biodiversity include issues such as protection of rare, threatened and endangered species and their habitats (Principle 6.2); protection of representative samples of existing ecosystems within the forest landscape (Principle 6.4); and control of adverse ecological impacts of the use of exotic species (Principle 6.9). Principle 9 emphasizes the need to conserve high conservation values.

Who decides on criteria for biocultural diversity?

Although various ecological and cultural aspects of biocultural diversity are included in forest certification schemes, they are usually formulated as separate principles. In spite of UNESCO's definition that biocultural diversity concerns not only the sum of, but also the interaction between biological diversity and cultural diversity, timber certification standards do not explicitly refer to such interactions. These interactions are reflected in the variety of human representations and values related to ecological diversity.

Although forest certification schemes acknowledge the need to recognize the range of local value and knowledge systems, certification criteria are determined not by local people but by professional experts. The criteria relate to the need to respect the forest property, access and use rights of local communities and indigenous peoples. They do not explicitly acknowledge local rights to identify needs and priorities for biodiversity conservation on the basis of local representations and values. Recent experiments in Nepal demonstrate the scope for a more participatory approach to identifying culturally-sensitive criteria for biodiversity conservation.

Participatory development of certification criteria

Nepal is recognized as one of the world's leaders in community forestry. Approximately 1.23 million hectares of forests are managed by 14,431 community forest user groups (CFUGs); these schemes benefit 1.66 million households, about 40% of all the country's households (MoFSC 2009).

A basic principle in community forestry is the need for a location-specific approach to forest management, and incorporation of local values and knowledge systems. Originally, community forestry focused on the basic forest-related needs of local communities.

Forest biodiversity is critical to the livelihoods of the people living around forests. Some indigenous communities, such as the Raute in western Nepal, are totally dependent on a variety of forest products for their livelihoods. Other indigenous communities, such as the Chepang in central Nepal, recently started to practise agriculture, but still depend on forests for many products. Even in communities that engage in agriculture, many people collect a variety of food, fodder and timber and non-timber forest products (NTFPs).

Forests also contribute to cultural identity. Cultural objects such as temples and graveyards are situated in forests, and several species, such as the Bodhi tree *(Ficus religiosa)* have religious significance.

A recent trend in community forestry acknowledges not only local forest-related needs, but the production of forest products for national and international markets. As a result, attention is now paid to whether CFUGs can comply with international certification standards. In a 2005 initiative, 21 CFUGs in Nepal were certified under the FSC to produce NTFPs (medicinal and bark products) for the international market. This certification, based on an assessment by Smartwood using international FSC standards, prompted efforts to develop a set of national standards for certification.

In light of the participatory nature of the Nepalese community forestry programme, some Nepalese foresters suggested that a participatory approach be used when developing these standards. Through a participatory approach by government foresters, NGOs and CFUGs (Shrestha and Khanal 2004) the global FSC standards will first be adapted into a set of local standards for community forests in different geographic areas; they will then be amalgamated into a national standard. In 2004 the first experiment to identify local criteria for assessing forest management was initiated by two CFUGs in Parbat district (Shrestha and Khanal 2004); these experiments are now being repeated and are currently ongoing in other regions.

A second initiative in participatory development of was undertaken in 2005. It involved the Ganeshman Singh Forest Conservation Award, which is presented annually by the Ministry of Forest and Soil Conservation to the most successful CFUGs. Six CFUGs in different physiographic regions identified local criteria and indicators for judging successful community forest management for the award (Pokharel and Larsen 2007).

Local opinions about biocultural diversity standards in Nepal

These two experiments provide insights into the opinions of local communities about relevant criteria for biocultural diversity. Additional information was collected by independent studies on local criteria for assessing community forestry (Smith, Chhetri and Regmi 2003) and biodiversity (Lawrence et al. 2006).

Jointly, these findings demonstrate that although local communities value biodiversity, their values regarding biodiversity are not necessarily the same as those of ecological experts. This is illustrated by an ecologically-focused study in two CFUGs reporting that biodiversity conservation was not an explicit management objective, and that biodiversity had either declined or had been altered as a result of management practices such as cleaning, weeding, thinning, selective felling and/or plantation establishment (Acharya 2004). The culturally-related local values mainly concern functional biodiversity rather than intrinsic values of biodiversity (Smith, Chhetri and Regmi 2003; Shrestha and Khanal 2004; Lawrence et al. 2006; Pokharel and Larsen 2007):

- The local ideal concerning forests is not undisturbed pristine forest, but rather a well-functioning, production-oriented forest. The villagers' appreciation of forest quality does not necessarily relate to the most biodiverse forests, but rather to those

best stocked with useful species. Locally valued biodiversity includes not only trees providing timber, fuelwood, or fodder, but also herb and shrub species that provide NTFPs, notably medicines.

- Functional biodiversity also includes a variety of ecosystem services, such as regulation of conditions related to soil, water and micro-climate. Local values recognize the need to protect endangered species — notably animals threatened by hunting — and to carefully monitor the introduction of exotic species.
- Local values emphasize the cultural significance of forests. Forest conservation and management should include the conservation of cultural sites — and the objects they contain — such as graveyards, monasteries, and locations of cultural ceremonies; their presence gives forest a high conservation value for local people. Forest value is also reflected in local knowledge about the distribution and use of a range of species and forest types; such knowledge is part of cultural identity.

- Local values of forests are reflected not only in technical practices of forest use and conservation, but in social practices of participation and benefit-sharing. Local communities are conceived of as heterogeneous rather than homogeneous groups of people (Ghimire, McKey and Aumeeruddy-Thomas 2004). Local people consider that social and economic diversity is as important as biodiversity. Local principles for forest assessment emphasize equitable distribution of different types of biodiversity to different categories of forest users, paying specific attention to poor and disadvantaged groups. They also identify the need for effective representation of women and disadvantaged and minority groups in the communities' management committees. Moreover, locals believe that outsiders who make use of indigenous knowledge regarding biodiversity should provide compensation for that use.

Conclusion and lessons learned

The experience in Nepal demonstrates the relevance of extending the concept of biodiversity to biocultural diversity and of including them, as well as standards for recognizing local representations and values, in certification schemes. Local standards for conserving biocultural diversity differ in several respects from the standards identified by ecological experts. Local people do not see biodiversity conservation as an ecological imperative for conserving the intrinsic values of nature in all its variety. Although local standards recognize the need to protect locally-acknowledged endangered species, they focus primarily on the need to conserve functional biodiversity. Functional diversity includes the provisioning, regulating and cultural services provided by biodiversity. Certification standards should focus not only on cultural aspects of forests, but on equitable sharing of forest benefits within heterogeneous communities. The Nepalese experiments demonstrate that conservation standards should recognize the diversity in cultural practices for using forest biodiversity and sharing its benefits.

Three main lessons can be learned from the Nepalese experience in terms of making forest certification more effective as a means of culturally-sensitive biodiversity conservation:

- Explicit attention should be given to both functional biodiversity and threatened biodiversity. At present, most forest certification systems focus on the provision of one dominant forest product (e.g., timber or carbon sequestration) with biodiversity conservation considered a benefit of sustainable forest management. More attention should be given to developing standards for balancing multiple uses of functional biodiversity and conservation of threatened biodiversity.
- It needs to be recognized that cultural values regarding biodiversity are expressed not only in location and group-specific practices for multiple forest uses, but in social practices for sharing diverse benefits. Standards for biodiversity conservation should focus not just on biodiversity, but on the socio-economic and cultural diversity of various forest products and services.
- Participatory approaches to standard setting for biodiversity conservation are needed. Such processes empower local communities to make use of local knowledge and deal effectively with global standards.

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Section 2

Monitoring: options and challenges

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2.1 Monitoring biodiversity in certified forests

TOBY GARDNER

Challenges and ways forward

The fate of much of the world's terrestrial biodiversity depends upon our ability to improve the management of tropical forest ecosystems in areas that have been or are currently being modified by humans (Gardner et al. 2009; Wright 2010). In seeking to establish and maintain ecologically responsible management standards forest certification makes a significant contribution to meeting this challenge. This article identifies ways in which biodiversity monitoring can be most effective in facilitating and guiding the process of certification. A large number of existing texts on monitoring focus primarily on the technical details of surveying biodiversity in the field. In this article, I take a few steps back and focus on the importance of first thinking about the why and what of monitoring, as well as the ways in which monitoring activities fit within the wider framework of the management system itself.

BIODIVERSITY MONITORING AND MANAGEMENT SHOULD BE VIEWED NOT AS STRICTLY SCIENTIFIC ACTIVITIES, BUT INSTEAD AS INHERENTLY SOCIAL PROCESSES THAT ARE INFLUENCED AND GUIDED BY SCIENCE.

Why should we be worried about biodiversity monitoring?

The straightforward answer to this question is that monitoring is generally done badly, but it remains the only way by which we can assess the state of our forests and improve our ability to conserve biodiversity in the long term.

Despite its theoretical importance monitoring is often trivialized as being a simple "tick the box" exercise, necessary to satisfy auditing requirements. Yet poorly conceived monitoring programmes can often do more harm than good — resulting in a waste of precious resources and an undermining of the credibility and value of monitoring in the eyes of forest management authorities and decision makers (Sheil, Nasi and Johnson 2004; Lindenmayer and Likens 2010).

Toby Gardner is NERC Fellow, Conservation Science Group, Department of Zoology, University of Cambridge, UK. He has ten years of experience in working with private and public forestry sectors, primarily in the tropics, to develop research programs that can make a useful and practical contribution to forest management.

Many if not most of existing biodiversity monitoring programmes centre on providing a "surveillance style" record of how biodiversity (e.g., the population size of a particular species or the area of a specific vegetation type) changes over time. Such information is often used as an early-warning system. For example, information on declines in populations or species can be used to kick-start conservation action, either in the form of a regulatory mechanism (as is commonly done in the management of fish stocks) or in raising public and political awareness about environmental issues. Long-term monitoring of biodiversity across a network of sites can also help in developing an improved understanding of background levels of variability in natural systems, and can capture information on hitherto unperceived threats. Surveillance style monitoring can also be an effective way to engage non-scientists in conservation (such as nation-wide bird surveys in countries like Britain, the Netherlands and North America).

Nevertheless, there are serious limits to a surveillance approach as a practical aid to forest management and the development of certification standards. Its main shortcoming is that it is disconnected from the management process. The monitoring programme is designed to have an isolated focus on specific elements of biodiversity (i.e., whether there are more or fewer individuals of an endangered species in the management area) and not on assessing the impact of the ongoing management activities themselves (e.g., the importance of variability in logging cycles, road building or the design of forest corridors for effectively conserving the biodiversity of interest). Surveillance approaches presume that a clear and workable plan of action is already available and that this can be launched once the warning bells start ringing. Unfortunately, this is rarely the case.

An operational framework for biodiversity monitoring

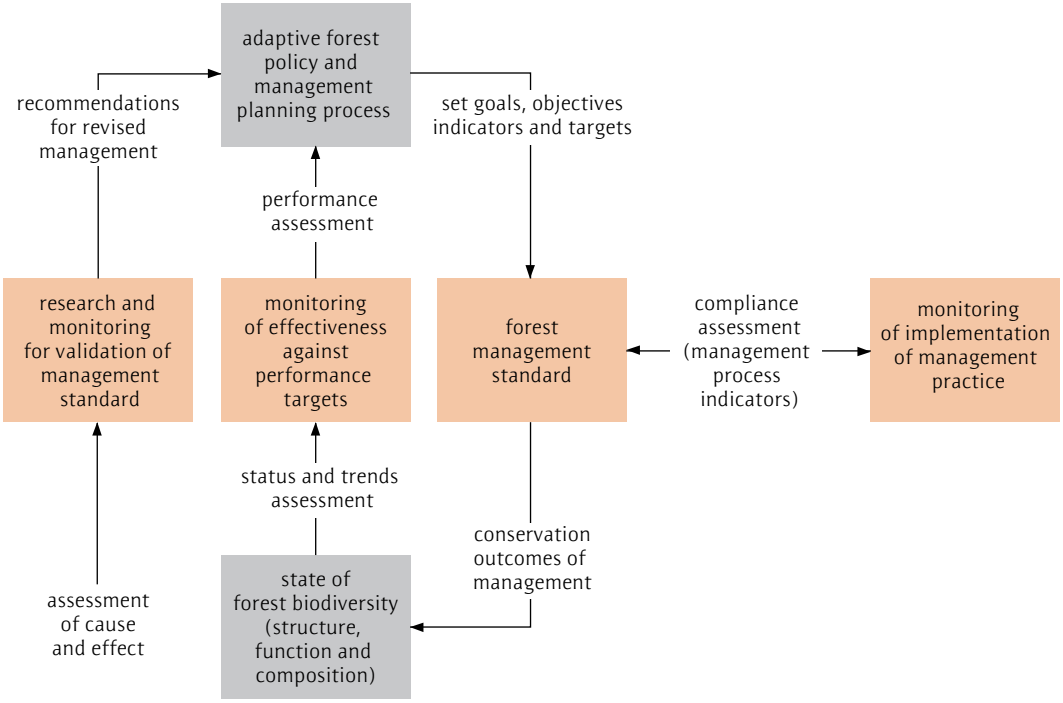
In an ideal world we would have a perfect understanding of how different management interventions affect forest biodiversity, and we could use this understanding to dictate a clear code of practice — or certification standard — that would guarantee responsible use. Management compliance could be obtained simply by monitoring the implementation of management activities (as noted by Noss and Cooperrider 1994 and Gardner 2010; often termed implementation monitoring).

This is clearly not the case, however. The biodiversity consequences of human impacts are unpredictable, many threatening processes remain poorly understood, and in the vast majority of cases we have a poor understanding of how generic guidelines can be most effectively adapted to fit the context of a specific forest landscape. Biodiversity monitoring is needed to overcome two interrelated problems that are central to the certification process (Figure 1):

- ensuring that minimum practice standards do indeed translate into minimum levels of performance on the ground (often termed "effectiveness monitoring"). This should represent an integral part of the auditing process, and is an essential part of any performance-based standard (e.g., ISO, FSC); and

- evaluating the extent to which existing management standards are adequate and how they can be further refined to ensure continued progress towards long-term conservation goals (often termed "validation monitoring"). This is essentially the same as applied research. It provides a valuable mechanism for learning about how to improve opportunities for biodiversity conservation within the certification process.

Figure 1. Conceptual framework of an integrated biodiversity monitoring programme



As shown in Figure 1, a monitoring programme should comprise three tiers to be effective in both assessing and evaluating performance:

- implementation monitoring of management practice compliance;
- effectiveness monitoring of the system against predetermined performance indicator values; and
- validation monitoring to evaluate how best to achieve continued progress towards long-term conservation goals

Done well, monitoring provides a linchpin between ultimate management goals (e.g., as stated in the principles and criteria of a generic certification standard) and the ongoing management process — the means by which to translate conservation objectives into improved on-the-ground management. This is the philosophy of adaptive management, which, although much discussed (and required — at least on paper — by many certification standards) has rarely been implemented effectively. Recognizing the

complementary aspects of these different types of monitoring approaches and their associated indicators (Figure 1) is key to successfully integrating biodiversity monitoring within the wider forest management process.

Developing a monitoring programme

Once the purpose of a monitoring activity has been established (e.g., effectiveness or validation monitoring or both) there is a logical series of steps to follow in developing the rest of the programme (Green et al. 2005; Gardner 2010). If the only purpose is to provide an audit function, the task is relatively straightforward: the certification authority determines indicators and minimum standards and collects monitoring data to verify that standards have been met.

In contrast, validation monitoring is a much more involved process. It requires measuring changes across different levels of cause and effect, including changes in management practices (ultimate drivers), through changes in forest structure and function (proximate drivers), to changes in biodiversity. The end goal of generating recommendations is improving management.

Conservation goals reflect societal values and political or institutional intent in management, and create the context and sense of purpose of biodiversity monitoring. They also provide the basis for selecting specific monitoring objectives and indicators. Conservation goals can focus on safeguarding individual species of conservation concern (e.g., threatened species or species of particular functional importance in forest ecosystems, such as key seed dispersers and pollinators). Alternately, they may reflect a broader, ecosystem-wide perspective to ensuring the protection (or restoration) of ecological integrity across whole management areas or landscapes (as determined by deviations from an appropriate reference condition, such as a neighbouring reserve or set-aside area).

Both goals are complementary (Lindenmayer et al. 2007; Gardner 2010), but the maintenance and restoration of ecological integrity invokes a much broader conservation challenge than just preserving a particular set of species. Although assessments of ecological condition or integrity are very well developed for aquatic systems (see Linke et al. 2007), they have received comparatively little attention in the terrestrial world, despite offering much promise.

Clear research objectives for validation monitoring are essential to ensuring that time, money and expertise are not wasted. Because no monitoring programme has sufficient resources to address all possible objectives it is necessary to prioritize investment so as to deliver the greatest benefits with respect to long-term conservation goals. This includes identifying which areas of management have the greatest impact on the biodiversity of concern, where the greatest areas of scientific uncertainty lie, and what is possible with the funds and human resources available.

Once the goals and objectives of monitoring have been agreed upon, the next step is to identify a set of indicators that are able to deliver the desired information in a cost-

effective manner. Particular care is needed to select an appropriate balance of indicators — of species and forest structure — that allows existing management performance to be reliably assessed and provides a mechanism for evaluating progress against long-term conservation goals (Figure 1).

- Species-based indicators do not generally provide reliable measurements for assessing compliance with minimum practice standards because of inherent technical difficulties in establishing clear links between management impacts and changes in biodiversity itself (Lindenmayer et al. 2000; Gardner 2010).
- Indicators of forest structure and function (such as understorey and canopy structure, corridor width and length, river sediment loads) generally do provide reliable measurements of management performance because they exhibit direct and measurable responses to changes in human activity.

Given these considerations a central goal of (validation) biodiversity monitoring is — through intermediary changes in the structure and function of the forest — to improve our understanding of the processes that link changes in management to changes in biodiversity. The primary task of biological indicators (to measure changes in ecological condition and target species - threatened species that represent conservation goals in their own right), should therefore be seen not as direct indicators of performance, but as evaluators of the (largely structure based) performance indicators that define auditable forest management standards (Kneeshaw et al. 2000). This process of validation is often missing from monitoring, but it is vital if we are to successfully link changing management practices to underlying conservation goals.

Sampling design and data analysis depend significantly on the choice of objectives and indicators, and should draw as much as possible from existing scientific knowledge in order to improve the reliability of inferences from field data. This process can often be aided by the development of conceptual models that describe the dynamics of the study system. Sampling designs and protocols, like the wider monitoring-management system itself, should be subject to revision when new information is received and monitoring programmes evolve. Data analyses need to carefully distinguish between approaches that are targeted at assessing management performance against pre-determined standards, and those that are concerned with understanding cause-and-effect relationships between human impacts and measured biodiversity (Gardner 2010).

Putting biodiversity monitoring into practice

Ultimately, theoretical arguments concerning the purpose, design and implementation of monitoring programmes can only go so far in ensuring success. Many biodiversity monitoring programmes either fall short of their original intentions or fail because insufficient attention was given to the factors that determine viability in the real world, particularly with regards to the people involved in monitoring.

Deciding on the appropriate combination of people to design and run a biodiversity monitoring programme depends on the desired level of detail and whom the data are intended to benefit. In many tropical forests an integrated approach to monitoring —

one that combines expert guidance and management from professional scientists with extensive participation by local people (forest managers or representatives of local communities) — is likely to provide the most effective solution.

The contribution of professionals ensures scientific rigour in programme design and data analysis. The involvement of local people facilitates the process of implementing any management recommendations, providing a cost-effective and sustainable means of data collection and a potentially rich source of local knowledge to help interpret results. In addition to improving cost-effectiveness, the viability of biodiversity monitoring can be further enhanced by increasing the relevance and utility of monitoring products to as wide an audience as possible, including forest management authorities responsible for development of standards, government agencies responsible for national biodiversity assessments, the scientific community and environmental educators.

Biodiversity monitoring and management should be viewed not as strictly scientific activities, but instead as inherently social processes that are influenced and guided by science. Without clear recognition of the broader societal context for the monitoring process, and of the conservation values that underlie the monitoring, even the most technically robust monitoring programme will fail. The challenge of putting biodiversity monitoring to work will ultimately depend, more than anything else, on people's behaviour and their capacity to change. As John Meynard Keynes so astutely put it, "The difficulty lies not so much in developing new ideas as in escaping from old ones."

I have only touched very lightly on some of the key considerations involved in developing a biodiversity monitoring programme for forest management and standard development. More detail and accompanying references are available in my recent book, *Monitoring Forest Biodiversity: improving conservation through ecologically responsible management* (Earthscan Forestry Library series 2010).

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2.2 Monitoring forest activities in Cameroon

YVES NATHAN MEKEMBOM

Preserving biodiversity in the process of certification

Cameroon's estimated 12.8 million hectares (ha) of permanent forest estate, including 8.84 million ha of natural production forest (ITTO 2006), has good potential for sustainable forest management. The forests are rich in biodiversity, with more than 8,300 plant species, nearly 300 mammal species, and 848 bird species (ITTO 2006) of which 30 mammals, 13 birds, 47 amphibians, and 249 plants are critically endangered, endangered or vulnerable on IUCN's red list of threatened species and are found in production forests (IUCN 2004, cited in ITTO 2006; MINEF 1998a). Much of this biodiversity can be preserved in forests certified as well managed. In this article I illustrate how the consideration of biodiversity conservation required of a forest company by a certification agency can aid forest managers, auditors and certifiers. Required forest management prescriptions in Cameroon include measures to protect soil, biodiversity, flow of water in forest management units, and a series of silviculture treatments to encourage regeneration of commercial tree species (MINEF 1998b; ITTO 2006). Most companies engaged in certification follow the requirements of the Forest Stewardship Council (FSC).

The pressure of Corrective Actions Requests during an audit is required to stimulate forest managers into management activities directed at biodiversity conservation.

Forest exploitation induces effects that are not well understood due to a lack of information about the ecology and responses to interventions of most forest tree species (Durrieu de Madron, Forni and Mekok 1998).

It is only through the monitoring and evaluation of forest activities that biodiversity conservation can be taken into consideration. In Cameroon, all certified forest companies have a management unit in charge of internal audits, monitoring of forest activities and fieldwork planning. The goal of monitoring is to assess the extent to which practices in the field (or other parameters, such as abundance of plants or animals) meet certain standards, as input into adaptive management processes.

Yves Nathan Mekembom works for the Limbe Botanic Garden. His interest in biodiversity monitoring and certification is improvement of the consideration of rare, threatened, endangered species and other useful forest resources during forest activities.

Monitoring forest activities before logging

Before logging commences, the areas to be exploited are demarcated and sometimes roads are built. This is followed by an inventory of all trees larger than 50 cm diameter at breast height; during this stage forest manager becomes aware of the state of the forest in terms of terrain, hydrology and swampy areas. The inventory data are used in the preparation of harvest plans.

During the inventory, a serial number and geographical coordinates are given to all trees to be harvested. Most companies pay particular attention to timber during inventory, but information about non-timber forest products (NTFPs), key habitats and key species, fragile sites (swampy areas, steep areas and hills) are usually not seriously considered. Dupuy (1998) and Nzogang (2009) list 79 and 124 trees species, respectively, as having commercial value in Cameroon, but no forest company (certified or not) exploits more than 20 timber species, since the international market is interested in only a few tree species. As a result, there is pressure on these internationally traded species. Local markets are not supplied by these companies, but by small local producers.

The most commonly used map in logging activities is the exploitation map. It does not include all forest inventory data, except those related to swamps, streams, and habitats of protected animals. The information needed — about future crop trees, tree species excluded from exploitation due to their low density, NTFPs, tree species with economic value but not in demand by the market, and other forest resources and animals — are not sufficiently included to ensure biodiversity conservation.

Due to FSC certification requirements, certified companies and those seeking certification have started to consider these issues. Certification places importance on these resources. Certified companies take biodiversity into consideration and consider information related to fauna, rare and endangered species, NTFPs and other resources as well as timber in their inventory reports. They also produce maps on the distribution of resources, human activities, mammal corridors and habitats to be managed. However, some of these maps are not used during logging activities. Certified companies have started to use inventory information for the demarcation and creation of buffer zones before logging activities, based on the recommendations of certification auditors. It remains a challenge to ensure that these areas are not disturbed during forest activities. Forest managers should be made aware of the value of biodiversity; in other words, biodiversity evaluation and conservation should not be seen as a waste of time and money; or merely as a requirement for certification bodies and forest administrations.

Construction of roads

The road network is constructed based on the result of the inventory. Roads are located so as to reduce their impact on the forest, taking into consideration river crossings, habitat of threatened species, large-mammal migration corridors, rare tree species and fragile ecological areas (swamps, slopes and rivers). It is always challenging to balance economical viability and ecosystem protection during road planning. When a road is not wide enough, the canopy is closed and the sun cannot penetrate to dry the road surface, which makes it difficult to transport logs due to mud. However, wide roads have a severe impact on vegetation and aerial pathways for crossing animals, and thus on biodiversity. Unfortunately, construction of wide roads is the option that most companies pursue. Certified companies, on the other hand, choose to cross rivers in places where the riverbed is narrow and tend to build narrow roads.

Logging activities

Logging has an impact on biodiversity by the opening of the canopy, compacting the soil and destroying vegetation. These impacts make RIL important. Some damage is difficult to avoid in logging operations (damage to or breaking of small trees). Under RIL practices, before loggers start harvesting timber, a team systematically marks critical areas and trees to be harvested. When possible, rare tree species, seed trees, endangered species and fragile sites are protected by directional felling.

After logging, monitoring consists of checking whether the right stems have been harvested and removed from the forest; it also assesses the impact of the operation on the environment. The results of monitoring cannot be used until the next year's operation, since forest activities are planned annually. Monitoring activities done by forest companies focus on the improvement of management practices that will increase timber production.

In order to ensure consideration of biodiversity conservation it is very important that monitoring be evaluated by an external, impartial organization. In Cameroon, this is done by staff of the Forest Department and the Environment Department and by auditors, but insufficient time is allocated to these tasks.

Monitoring after exploitation

Once the last log has been removed to the sawmill certain activities should be conducted in order to ensure the regeneration of the forest:

- Restoration of vegetation at log landings, skid trails and near secondary roads by scarification of the soil and reforestation with a combination of slow and fast-growing tree species, especially those exploited by the company, in order to regenerate or redensify canopy openings. Certified companies sign conventions with ANAFOR, the national agency in charge of silviculture in Cameroon, for technical assistance. Although trees are planted, no monitoring of reforestation success is carried out.
- Destruction of bridges and culverts to prevent access by vehicles and people after exploitation is finished. It is also a means to control hunting in the forest management unit (poachers often use bikes or cars on roads created by

logging companies). Logging areas are usually far from villages (15 to 100 km). The destruction of bridges makes vehicle access to the forest impossible. In addition, forest companies, in collaboration with local NGOs, report poaching to administrators to facilitate specific anti-poaching actions; the companies also contribute financially to such operations. The results of these measures have been very good.

Conclusions and recommendations

Forest certification has contributed to greater enforcement of laws and regulations by certified companies in Cameroon. As a marketing tool it can contribute to biodiversity conservation in the country's production forests, but work still needs to be done in this area. Monitoring of forest activities alone cannot ensure biodiversity conservation in production forests, certified or not. Also forest managers may not be inclined to carry out activities not directly related to timber production. The pressure of corrective action requests during an audit is required to stimulate managers into management activities directed at biodiversity conservation.

In addition, biodiversity conservation in tropical production forests is difficult to evaluate due to the complexity of the ecosystem and the rich biodiversity that it accommodates. Some impacts of forest logging in tropical production forests are unavoidable. At the very least, logging companies should be encouraged to improve implementation of RIL in their activities.

In Cameroon, forest area is divided into typical conservation forests, production forests and other land uses. Production forests have management plans with specified activities and objectives (controlled by the Forest Department and the Environment Department). Forest managers tend to see biodiversity conservation objectives in production forests as converting production forest into a national park or reserve.

In order to ensure that forest certification contributes to biodiversity conservation it is important to carry out several tasks:

- observations and checks from government agencies in charge of forests and the environment, and from internal audits that are part of forest activity monitoring should be integrated in companies' work plans;
- auditors and certification bodies should evaluate compliance with biodiversity conservation according to locally adapted standards and the company's effort to respect norms; and
- more time should be allocated to evaluating biodiversity conservation efforts during audits and checks.

Some key obstacles can make it difficult to monitor biodiversity conservation in production forests:

- botanists engaged by forest companies are more familiar with timber species than with other plants;
- the biodiversity of Cameroonian forests is complex;
- the main objective of management plans for production forests in the is sustainable production of timber, not biodiversity conservation;
- biodiversity conservation in production forests in Cameroon is not clearly and effectively set out in laws, regulations and management plans;
- forest managers are reluctant to implement any new practice that is not directly related to timber production; and
- the concepts of biodiversity and conservation are poorly understood due to the level of education of some forest workers.

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2.3 Locally based monitoring and forest certification

BEN PALMER FRY

Introduction

"Certification networks could be more effective at containing negative social and environmental impacts if they borrowed from community-based natural resource management approaches." Although this statement is drawn from shrimp farming (Vandergeest 2007), the message rings true for the forest certification sector. We need to take notice.

All recognized forest certification bodies have specific biodiversity conservation standards; certification is expected to contribute to biodiversity conservation. For example, the Programme for the Endorsement of Forest Certification Schemes (PEFC) has a requirement in its criteria and indicators that the impact of [timber] harvesting on biodiversity be minimized.

THE VALUE OF LOCALLY BASED MONITORING IS CLEAR FROM EXAMPLES IN THE DEVELOPED WORLD, WHERE "CITIZEN SCIENCE" HAS OFTEN PROVIDED HIGH-QUALITY INFORMATION AT A FRACTION OF THE COST.

Adapting management practices to certification standards is only half the story, however. Standards must also require managers to regularly monitor and act on the socio-environmental state of their forest. This essentially checks on the status of the forest under certification. For instance, Forest Stewardship Council principle 8 requires appropriate monitoring of the condition of the forest, management activities and their social and environmental impacts.

Forest monitoring — which includes biodiversity monitoring —provides the focus of this article. Like other natural resource monitoring, forest monitoring for conservation purposes has been historically conducted by external professionals (Angelsen 2009). Recently, in some places, the monitoring responsibilities are being devolved to local communities, a practice that has become known as community-based or locally based monitoring (Garcia and Lescuyer 2008). The value of locally based monitoring is clear from examples in the developed world, where using "citizen science" in projects has

Ben Palmer Fry is a doctoral researcher in forests and locally based monitoring, Centre for Environmental Policy, Imperial College, London. His interest in this theme is primarily academic and stems from his research experience in forest monitoring in Argentina and community engagement in East Africa.

provided high-quality information at a fraction of the cost. Examples include the development of the European Bird Atlas in the 1990s and the Open Air Laboratory (OPAL), the UK environmental-monitoring initiative that involves the general public in measuring soil, air, water, biodiversity and climate indicators. As conservation funding is often scarce, locally based monitoring may well prove to be a pragmatic and sustainable way to assess the progress of forest certification.

Professional versus locally based monitoring

Garcia and Lescuyer (2008) claim that the devolution of forest monitoring responsibilities has been largely unsuccessful in improving the condition of the forest or halting degradation. There are exceptions, however; notably, two African examples of successful, long-standing, locally based biodiversity monitoring systems in Ghanaian and Tanzanian nature reserves (Brashares and Sam 2005; Blomley at al. 2008). Similarly, recent studies in the Philippines indicate the potential success and feasibility of locally based monitoring (Uychiaoco et al. 2005; Danielsen et al. 2007). Regardless of the context, there are three areas to address when comparing professional monitoring to locally based monitoring:

- accuracy and variability;
- cost and sustainability; and
- cultural relevance.

Accuracy and variability

Depending on a number of conditions (see "Techniques"), there is a growing consensus that locally based monitoring can produce data that are just as accurate as those derived by professionals (Yoccoz, Nichols and Bouline 2003; Danielsen, Burgess and Balmford 2005; Danielsen at al. 2008). Nevertheless, the variability of locally produced information remains problematic, as exemplified by the international K:TGAL carbon monitoring project (Skutsch et al. 2009), where almost all the test sites showed an extensive range in the carbon measures per hectare of forest. Although they don't gloss over this problem, Skutsch et al. insist that this high variability is an inherent part of the different monitoring techniques used, and that simplified and participatory methods have greater variance than more conventional "scientific" practices. An example from the non-tropical world that lends weight to locally based monitoring is that of the Sami reindeer herders, whose "observation of how snow depth has changed over the past 50 years aligns with long-term data collected by scientists" (Danielsen, Burgess and Topp-Jørgensen 2007).

Cost and sustainability

Locally based monitoring is cheaper than professional monitoring at all stages of the monitoring cycle, even if the start-up costs for locally based systems are high (Topp-Jørgensen et al. 2005). Intuitively, if the costs of locally based natural resource monitoring are low, the monitoring programme is more likely to be financially sustainable than a costly professional scheme (Ghazoul 2001). In addition, the locally based approach involves the community in planning, data collection, analysis and decision making, which in turn generates local ownership for the monitoring programme.

The success of the International Model Forest Network (IMFN), which relies almost entirely on local leadership and participation to sustainably manage and monitor its sites, is testament to the cost-effectiveness and sustainability of the locally based approach. More than 50 model forests have been established in 20 developing countries since the 1990s, and almost all are still in existence (see www.imfn.net). This approach increases capacity and environmental awareness among community members. It also creates a local institutional framework that can link more remote rural communities with sub-national and national institutional arrangements, encouraging relationships with the government.

Cultural relevance

Involving local people in the planning and operation of monitoring programmes gives them the opportunity to significantly influence what is monitored. Since these will likely include resources on which they depend, local people usually detect any threats to these resources quickly. Threats then can be addressed through local management actions.

I experienced this in 2009 in southwest Uganda. Bamboo growth within the Echuya Forest was closely monitored by the local Bachiga and Batwa people, who used it as a building material; they frequently reported illegal harvesting to the forestry department, who would subsequently send out patrols. The relevance of locally based monitoring is also shown by Danielsen et al. (2007) in the Filipino national park network. This can be contrasted to professional biodiversity monitoring, which may focus only on rare, endemic or charismatic species. Local communities are often more interested in the broader resource base of the forest than the status of particular flora or fauna.

Locally based monitoring isn't a silver bullet. Professional monitoring will continue to be required in certified areas where there are no residents; where local people don't depend on the natural resources around them; where the relationship between the communities and the local authorities is poor; and where monitoring parameters are highly complex. Professional monitoring also has the advantage of being able to be conducted anywhere and at any time, with little notice, given the international pool of trained scientists with the appropriate skills. The quality of information can be largely guaranteed through the initial selection of the external team and proven protocols. In addition, this information is frequently published in the international science and policy world, so it may have a much greater impact.

Despite the relative advantages of locally based and professional monitoring, the best approach will often be a combination of the two. For example, programmes could use data collected by local community members but have all other aspects run by professionals (as in the creation of the European Bird Atlas), or could involve communities in all aspects of the monitoring, from planning to data analysis. External experts can be helpful in helping communities to ensure that the planning phase covers elements that are both culturally

relevant and scientifically useful (Garcia and Lescuyer 2008). An example is non-timber forest products that are used for subsistence but are also suitable indicator species such as monitoring butterfly diversity during harvesting in the Iwokrama Forest in Guyana (Bovolo and Losos 2010).

Techniques

With the advantages of locally based monitoring becoming clear, establishing and sharing appropriate practical techniques has become important. In 2006 an international network was established called Monitoring Matters (MOMA); it includes Tanzania, Nicaragua, Bhutan, Ghana, Namibia and the Philippines, as well as research scientists from across the globe. MOMA conducted a three-year project (Jensen 2006), tracking six categories of natural resource indicators (e.g., vegetation types, bird populations) in the six countries and utilizing a range of monitoring techniques (both participatory and conventional "science" techniques). Many specific practical lessons have been drawn from this, some of which are discussed here. There appears to be consensus on a number of community-based monitoring issues:

- It is better to use appropriate, participatory methods of data collection (e.g., using field diaries instead of line transects for biodiversity, and using disturbance checklists instead of fixed-point photography to assess forest disturbance) instead of attempting to train local people in conventional scientific methods. A focus group is seen as the most universally useful technique in that it draws information from a number of different sources simultaneously, while creating an institution in itself through which the local community can be empowered to solve their local problems and influence government (should that institutional setup be lacking).
- Studies in East Africa found that with a minimum of one day of training, local monitors were capable of producing data on habitat loss and forest disturbance that was comparable to that collected by those with formal scientific training (Holck 2008).
- Concerted input is typically needed to ensure continuity, starting with planning and continuing through data collection. This input may come from a local NGO worker or a local government official (Uychiaoco et al. 2005).
- Communities have their own ways of monitoring their resources, and it is essential to integrate any applicable elements of this indigenous system into the monitoring scheme.
- The benefits that the monitoring participants receive — whether economic or social — must be apparent in order for the monitors to perceive that the benefits outweigh the costs.
- With any scheme run by the people that it directly serves, integrating independent verification is an essential component to ensure functionality. No credible scheme can be self-policed.

There is disagreement regarding the use of advanced technology. Skutsch et al. (2009) consider GPS units, geographical information systems and online tools as necessary components of community-based forest monitoring. Abrell et al. (2009), on behalf of the

United Nations Environment Programme, also promote the use of advanced technology in locally based monitoring. Although such an approach helps build technological proficiency and potentially allows locally derived data to reach higher institutional levels, Rodríguez (2003); Danielsen, Burgess and Balmford (2005); and Global Witness (2009) state the need to avoid using high-tech equipment which is hard to maintain when in remote rural settings, despite the pressure to use it for local and governmental prestige.

All of these practical lessons are drawn from initiatives that directly or indirectly aim to conserve biodiversity and so can be utilized to shape future biodiversity monitoring systems, especially within forest certification schemes.

Using locally based monitoring

Apart from lower costs and greater cultural relevance, there are two other areas in which locally based biodiversity monitoring could substantially improve the conservation value of forest certification systems.

First, it generates community ownership of the monitoring programme and of the actual resource being monitored. The so-called "tragedy of the commons" (Hardin 1968), where people selfishly exhaust a communal resource, is all too commonplace throughout the world. Centrally managed tropical forests experience this problem. The best recognized solution to this "tragedy" is the privatization of communal resources, giving groups ownership of the resource and causing them to restrict the use of it according to their needs. A potential solution for tropical forests is to "privatize" them by increasing responsibility for the forest among the local communities instead of excluding forest-dependent people in fortress-style conservation. Current certification systems do not necessarily empower local people; whereas, locally based biodiversity monitoring could support community ownership of the programme and an enhanced relationship with the area's natural resources.

Second, and importantly, it generates more local jobs under the forest management scheme. As one of the primary goals of certification is to reduce illegal logging (artisanal or otherwise), any forest certification scheme must include alternative livelihood possibilities for people whose employment is affected by its introduction. Locally based approaches can effectively provide monitoring jobs for displaced workers (such as in the SAGUN programme in Nepal, Blomley and Franks 2009) and in doing so reduce any resultant pressure from millers turning from harvesting wood to harvesting other non-timber biodiversity.

Conclusions

If locally based monitoring is going to be integrated into forest certification, further work is required. Scepticism towards this style of monitoring is still found in the government, non-government and private sectors. This is attributed to the need for more quantitative studies that verify the quality of the locally produced data compared to professionally derived data. Also, in comparative reviews by Oliver (2001, 2004) on behalf of the Confederation of European Papers Industries, almost all the forest certification schemes across the world scored top marks on "opportunities and encouragement [for stakeholders] to participate." Nevertheless, certification schemes predominantly focus on the participation of forest managers, and often only obtain "consent" from the diverse forest-dependent people. A more complete review of who is actively participating in ground-level certification schemes would be beneficial and is likely to further justify the need for locally based forest monitoring.

There are already encouraging signs of large-scale viability; national, locally based biodiversity monitoring programmes have been established in Ghana, Madagascar, Nicaragua, the Philippines, Tanzania and Namibia. There is no reason why this practice can't also be applied in forest certification.

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2.4 Auditing and biodiversity conservation

SIMON ARMSTRONG

Why stakeholders and the right tools are so important

Occasionally, concerns are raised about how biodiversity conservation is addressed during audits of forest management (Bennett 2001) and the expertise of in auditing teams. Here I try to inform the discussion concerning the link between certification and biodiversity based on my experience of auditing. It is useful to clarify what audits do and don't do.

An audit is a systematic, independent and documented process for obtaining evidence and evaluating it objectively to determine the extent to which the criteria are fulfilled. The principles of FSC audits are based on the internationally recognized and widely implemented ISO system. Audits assess compliance against specific requirements and ignore factors not included in these requirements. The biologist's role in developing standards and tools to help forest managers meet the standards is vital.

Local standards are often the result of a negotiated agreement reached through consensus among diverse stakeholders.

In addition to forest management audits, FSC operates a third-party accreditation assessment of the competencies and capabilities of Certification Bodies or CBs (e.g., SGS Qualifor, Soil Association Woodmark) to implement the FSC certification system, again in line with the internationally recognized ISO system. These assessments aim to maintain the quality and consistency of forest management audits.

The FSC system does not require CBs to monitor biodiversity conservation directly; for instance, during field audits of Certificate Holder (the forest management unit or the forest management company). CBs are required to assess if the Certificate Holder has an appropriate management system in place to achieve biodiversity objectives; that this system is implemented; and that the Certificate Holder monitors its impacts to inform its operations.

Simon Armstrong is the Director of Simon Armstrong & Associates and an FSC Accreditation Services International (ASI) Accreditation Lead Assessor. He believes that certification provides an important tool in improving management of the world forests, based on his experience of working with tropical forest management companies.

I don't think the main problem of how to appropriately address biodiversity concerns is one of poor auditing or of auditors not checking biodiversity requirements. I cannot prove this, but it could be assessed through a review of both publicly available CB reports of forest management certificates, and of Accreditation Services International's publicly available witness reports of CBs. A larger problem is the complexity of some of the concepts being considered and how to develop the local standards required to incorporate these concepts and identify measurable indicators.

An example of a complex concept that must be audited is Principle 9 on High Conservation Value Forests (HCVFs). FSC requires that management activities in HCVFs maintain or enhance the attributes that define such forests. The definition and practical interpretation of some elements of HCVFs, for example their scale, is not straightforward. Similarly, the operational interpretation of key concepts such as "maintain the ecological functions and the integrity of the forest" is complicated. The question becomes: what should be assessed to determine if ecological function is being maintained?

Stakeholders can influence the way in which biodiversity conservation is assessed in the certification process in a number of ways, from being involved in the formulation of local standards to participating in the auditing process.

What is certain is that the selection of indicators by these stakeholders shapes the impact of certification on biodiversity conservation. Determination at the local and operational level of complex concepts can be strongly influenced by the locally adapted standard. Indeed, this local standard provides the indicators against which certification is assessed, including those relating to biodiversity conservation. Local standards are often the result of a negotiated agreement reached through consensus among diverse stakeholders. As few of these people have experience with auditing, the standards are often developed without adequate consideration of the context of auditing. This can lead to problems. Getting the standards and indicators right is crucial. It involves engaging with people with the right skills and experience, not only in technical issues and social issues, but also in auditing.

An auditor's job, and the processes he or she follows, is well defined, but a worker is only as good as the tools, standards and indicators on hand. Stakeholders really can influence the development of local standards and have positive impacts on certification's ability to improve biodiversity conservation.

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2.5 Monitoring the impact of certification

HANS DE IONGH and GERARD PERSOON

Is there a future for participatory approaches?

In spite of extensive sustainability indicators, there is a lack of quantitative evidence of the positive impact of certification on forest biodiversity. The widespread use of conventional monitoring approaches have thus far not provided conclusive information about the effects of forest certification schemes such as that of the Forest Certification Council (FSC). One of the reasons for this is thought to be the high costs of conventional monitoring (and consequently the relatively small sample sizes), which does not permit representative sampling (van der Hoeven et al. 2000; van Kuijk, Putz and Zagt 2009).

The use of participatory monitoring methods in sustainable forest management certification schemes should be further promoted and should complement and eventually replace conventional methods.

Conventional monitoring tools

Some species of vascular plants (*Mallotus* spp. and *Macaranga* spp.) have been used as indicators for forest disturbance (Kessler 1999; Slik 2001). Although most evidence indicates that single species are not good indicators, there is some scientific evidence that single fauna taxa (species or genera) in tropical rainforests have this predictive capacity (Azevedo-Ramos, de Carvalho Jr. and Nasi 2002). Johns (1987, 1997) and Grieser Johns (1996) provide good examples of structural responses — in terms of changes in species composition and guild composition of avian communities — to disturbance caused by logging in tropical lowland forests. Several authors suggest, however, that single taxa alone are not sufficient to measure the impact of logging on forest biodiversity; they also question whether such an approach is helpful (Landres et al. 1988; Sheil 2001; Azevedo-Ramos, de Carvalho Jr. and Nasi 2002; Sheil, Nasi and Johnson 2004). Some of them conclude that a suite of indicators is needed to make accurate estimates of impact.

Hans de Iongh and **Gerard Persoon** work for Leiden University, the Netherlands. Their interest in this theme is primarily academic, but is also based on extensive experience with tropical timber certification schemes in the Netherlands.

Ghazoul and Hellier (2000) suggest a monitoring protocol based on five indicators:

- forest structure;
- bird community structure;
- butterfly species richness;
- mammal species richness; and
- forest disturbance (dead wood and decomposition).

We suggest that this protocol is suitable to be used in a participatory approach that uses local knowledge and assigns monitoring responsibilities to local people.

Recommendations

As mentioned above, two of the reasons for the lack of conclusive results are thought to be the high costs involved in conventional monitoring and the relatively small sample size, which does not permit quantification of forest management impacts. An important question is: are there alternatives? Are there more efficient and more cost-effective systems that would lead to better results? Sheil, Nasi and Johnson (2004) and Sheil (2001) propose a range of participatory approaches, including participatory mapping, preference matrices for forest products, and inventories of indigenous knowledge.

They recommend the use of local and indigenous knowledge in monitoring the impact of logging on biodiversity in forest concessions. A participative, locally based approach is believed to be more cost-effective; it can also cover a much larger sample area than conventional methods.

Recent research that compared the results of conventional transect counts with results obtained through local knowledge showed that local communities provided accurate estimates (determined by comparing empirical research results with the results of participatory monitoring) of wildlife densities in tropical forests (van der Hoeven 2007). Danielsen et al. (2007, 2008) state that in some circumstances locally based monitoring has advantages over conventional monitoring by professionals. It can build on local capacity and relations between local people and authorities, and can result in more timely management interventions.

We believe that the use of participative monitoring methods in sustainable forest management certification schemes should be further promoted and should complement conventional methods. We also believe, however, that conventional methods cannot be abolished altogether, but should be merged with participatory monitoring to provide calibration and back-up. Little research has been done on the effectiveness of combining conventional and participative methods. A major research effort should result in applicable protocols for forest managers.

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2.6 Certification of non-wood forest products

PAUL VANTOMME

A proxy for monitoring forest biodiversity?

Monitoring biodiversity to determine how management is complying with guidelines is a complex and costly exercise. Not only do habitats and their species differ in many ways; it is generally a challenge to define what exactly needs to be measured, and how and when to measure it.

In forest habitats, forest inventories provide a useful framework to support biodiversity monitoring (including non-tree species) by including measurements and observations of selected biodiversity indicator species. However, the longer such list of species becomes the more complex — and more expensive — biodiversity monitoring will be.

CERTIFICATION OF AN NWFP SPECIES REQUIRES NOT ONLY ITS SUSTAINABLE USE, BUT ALSO PROVIDES A WAY TO ASSESS THE ABUNDANCE OF OTHER SPECIES DIRECTLY LINKED TO ITS SURVIVAL.

The question is: does certifying non-wood forest products (NWFPs)[1] guarantee that biodiversity will be monitored in the habitats where they were collected? In some cases, the answer is yes. The certification of Brazil nuts from Amazon forests in Bolivia or in Acre, Brazil, for example, includes monitoring of the pollinator species (bats) and the small rodents that disperse the seeds, because they contribute to a sustained supply of Brazil nuts and the natural regeneration of the Brazil nut tree.

Several certification schemes address forest management for NWFPs. A good example is provided in the Forest Certification Council (FSC) step-by-step guide to certification requirements (FSC 2009). Step 3 of the guide describes the procedures to monitor the population levels of the NWFP species being harvested and those of other species in the harvested forest. Certification of an NWFP species requires not only its sustainable use, but also provides a way to assess the abundance of other species that it is ecologically

Paul Vantomme works for the Forestry Department, FAO, Rome. His interest in this topic is based on extensive work at FAO HQ and in the field with producers, traders and consumers of NWFPs as to advice member countries on improving their forest policies and institutional capacities.

linked to. In this way, certification of NWFPs provides an opportunity to assess at least a part of the biodiversity of the harvested forest, and have some of the associated monitoring costs borne by the consumers of the certified NWFPs.

Although considerable indigenous knowledge often exists for specific NWFP, formal resource inventory techniques for them are relatively new, especially in tropical countries, and have received little attention to date. The assessment of NWFPs and the resources that support them is a difficult task for several reasons:

- the number and variety of NWFPs;
- the multiplicity of interests and disciplines involved in NWFP monitoring;
- organizational and financial constraints;
- the lack of globally or even nationally recognized common terminology and units of measurement.

In response to this situation and to raise awareness of the importance of accurate and precise resource assessments at all levels of forest use for NWFPs, the Food and Agricultural Organization (FAO) has compiled a technical guidebook (FAO 2001). It provides information about the design and selection of appropriate methods of resource quantification for a range of situations and products. It also reviews and analyzes a wide range of approaches developed to measure NWFPs.

Certification of NWFPs is increasing quickly for both global and national markets in developed and developing countries. In addition, technical manuals are becoming available to assess the status of NWFP-producing species. They include information on how to define sustainable harvesting levels for mushrooms, medicinal plants, berries, wild honey, fruits, as well as best-practice guidelines for the certification of NWFPs. It is expected that the growing number of certified NWFP species and their increasing market share will strengthen conservation of these species, and of the general biodiversity of the forests where they were harvested.

Endnote

1. FAO defines non-wood forest products as "products of biological origin other than wood derived from forests, other wooded land and trees outside forests" (www.fao.org/forestry/nwfp/6388/en/).

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Section 3

Practical experiences

Photo credits

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3.1 Congo Basin timber certification and biodiversity conservation

JOHN R. POULSEN and CONNIE J. CLARK

Context

The Congo Basin retains nearly 60% of its original forest, making it an important reservoir for biodiversity. Economic development and the global demand for timber, which is expected to increase in the coming years, threaten this reservoir, however. Logging concessions have been allocated for 30–45% of the area's remaining forests (60 million ha) and as much as 70% of forests in some countries (Global Forest Watch 2002), although many of these concessions are not yet active. Because timber extraction occurs over such a large area, and standard practices tend to be destructive, logging represents a serious threat to biodiversity conservation. Timber harvesting typically leaves behind a sea of residual damage, rendering forests susceptible to drought, fire and eventual deforestation. Logging operations open up the forest, which allows access into remote areas. Access encourages commercial bushmeat hunting; this depletes wildlife and often weakens the authority of local people to manage and use their traditional forests (Robinson, Redford and Bennett 1999).

PERHAPS THE GREATEST SINGLE CONTRIBUTION OF CERTIFICATION TO BIODIVERSITY CONSERVATION IS THE REQUIREMENT THAT A MANAGEMENT PLAN BE WRITTEN AND IMPLEMENTED FOR EACH TIMBER CONCESSION.

Nevertheless, there is reason for cautious optimism that forest certification could benefit biodiversity conservation by raising management standards and improving practices. The recent certification by the Forest Stewardship Council (FSC) of two timber concessions in the northern part of the Republic of Congo created the largest tract of contiguous certified tropical forest in the world (750,000 ha). In addition to reduced-impact logging (RIL) practices implemented by the *Congolaise Industrielle des Bois* (CIB), the concessions are managed for wildlife and biodiversity.

John R. Poulsen and **Connie J. Clark** work for the Woods Hole Research Center. Their interest in this theme is based on extensive work in conservation and research in the Congo Basin, with WHRC and previously for the Wildlife Conservation Society

There is precedence for this optimism. In 1999, the Wildlife Conservation Society (WCS), CIB, and the Congolese Ministry of Sustainable Development, Forest Economy and the Environment (MDDEFE) created the Buffer Zone Project (BZP) – an unprecedented partnership to manage wildlife in logging concessions. More than ten years later, elephants and apes roam the forests at densities that rival or surpass the adjacent Nouabalé-Ndoki National Park (NNNP; Clark et al. 2009; Stokes et al. 2010).

Activities

Project background

As CIB expanded its operations in the Kabo concession in the late 1990s it came under attack from critics who accused the company of sanctioning bushmeat hunting, specifically the killing of apes (World Rainforest Movement 2003). In response, CIB established a partnership with WCS, a conservation organization, which led to the development of the BZP project. This in turn readied the company to meet certification standards. In 2003, CIB announced its intentions to seek FSC certification to position itself more competitively in the global market.

The BZP partnership aimed to mitigate the direct and indirect negative impacts of timber extraction on wildlife and forests. Its objectives included 1) sustainably managing the wildlife in the timber concessions adjacent to NNNP; 2) protecting NNNP from the negative impacts of timber extraction; and 3) collaborating with local communities on the sustainable management of their territories and wildlife resources. BZP included a wildlife management system based on several key principles and implemented through multiple on-the-ground activities (Elkan and Elkan 2005; Elkan et al. 2006; Poulsen, Clark and Mavah 2007; Poulsen, Clark and Bolker in review; Poulsen 2009).

Regulating access to resources through land-use planning

The first step in the development of a management system was land-use planning. Through a participatory mapping exercise, BZP worked with local communities to develop a zoning plan for hunting and resource use based on traditional territories (for village-based communities), resource use areas (for semi-nomadic communities), and the location of sacred areas (e.g., ceremonial grounds) or important trees (e.g., those that produce crops of caterpillars). After the initial mapping, all communities were revisited and maps were approved and adopted during a series of village meetings. These efforts resulted in land-use plans that were written into management plans for each CIB timber concession. For example, in the Kabo concession 47% of the area is included in hunting zones; 39% of the area can be logged, but not hunted; and 14% is off-limits to hunting and logging. Roadside signs demarcate the zones.

A key lesson emerged: even in logging concessions, participatory mapping is an effective method to clarify land tenure and empower local people to manage their own natural resources. Although the government did not previously acknowledge traditional land tenure, it was incorporated in official management plans.

Promoting selective hunting through law enforcement

In response to the BZP planning, CIB integrated Congolese hunting laws into its company rules. Among other things, the company prohibited the transport of hunters, bushmeat and weapons on logging vehicles. Company employees were required to comply with all national hunting laws and to respect hunting zones. The regulations were explained to newly hired employees, who agreed to them in signed contracts. Frequent outreach campaigns and village meetings built awareness of the company regulations and national hunting laws. Employees who broke the company's wildlife rules were penalized, possibly forfeiting part of their pay or losing their jobs.

Congolese law requires timber companies to financially support a law enforcement unit in their concessions, although this law is not widely implemented. CIB is one of the few companies that comply with the law. In addition to logistical support, CIB invests US$10,000 a month towards a government managed eco-guard unit, approximately 75% of the total cost. The eco-guard unit patrols the forest and staffs roadside posts where logging vehicles are stopped and searched.

Developing economic and protein alternatives to hunting and bushmeat

CIB has also invested materials and manpower to increase the availability of domestic protein for its workers and their families. By importing frozen meat and livestock into logging towns, it potentially decreased the demand for bushmeat, and thus the intensity of hunting. To provide alternative sources of protein and revenue to bushmeat, the BZP has experimented with several types of animal husbandry and alternative livelihoods projects (Elkan et al. 2006; Poulsen 2009).

Developing management plans to formalize wildlife management

Perhaps the greatest single contribution of certification to biodiversity conservation is the requirement that a management plan be written and implemented for each timber concession. In 2006, the management plan for the Kabo concession became the first one to be approved by the Congo government. The plan specified the wildlife management rules designed and tested by BZP, including the land-use plan.

In 2007, the strength of management plans for biodiversity conservation was put to the test. A government official delivered a large game-hunting permit to a group of expatriate hunters and directed them to the Kabo logging concession. According to the hunters, the official told them it was the only timber concession in Congo with abundant animals and easy hunting. When the CIB general director heard that a group of European hunters was crossing into the concession, he called the WCS project director to warn him of the problem. With a phone call to the official and a friendly reminder that the Kabo management plan prohibits safari hunting, the mistake was recognized and corrected. The hunters were directed to a different forestry concession, where safari hunting was permitted.

Adapting management strategies to on-the-ground circumstances

Biological and socio-economic monitoring was used to assess the impact of timber extraction on people, wildlife, and forests and to evaluate the success of conservation strategies.

With real-time data, BZP adapted its law enforcement activities to the situation in the field. Observations of protected species in village markets, for example, might elicit more eco-guard patrols in the forest around those villages. Field data were also used to develop policies on the width of roads and size of buffer zones around forest clearings. Although WCS typically raises funds for monitoring activities, CIB secured funds from the *Fonds Français pour l'Environnement Mondial* (FFEM) for the first mammal survey in the concessions.

Recent results from the monitoring program suggest that the BZP management system — and, by extension, FSC certification — work to conserve biodiversity. Data from bushmeat markets and household diets in logging towns demonstrate that even though immigration has increased the human population by 64%, none of the telltale signs of unsustainable hunting (e.g., reduction in bushmeat availability, increase in price, or change in species composition) are evident (Poulsen et al. 2009).

A 2002 survey of several species of large mammal found no difference in the abundance of most species between logged and unlogged areas (Clark et al. 2009). Similarly, a survey of apes and elephants in 2006 (Stokes et al. 2010) determined that species abundance was highest where there was active management, regardless of the type of land use (logging concession, protected area). In fact, densities of elephants and gorillas tend to be higher in the CIB logging concessions than the adjacent park. Comparatively, densities of these species were significantly lower in an adjacent non-certified concession where wildlife management activities do not occur (Stokes et al. 2010).

Lessons and insights

Certification motivates companies such as CIB to invest in biodiversity conservation. Certification brings prestige to companies; it also provides access to new markets and the ability to sell products at higher prices. The lesson from BZP is that multi-organizational partnerships can be used to achieve it. Logging companies rarely have the expertise or resources to design and implement a comprehensive biodiversity management system. With WCS, CIB acquired a partner with the expertise to develop and implement a wildlife management system – an essential part of biodiversity conservation in Central African forests. With MDDEFE, CIB acquired a partner with the mandate to manage eco-guards and enforce hunting laws.

The CIB operations were among the first certified by FSC in central Africa. Despite the lack of government oversight of logging operations at the national level and the absence of rigorously enforced laws, this certification, in our opinion, was not achieved by lowering the bar. Weakening of standards remains a concern, however, in some geographic regions. Two measures can be taken to protect against this:

1. Certifying bodies need to assure the quality of the auditors and the rigour of their work. A certificate is only as good as its reputation, and certifying bodies should have every motivation to make sure that they do this. In fact, because Congo Basin countries often lack the financial and human resources to enforce forestry laws, the

auditing process, with its frequent visits and spot-checks by experts, could partially make up for the lack of enforcement.

2. The private-sector partnership for conservation, as found in the BZP model, provides an additional layer of oversight to biodiversity conservation and logging practices (Poulsen 2009). Although WCS is an integrated partner in the wildlife management component of the certificate (and therefore not an unbiased observer), it simultaneously serves as an independent observer to ensure that CIB upholds agreed-upon forestry and social standards. For example, WCS field staff have reported infractions (e.g., cables left in the forest, felling of trees sacred to indigenous peoples, improper road construction, transport of bushmeat and hunters) to the company and pressured it to remedy these problems. WCS also has invited independent research groups to study changes in animal abundance and forest structure, diversity, and above-ground biomass associated with logging and conservation activities.

Recommendations

Perhaps the greatest challenge for certification is defining standards for wildlife management and biodiversity conservation; these remain at an early stage of development (Bennett 2001). Although most certification bodies address wildlife conservation to some extent, their principles and guidelines typically focus on endangered species and protection of critical sites and habitats. However, the protection of endangered species is an insufficient goal for biodiversity conservation. For example, although the combined effects of logging and hunting in forests around the village of Kabo did not reduce densities of elephants, densities of duiker, pig, and monkey were reduced by 53, 61 and 66% respectively (Poulsen, Clark and Bolker, in press). While populations of endangered species in certified forest may be sustained, game species still face declines — at least near villages and towns.

Surveys of endangered species do not provide adequate information about the population status of most vertebrates. Non-endangered species are often important sources of protein for rural people and provide ecosystem services critical to forest regeneration. At a minimum, certification standards should have provisions for maintaining functional populations of species that provide valuable services to forests and forest-dependent peoples.

One way to reduce threats to biodiversity is to minimize the number of people drawn into frontier forests by the lure of employment and the development of logging towns (Poulsen et al. 2009). Certification standards need to tackle the population problem by setting standards that limit the number of logging towns in timber concessions. By encouraging companies to house workers and build sawmills in existing towns outside of concessions, timber extraction can still make a substantial contribution to development and poverty alleviation while having a lesser impact on frontier forests.

For more information

Please go to www.wcs-congo.org.

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3.2 Forest certification in Cameroon

TIEME WANDERS

Between 2002 and 2007 FORM International assisted companies in Cameroon to apply sound forest management and validate this management through FSC certification. Local management had to be improved to meet the stringent demands of the FSC label, partly because these were among the first forest management certificates to be awarded in the Congo Basin. Our guiding philosophy through this process was to find rational and cost-effective solutions to FSC requirements.

Background

At the end of the 1990s non-government organizations (NGOs) drew international attention to Cameroon by exposing problems with legality and sustainability in the export of logs and timber. This notoriety had substantial impacts on timber companies; their customers started to demand proof that the timber sold to them was of legal origin. It became increasingly important for companies that wanted to stay in business to secure third-party certification of legal origin and sustainable forest management. They relied on third parties (auditing companies) to provide independent declarations of legality. *Bureau Veritas* (then Eurocertifor) developed the "Origin and Legality of Timber (OLB)" label in 2003 and awarded the first certificate in 2004. By the end of 2009, this proof of legality had been issued to nine companies controlling two million hectares (ha) in Cameroon.

ALTHOUGH CERTIFICATION IS RELATIVELY NEW IN CAMEROON, THERE IS A MARKED DIFFERENCE IN IMPACTS ON THE FORESTS BETWEEN CERTIFIED AND CONVENTIONALLY MANAGED FORESTS.

While seeking certification of legality, many companies started working towards FSC certification. FSC certification is much more complex than certification of legality because it addresses various additional factors, including biodiversity conservation. Mostly as a result of this complexity, the first FSC certification of a logging company in Cameroon was not achieved until the end of 2005. Another, seldom recognized, cause of the delay was that companies were forced to take over responsibilities that were formerly assumed by government bodies

Tieme Wanders works for FORM International, Hattem, the Netherlands. A tropical forester trained in Wageningen, the Netherlands, he is involved in advising forest concessions and plantation companies with regard to management planning, training in reduced impact logging and preparation for certification.

or public organizations. Across production forests in Cameroon, management activities related to wildlife and biodiversity are now carried out by private companies (sometimes with the assistance of environmental NGOs) and not by the government.

Sustainable management in Cameroon

Cameroon's forest legislation requires logging companies to have management plans; these are checked and validated by the government. In principle, these plans provide a sound basis for sustainable management. They have to be based on an inventory of 1% of the area in concessions less than 50,000 ha in size and 0.5% of larger concessions. The inventories include all trees greater than 20 cm in diameter at breast height (DBH) in half-hectare plots positioned along inventory lines cut through the forest. Younger trees (between 10 and 20 cm DBH) are tallied in sub-plots to assess advanced regeneration.

The harvesting system in Cameroon is based on minimum diameters. This means that on the basis of species-specific ecological information (size distribution as well as growth and mortality rates) an optimal minimum diameter is calculated at which the current harvest should be in equilibrium with future harvests. National minimum diameters are based on national inventories, but specific minimum diameters have to be determined in each Forest Management Unit (FMU), from calculations based on the forest inventory. For FSC certification the calculated specific minimum diameters at the FMU level serve as the justification for harvest intensity that is applied.

The forest inventory also provides information about the occurrence of rare and endemic species. The management plan includes special protection programmes for these species. Training forest workers to recognize these species is the first step in protection. It is hoped that selective protection will safeguard populations and may even help species to increase in abundance. Commercial timber species that are found in densities of less than 1 per 100 ha in an FMU are legally protected in Cameroon. Other sorts of information included in official management plans are based on a socio-economic study, fauna inventory and an environmental impact assessment.

The state has usually not completed land-use planning for areas given out as concessions to logging companies and this activity is delegated to the companies. The state checks proposals for land use planning made by the companies and, if acceptable to the local population, they are endorsed. In practice, companies can decide to change the boundaries of their concession in favour of local people by excluding occupied areas and making allowance for future growth of the population. The companies use information from socio-ecological studies as the basis for identifying human occupation of the area. In combination with satellite images, this gives accurate information about which areas are occupied and which are appropriate for harvesting or protection. Invariably this method leads to disagreements, however; some people claim to use areas not identified during the studies and subsequent analyses. A typical result of these negotiations is that the area to be managed for timber is reduced in

order to reserve important pieces of land for the local population. The selection of areas for the local population is usually based on proximity to villages and not on their conservation or production values. Companies thus end up with smaller productive areas then they originally bid for. Despite this fact, the Government of Cameroon uses the original area of the forest concession to calculate area-based taxes.

Challenges to conservation

Some certification requirements are more difficult for forest managers to fulfil than others. The problems that companies seeking certification encounter are mainly related to the availability of information and know-how in forest management. Questions such as how to manage populations of rare plants and mammals, how to control poaching, and how to manage high conservation value forests (HCVFs) are difficult for concessionaires to answer. Attempts at answering these difficult questions are illustrated below.

Wildlife management is a complicated matter, and for certification purposes, information about fauna is vital. A few organizations in Cameroon can provide assistance by conducting faunal inventories and analyzing data, but unfortunately, no clear guidelines exist for the management of animal populations. Their management is mostly based on the selection of no-intervention zones, and on agreements with the local people to respect such zones. Cameroon has also experimented with the creation of communally managed hunting zones. After extensive consultations with the villages, zones were identified where people counted the existing larger mammals. The people then decided on how many could be hunted each year.

This approach has worked relatively well in certain zones: everybody was present during the discussions; a collective decision was reached; and the villagers police each other. One of the problems encountered was poaching. Professional poachers do not respect such village decisions and may even harm the villagers who are trying to chase them away. The timber companies can do little more about this than inform the authorities, as it is impossible for them to assume the policing activities linked to wildlife protection.

Box 1. Reducing the demand for bush meat

When companies provide affordable protein to workers and the local population it helps reduce the demand for bush meat. The Wildlife Conservation Society experimented with this approach at a timber company in Cameroon, stocking a large fridge with meat and fish bought in large cities. A shop was open at certain times of the day, and the meat was sold at cost. Although this type of arrangement mainly benefits people with access to cash, they are usually the ones who are responsible for a large share of bush meat consumption. The companies can run such schemes at almost no cost, because they can buy the meat relatively cheaply.

One solution, tested in West Cameroon, was for the company and the forest service to work together to curb poaching by staffing roadblocks and financing patrols. The funds

are provided by the company whereas the rights to investigate and arrest remain with the forest service. The weakness of this approach is that funding will always be necessary. In lean financial times companies may stop funding these activities and as a consequence lose their certification.

Managing HCVFs is another difficult issue for forest managers in Cameroon. Initially it was problematic because people didn't really understand what the FSC standard required the companies to do. Later it became clear that they first had to identify which types of high conservation values were present, based on existing information and then had to decide how the presence of a conservation value would affect management. The companies were relieved to find out, for example, that the presence of elephants in an FMU does not preclude timber harvesting. There are several examples of how high conservation values can affect forest management:

- having a botanist participate in timber inventories to delineate populations of rare and endemic species;
- increasing the frequency of fauna inventories to see how logging affects chimpanzee and gorilla populations; and
- monitoring silt levels in certain watercourses to assess if logging increases erosion.

Although certification is relatively new in Cameroon, there is a marked difference in impacts on the forests between certified and conventionally managed forests. In conventionally managed forests the logging company carries out an inventory, writes a management plan, establishes minimum logging diameters, and sets up annual cutting areas. All of this is good, but it is also more or less where engagement in sound forest management ends. In contrast, certified companies carry out additional activities such as reduced-impact logging, monitoring of flora and fauna, creation of conservation zones in the concession and patrolling for illegal activities to ensure that they minimize their impacts on the environment; they also actively monitor these impacts so that management can adapt when necessary.

A lot of effort is put into conservation of biodiversity through regulation of harvests, regulation of hunting, and protection of rare species. Whether or not these efforts are successful is not yet known, since the first certificates are only about five years old. It is clear, however, that through certification the companies are carrying out intensive monitoring, and that the transparency that comes with certification has created new opportunities for cooperation between companies and researchers. This openness will ensure that a continued effort is made to conserve biodiversity. If monitoring shows that certain practices are harmful, management can change them to improve the situation. This is a very positive situation that will be further improved when consumers buy certified wood.

3.3 Certification in Indonesia: a practitioner perspective

ALLISON BLEANEY

Contributors: AGUS HERIYANTO, ART KLASSEN, ROB MCWILLIAM, YANA SURYADINATA, AGUNG WIYONO and TINT LWIN THAUNG

Putting certification in context

Certification is an important tool for companies committed to improving the legality and sustainability of their operations, and to positive conservation outcomes. Legality and sustainable management are increasingly becoming necessary and more enforceable conditions for access to key markets.[1] This gives certification a new relevance for companies and a corresponding heightened promise of success as a way to improve biodiversity conservation in tropical forests.[2] Demand from the forest products industry for support to comply with emerging requirements is strong and growing.[3]

THE FIRST STEP IN ACHIEVING CERTIFICATION IS TO ENSURE THAT FOREST COMPANY OWNERS AND MANAGERS UNDERSTAND HOW THEIR BUSINESS WILL BENEFIT.

Certification is one of the benchmarks used to guide efforts to improve forest management and trade practices under the Responsible Asia Forestry and Trade (RAFT) Programme (Box 1). This article describes the relationship between conservation and certification in Indonesia, with a focus on reduced-impact logging and the concept of High Conservation Value Forests. RAFT partners — The Forest Trust (TFT), Tropical Forest Foundation (TFF) and The Nature Conservancy (TNC) — provide practical lessons about working with commercial forest management units (FMUs) to realize conservation through certification and highlight the challenges going forward.

Allison Bleaney and **Tint Lwin Thaung** work for the RAFT Programme; **Agus Heriyanto** and **Yana Suryadinata** work for TNC; **Art Klassen** works for TFF; and **Rob McWilliam** and **Agung Wiyono** work for TFT. Their interest in this topic is based on extensive experience with FMUs and factories in Indonesia and elsewhere to support improved forest management, using certification as a benchmark.

Box 1. The RAFT Programme

The RAFT Programme (Responsible Asia Forestry and Trade) was launched by The Nature Conservancy and a diverse group of implementing partners with the support of the United States Agency for International Development Regional Development Mission for Asia (USAID RDMA). RAFT provides a comprehensive response to persistent deforestation and forest degradation in the Asia-Pacific region. It is a five-year programme (October 2006–September 2011) designed to improve forest management and timber trade practices in Asia, thereby reducing carbon dioxide (CO_2) emissions from deforestation and forest degradation. RAFT implementing partners include the International Union for Conservation of Nature (IUCN), The Center for People and Forests (RECOFTC), The Forest Trust (TFT), Tropical Forest Foundation (TFF), The Nature Conservancy (TNC), the Wildlife Trade Monitoring Network (TRAFFIC), and the World Wide Fund for Nature's Global Forest Trade Network (WWF GFTN). RAFT operates in Cambodia, China, Indonesia, Lao PDR, Malaysia, Papua New Guinea, Thailand and Vietnam.

Conservation benefits of reduced-impact logging

Reduced-impact logging (RIL) consists of technologies and practices that are designed to minimize environmental impacts associated with industrial timber harvesting. Though not explicitly linked to certification, key elements of the RIL system support a number of the requirements for FMUs to become certified.[4]

Better planning

Environmental standards developed as part of a RIL system must address the maintenance of hydrological function and water quality by such measures as restricting machine movements in riparian zones and establishing stream buffer zones. This implicitly deals with the issue of erosion. Pre-harvest tree information clearly indicates the trees to be removed and those to be protected for habitat values or maintenance of the forest structure. The by-product of a more rigorously planned and controlled harvesting activity is a substantial reduction in the amount of soil disturbance throughout the harvesting area (often by 25–50%, Putz et al. 2008).[5]

FMU readiness and commitment

Demonstrations have shown that RIL can lead to substantial increases in machine productivity and volume recovery, and overall lower harvesting costs. Enabling companies to see the benefits of reducing the impact of their operations on the surrounding environment, helps to build interest in and commitment to certification. Having a RIL system in place also better prepares FMUs to meet standards of certification and increases their likelihood of success.

Conservation benefits of high conservation value forests

A high conservation value forest (HCVF) possesses one or more of six environmental, social or cultural attributes — high conservation values or HCVs — considered to be of exceptional importance or critical at the local, regional or global level (Appendix 3).[6] The HCVF concept was developed by the Forest Stewardship Council (FSC) in 1999 and included as Principle 9 of its Principles and Criteria (Appendix 2; also see article 5.1 in this issue.)

Better information and understanding

Through the HCVF process, baseline information about endangered and/or vulnerable flora and fauna is collected, often for the first time. This enables forest managers to make decisions about the kind of management actions needed to conserve HCVs in a way that is appropriate for their FMU. Training and assessments to help managers better understand the significance of species and other values present helps to instill pride in and responsibility for ensuring that they are better managed.

Dwima Jaya Utama concession in Central Kalimantan, Indonesia, is a case in point. According to Rob McWilliam of TFT: "Staff at Dwima Jaya Utama today will speak with pride about identified values and can tell you why they are running their operations in such a way to protect the value. In concessions that have not applied the HCVF framework, knowledge and management of these values is much lower."[7]

Better management

HCV assessments include recommended management options to maintain and enhance identified HCVs. Based on assessment findings and recommendations, FMU management and staff work with partner organizations to develop management and monitoring systems tailored to their circumstances.

Conservation knowledge and skills

In a typical business-as-usual scenario, there is little awareness and understanding of the values of conservation and how to practice it. Through direct involvement in the HCV assessment and trainings, FMU management and staff — and the communities living in and around the FMU — acquire knowledge and skills to implement and monitor conservation in accordance with the management systems developed.

Certification in practice

Suka Jaya Makmur (SJM), a 171,300-hectare concession in West Kalimantan, demonstrates how RIL can lead to higher standards of conservation in productive forests achieved through certification. The positive outcomes of adopting RIL in Sari Bumi Kusuma, a subsidiary of the same parent company (Alas Kusuma Group) is rooted in the decision to incorporate RIL as part of a larger goal in becoming FSC certified. Alas Kusuma Group

realized significant financial premiums from RIL, and even more significant market premiums as a result of FSC certification, and decided follow the same path with SJM.[8]

Engagement with SJM began in 2003 with RIL training and research trials conducted by TFF. In 2007 this opened the door for developing a sustainable forest management system, including HCVF, in cooperation with Fauna and Flora International (FFI). In 2008, the Nature Conservancy (TNC), in cooperation with TFF and FFI, began implementing an HCVF process in SJM. Throughout 2009 and 2010 TFF has also continued to support a range of activities to prepare for certification.

The HCVF assessment was conducted from August to September 2008 by more than 30 SJM staff members, with support from researchers and field practitioners. It found almost all HCVs to be present within the concession area. Specifically, it identified the area as habitat for six species listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora[9] and 19 *Dipterocarpaceae* tree species that have been classified as "critically endangered" on the IUCN RED List.[10] The area also supplies basic needs for local communities, including water, food, construction materials, firewood and medicines. Ecologically and culturally significant areas and areas for basic needs have been mapped and delineated as a result of the assessment and are recognized by both communities and concession staff. Establishing basic needs areas that provide agreed alternative areas for resource use has helped to reduce encroachment in designated ecological areas.

Several priorities now being incorporated in the management and monitoring plan, based on assessment findings include: conservation of orangutan habitat; implementation of RIL in all areas being logged; reduction in poaching and encroachment; and increased community participation in protecting delineated basic needs and cultural areas. SJM was assessed against FSC standards in March 2010 and is expected to achieve FSC certification later in 2010.[11]

Lessons learned

Improved forest management requires commitment

The first step in achieving certification is to ensure that forest company owners and managers understand how their business will benefit. From this understanding comes a commitment to invest in improved forest management. Without this commitment, certification will be unable to produce lasting conservation outcomes. As the SBK and SJM cases have shown, RIL offers a first step for companies that is relatively less costly and less challenging than certification. This helps to building understanding, confidence and commitment to environmentally responsible practices with demonstrated benefits.

Commitment can also be developed through an initial focus on legal compliance. Exposure to designing, implementing and monitoring systems to verify legality gives FMU managers the confidence to tackle more complex issues such as the social and environmental aspects

of improved forest management. As with RIL, the process of achieving demonstrable legal compliance also helps to build mutual trust and understanding between FMUs and supporting organizations. Where verification statements are issued, this provides confidence that progress will be made with other components of improved forest management.

Institutionalization is the key to lasting results

In order for the practices and systems developed as part of a certification support programme to last, they must be integrated into short-, medium- and long-term operational strategies and business plans. To ensure the sustainability of good practices initiated by an FMU, it is critical that they be compatible with a company's structure, operating systems and the specific nature of its business (e.g., what is being produced, for which market, etc.). This requires a comprehensive understanding of the FMU and what is possible, desirable and/or appropriate. Developing and integrating operational and environmental standard operating procedures as part of RIL systems is one way to initiate this. Institutionalization of good practices is also helped by building awareness and skills among FMU management and staff and communities through their participation in HCV assessments.

Good social relations make good conservation and business sense

Developing good relations with the communities in and around concession areas is an important part of a comprehensive conservation strategy. Under the HCVF framework, FMUs must recognize communities' basic and cultural needs. Communities and FMU staff can work together through the collaborative process of assessing HCVs, delineating HCV areas and developing management and monitoring plans, and developing new skills toward a common objective. Beyond meeting social requirements, this broad engagement and active participation by stakeholders is a requirement for effective concession-wide conservation. Conflict management support is often central to this effort and can ultimately reduce costs for businesses by ending demonstrations and improving a company's public image.

Challenges

The main challenge going forward is continuing to attract FMUs to certification and retaining their commitment. Although interest is growing, this will continue to be a challenge for several reasons.

Keeping standards realistic

Certification represents different things to different stakeholders. For example, since some proponents of certification are opposed to any logging, their agendas may not be related to improving forest management involving commercial utilization of the forest. The large range of interests represented on FSC standard setting bodies tends to move certification toward ideals that do not necessarily reflect achievable realities on the ground. To maintain interest in certification, it is important to keep standards realistic.

Auditing capacity

Auditing FMUs' initial and continued compliance with certification standards is a fundamental part of the certification process. Limited availability of auditors can sometimes delay the approval process, frustrating FMUs that are keen to have their efforts recognized. When assessing the degree to which certification results in effective conservation of key species, for example, a lack of trained taxonomists to conduct audits is a challenge.

Expanding demand for certification

Until now, financial incentives have been sufficient to attract FMUs to certification. The main markets for certified products, however, remain Europe and North America; this leaves out several large markets that could help increase the demand for certified timber. At the same time, markets that do not require certified products provide alternatives for companies that continue to practice destructive harvesting.

This is where the ability to trace supply chains and chain-of-custody certification for wood-processing factories becomes particularly important. It not only creates demand for wood from certified FMUs from certified factories; it also helps ensure that countries that process and trans-ship products are required to use certified wood.

Multiple certification programmes

While the many existing certification programmes are useful, they can confuse the consumer, retailer and other actors along the supply chain. Certification is not only a tool for FMUs; it is also a means by which consumers and retailers purchase responsible products. Increasing awareness of certification options and what they mean in practice may help to foster better understanding and increase the demand for certified products.

Conclusion: Does certification equal conservation?

Certification is not equal to conservation; rather, it supports key elements of a wider conservation approach. Certification is a system to measure and recognize good forest management. This in turn provides a framework — and incentive — for FMU owners and managers to maintain and enhance the multiple functions of production forests, including but not limited to ecological functions, such as providing habitat for endangered species and other ecological services.

The degree to which improved forest management results in better conservation in Indonesia is not well documented and therefore difficult to verify. Further, assessments that identify specific species are not always conducted with sufficient rigour and frequency to establish baselines and measure change. Evidence of the ecological benefits of certification is mainly anecdotal, looking at the impacts of improved management on a case-by-case basis.

For practitioners working on the ground, the improvements over a business-as-usual scenario are significant and obvious. If an FMU does not have an effective management system in place, illegal logging, poaching and conversion are common; this can directly affect biodiversity and other values.

It is clear that companies that see benefits from improved forest management tend to continue to manage their forests well. Although anecdotal evidence clearly suggests that this leads to improved conservation at the FMU level, more systematic documentation of maintenance and enhancement of ecological functions resulting from improved forest management would benefit the global discussion.[12]

For more information

See Box 1 or visit www.responsibleasia.org.

Endnotes

1. Recent or emerging policy drivers include 2008 Amendments to the United States *Lacey Act*; Voluntary Partnership Agreement (VPA) negotiations between Indonesia and the European Union and forthcoming Due Diligence Regulation; Indonesia's national Timber Legality Assurance Standard (TLAS or SVLK) for all wood exports.
2. In Indonesia, introduction of a national regulation that supports the objectives of certification alongside market drivers can be expected to increase the likelihood of certification's success. For an elaboration of this argument, see Ebeling and Yasué 2009.
3. Between 2007 and 2010, the number of concessions the RAFT programme is working with in Indonesia to improve forest management grew from 10 to 31 in response to demand.
4. For more information on the specific relevance of RIL to FSC principles and criteria as well as TFF's work in Indonesia, visit www.tff-indonesia.org.
5. A range of 15-30% has also been derived from the results of operational research conducted four times in the last ten years by the Tropical Forest Foundation (TFF) in Indonesia.
6. For more information about HCVF, see http://hcvnetwork.org and article 5.1 in this issue.
7. Rob McWilliam, pers. comm., June 2010. From 21-25 June 21–25, 2010, Dwima Jaya Utama forest concession was independently pre-assessed against the FSC forest management standard. RAFT will continue to support Dwima through RAFT-partner TFT to address remaining shortcomings identified in the pre-assessment, with the aim of conducting a main assessment by the end of 2011. For more information on this case and others, see: www.tft-forests.org.
8. Alas Kusuma Group has clearly indicated that they receive premiums but have not said how much. This information tends to be closely guarded for marketing purposes and also varies with market conditions and customers.
9. Species listed in Annex I face an imminent threat of extinction and are banned from all international commercial trade. For more information about CITES, visit www.cites.org.
10. For more information about the IUCN Red List, visit www.iucnredlist.org.
11. For more information on TNC's work in Indonesia, visit www.nature.org/wherewework/asiapacific/indonesia.
12. Also see the findings from Latin America on certification's contribution to limited deforestation and conservation reported in article 4.1 in this issue.

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3.4 Biodiversity and certified community forests in Tanzania

STEVE BALL

A major motivation of the founders of the Forest Stewardship Council (FSC) was to develop a market mechanism that would support community forestry in the tropics. Unfortunately, it did not quite work out that way. This was partly because meeting the requirements of certification turned out to be relatively easy for plantation owners and forest managers in developed countries (mostly in temperate and boreal zones), but highly challenging for poorly educated people from rural communities in the tropics. To help address this challenge, FSC developed their Small and Low Intensity Managed Forests (SLIMF) standards, but this has not yet led to a big increase in certified community forests.

CERTIFICATION IMPOSES THE DEMANDS OF MODERNITY ON COMMUNITIES, PRESCRIBING DEFINED MANAGEMENT APPROACHES AND ROBUST MONITORING SCHEMES.

Having been through this process – the Mpingo Conservation and Development Initiative (MCDI) holds the first, and so far only, FSC certificate for community-managed natural forest in Africa – we can attest to the considerable challenges of forest certification in the community context. The issue that caused the greatest difficulty was the biodiversity protection and monitoring requirements of FSC certification. This article outlines the approach taken by the project to satisfy FSC's criteria. It also discusses some of the contradictions encountered en route.

Context

The Mpingo Conservation and Development Initiative is an independent NGO based in Kilwa District, southeastern Tanzania. Its aim is to conserve endangered forest habitats in East Africa by promoting sustainable and socially equitable harvesting of valuable timber stocks, and with a particular focus on mpingo (East African blackwood, *Dalbergia melanoxylon*) which is used to make clarinets, oboes and bagpipes.

Steve Ball is a conservation project manager in the NGO sector, and the founder and International Coordinator of the Mpingo Conservation and Development Initiative. MCDI aims to conserve endangered forests by promoting sustainable and socially equitable harvesting of mpingo and other valuable timber stocks.

The project's work is founded on Participatory Forest Management (PFM), which has been under development in Tanzania for more than 20 years and was enshrined in law by the *Forest Act*, 2002. The act exempts communities with an approved forest management plan from paying government royalty fees on reserved timber species felled in their Village Land Forest Reserves (VLFRs). In theory this means that forest-adjacent communities should be able to charge loggers the government royalty rate. Unfortunately, widespread illegal logging — which in recent years reached an estimated 96 percent of timber extracted from the region (Milledge, Gelvas and Ahrends 2007) — means that communities would have to accept a substantial discount on the government rate in order to supply timber at competitive prices. In addition, loggers would have to be willing to conform to basic forest management principles such as sustainable offtakes.

This leads to two conclusions. First, it would be nearly impossible to run a profitable timber business in such an environment without breaking the law (since most, if not all, one's competitors would be breaking it). Second, a forest product labelling scheme was required to distinguish our communities' products. In other words, forest certification was needed in order to realize the full potential of PFM.

The project's flagship tree species greatly helped in this respect. Woodwind musicians tend to live in developed countries, be well-educated, liberal in outlook and reasonably well off; they are ideal customers for ethically marketed products such as those labelled Fair Trade or FSC (Davies, Titterington and Cochrane 1995). Moreover, the final sale price of most blackwood instruments is very high (more than US$1,000) compared to the cost of the wood (less than $50 for the set of billets (wooden blocks) required for a single instrument). Even a small increase in an instrument's sale price would translate into large premiums for community forest managers.

MCDI established a group certificate scheme that is open to any community-managed natural forest in Tanzania. Membership is voluntary, and but members should commit for a minimum for five years. In order to become members community forest managers have to agree to a set of conditions necessary to meet FSC's principles and criteria, such as regular monitoring of the forest, see below. A community can be suspended from the group certificate for serious or persistent failure to abide by its terms and conditions. We expect this will be a pivotal learning experience for all the communities in terms of fully understanding the nature of the group rules and provisions. It would also demonstrate that forests do not have to be lawless places where there is no penalty for misbehaviour.

MCDI was assessed by FSC-accredited inspectors from Soil Association WoodMark in 2008–09 and awarded a group forest management certificate in March 2009. For technical reasons MCDI opted to qualify under the full FSC standard rather than the less stringent SLIMF standard, although this decision is now under review. As of June 2010 two communities had joined the group certificate scheme, and MCDI was working with a further six to support their entry.

The first commercial harvest of mpingo in a certified VLFR was completed in November 2009. It brought revenue of US$1,800 to Kikole village. Kikole used half of this money to pay for forest patrols and other management activities — these payments all went to local workers, further boosting the village economy — and used the other half to complete a new house for the village midwife. We estimate that communities with substantial areas of forest (more than 7,000 hectares) could eventually earn more than US$100,000 per year from the scheme, 40 percent of which would come from blackwood and 60 percent from other species.

Managing biodiversity

The forests where the project works are a coastal variant of miombo woodland. They are a temporally-shifting mosaic of closed canopy forest, open canopy woodlands and savannah grasslands; all are shaped by fire (natural and anthropogenic), other human activities and elephants. People have been living in and around the forests for many years; some villages are more than 100 years old, and human occupation in the area clearly dates back a long, long time. The last human migrations in the region date back to the Zulu expansion in the late 19th century; since then, the population in the area has been relatively stable. These communities have been living in the ecosystems around them for a substantial period of time, but commercial logging pressure and government regulation are relatively recent.

In circumstances such as these, with long-term resident populations, community forestry is made somewhat easier, since communities have an existing affinity for the forest. The project's basic approach has been to minimise forest management prescriptions, since the forest has survived and even thrived through a century or more of local utilisation. If possible, we would do little more than develop a management plan (to secure legal tenure) and regulate timber harvesting (since commercial demand is not subject to traditional management), and leave it at that.

Unfortunately, FSC does not explicitly give credit for a history of previous benign but informal management, and it would be difficult to craft criteria by which to do so. FSC certification has therefore forced the project to be much more prescriptive about forest management: fire must be controlled and a 10% no-take zone must be established in each VLFR. The first requirement puts a significant additional burden on the communities (to clear fire lines and induce preemptive "early burns") and the second reduces their potential gains.

Monitoring biodiversity

Monitoring requirements are another burden of FSC certification. Under Criterion 8.2c, FSC requires forest managers to monitor "Composition and observed changes in the flora and fauna" (FSC 2004). This makes sense from the perspective of technical managers, who may otherwise lack a thorough understanding of the forest they are overseeing, but

numeracy and literacy levels in the local communities are generally low. Although many people have an intuitive appreciation of the forest and its rhythms, few have progressed beyond primary education. This makes it challenging to manage and understand quantitative assessments.

For monitoring to be useful, its results must inform future management and be part of the feedback loop. Since in this case local communities carry out the management, then they should also collect data and perform the analysis and interpretation. Many approaches to participatory monitoring rely on outside experts for the latter two tasks, but this partially abdicates responsibility for management decisions to technical advisers and undermines the autonomy of community forest managers. If communities can follow the data through to conclusions they are much more likely to support and engage in required management decisions than if these recommendations come from a system they do not understand.

With MCDI's support, the communities have initiated two biological monitoring programmes in the certified VLFRs:

1. Forest integrity is tracked through permanent sample plots that are monitored annually. Basal area is the primary quantitative indicator and is supported by visual records obtained through controlled photographs at specified locations.
2. Biodiversity is monitored by regular forest patrols to combat unauthorized logging (roughly weekly, routes vary) whose members collect data on large mammals and selected bird species (with additional fixed-transect monitoring of bird species in the no-take zone).

For biodiversity monitoring, three bird species (African broadbill, Crested guineafowl and Dark-backed weaver) indicative of non-degraded forest were selected following a technical baseline study carried out by experienced ornithologists from the United Kingdom and Tanzania. The communities have been learning to collect standardized data. We plan to develop participatory analysis protocols that can be followed in the field using only paper, pen and simple calculations. As community members become more experienced, materials will be developed to help them interpret their results.

Ecological trends

One biodiversity-related trend has been noticeable over the six years that MCDI has been operating in Kilwa and has been much remarked on by communities: elephant numbers in the forests have gone up. This development is associated with increasing instances of human-elephant conflict; in some cases people have been killed. The increase has two implications:

1. Some community members associate the increase in elephant numbers with the beginning of PFM (although it is probably best explained by population dynamics across the greater Selous-Niassa ecosystem).

2. The communities feel constrained in what they can do to respond to the increasing number of elephant encounters. In the past they might have lit fires to scare away elephants, but under PFM they are not allowed to do so.

Another biodiversity trend reported by villagers is increased sightings of monkeys in the forest since it was set aside as a VLFR. They are also an agricultural pest.

Protected areas are frequently affected by environmental changes at a large scale; these issues are by no means unique to either FSC certification or community-managed forests. Sometimes the reasons for these effects are obvious to technical specialists, sometimes not, but experienced protected-area managers should be able to calibrate their management responses accordingly. Poorly educated rural communities will need support in interpreting monitoring results and advice on how to react. Conversely, they often do not need monitoring data to tell them what is happening in their forests.

Conclusions

Forest certification is a market tool to reward improvements in forest management. Certification standards make substantial demands on applicants to document their management systems and monitor their impacts. Most private-sector applicants for certification have the resources to manage the forest to these high standards, but unless independent audits hold applicants to their commitments, financial considerations might encourage them to cut corners.

In contrast, indigenous communities are the kind of forest managers that certification is designed to support. Forest certification should be easy for them. However, just as the legal land-tenure system requires the borders between communities to be delineated by lines drawn on a map, certification imposes the demands of modernity on communities, prescribing defined management approaches and robust monitoring schemes.

The communities with whom the project works are still learning what forest certification means and the responsibilities it entails. For now, they remain enthusiastic about PFM and forest certification despite the slow take-off of harvesting revenues and problems of human-wildlife conflict, which MCDI is helping them to combat.

In Tanzania and elsewhere it is by no means certain that community forest management will lead to effective biodiversity conservation, but such approaches underpin many conservation efforts throughout the tropics. The paucity of examples of certified community forests illustrates the challenges — which conservationists still grapple with — to achieving clear successes. Although the project's experiences with forest certification and FSC are positive, certification imposes a steep learning curve for rural communities in developing countries. More could be done to make the process easier and make certification more relevant to the issues they confront.

For further information

The project web site (www.mpingoconservation.org) has all the documents used in establishing the group certificate scheme. These may be useful for anyone else contemplating a similar initiative.

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3.5 Forest certification in indigenous communities in Peru

ALFREDO RODRÍGUEZ and CARLOS CUBAS

Voluntary forest certification is not new in Peru. To date, more than 670,000 hectares (ha) have achieved Forest Stewardship Council (FSC) certification. This represents less than nine percent of the area of forest concessions granted by the government since 2000, when the new forest law was approved. The first forest certified in Peru was the 35,000 ha area belonging to the Shipibo-Konibo ethnic group in the Ucayali region; it achieved FSC certification in 2005.

Forests are a major source of environmental, social and economic benefits for indigenous communities, and activities such as illegal logging threaten local development and economic growth. The promotion of responsible forest management within indigenous communities is beneficial, mainly due to the fact that these people count on forest resources in the long term.

This experience of forest management by indigenous communities is considered promising because it meets the international standards of the Forest Stewardship Council's Principles and Criteria.

In the Peruvian Amazon, as elsewhere in the Amazon and some other tropical rainforests, logging involves low rates of extraction: typically less than three m^3/ha. Nonetheless, logging remains the most lucrative use of Amazonian forests that could be considered as environmentally sustainable in the short and medium term and as compatible with many conservation objectives. For instance, a study carried out by a WWF Peru fauna monitoring project in Espinoza Forest Concession[1] showed that FSC-certified forest concessions could have large-animal densities that rival those of protected areas.

Of Peru's 128 million ha, just over half is covered by natural forests (68.7 million ha); 17.7 million ha are protected areas. According to the Peruvian National Forest Authority (*Dirección General Forestal y de Fauna Silvestre* or DGFFS) only around one million of the 13.6 million ha belonging to indigenous communities include legal rights for timber

Alfredo Rodríguez is GFTN Coordinator with WWF Peru and **Carlos Cubas** is a Forest Certification Specialist with WWF Peru. Their interest in this theme is related to conservation and methods for sustainable forest management.

extraction. On the other hand, between 2002 and 2004 the Peruvian government granted more than 7.5 million ha of forest in concession to logging companies in the regions of Ucayali (38%), Loreto (35%), Madre de Dios (17%), San Martin (6%) and Huanuco (4%) (Perez 2010).

Box 1. Forest Regents

The Forest Regent scheme was developed by FSC to allow small land-owners to apply for forest certification as a group. This scheme, which is also practised outside Peru, recognizes one organization as the "forest regent" that is responsible for the sustainable forest management of its partners. Regency schemes prevail in Peru because certification is a complex process for indigenous peoples due to the number of requirements needed to achieve FSC certification and the work required to obtain the logging permit granted by the DGFFS. The communities first need to have legal title to their territory; they then require a board of members recognized by the national authority and the Ministry of Agriculture; registration in the tax office; and a detailed annual operation plan. This thorny paperwork always requires support from consultants, who indigenous peoples cannot afford, complicating the process to achieve certification even more.

Currently, certified forests in Peru cover an area of 673,715 ha: 406,878 ha (60.4%) belong to 12 forest concessions; 266,837 ha (39.6%) belong to 16 indigenous communities, all under the Forest Regent system (FSC Certification Data Base 2010).[2] On a proportional basis, five times more indigenous lands are certified than private forest concessions: at the national level, 26.7% of indigenous communities with logging permits granted by the DGFFS are certified, while 5.4% of forest concessions granted by the state are certified under the FSC scheme.

The requirements for drafting and evaluating forest management plans are included in the appendix of Peru's 2006 forest law for community forest management.[3] The law permits three levels of timber extraction, depending on the size of the communities: the first level allows extraction of up to 650 m^3 annually; the second allows 650–2,500 m^3; and the third allows more than 2,500 m^3. Only at the third level is heavy machinery permitted, such as large trucks and tractors. Most communities apply for one of the first two levels. Both the second and third levels require a forest inventory (Sabogal, Nalvarte and Colan 2008).

The Calleria Indigenous Community

The Calleria Indigenous Community was formed at the beginning of the 19th century[4] in the Ucayali region in the territory of the Shipibo-Konibo ethnic group. Since the main road to Pucallpa was built, immigration to the area by colonists and people from other indigenous communities has led to the destruction of a large part of the forest; this has driven the local indigenous peoples into more remote and less fertile areas. The Shipibo-Konibo people share their forest with other indigenous groups (Cocama, Cocamilla, Asháninka and Piro) and with mestizo populations.

The Calleria Indigenous Community is the official name given by the state in the early 1970s by a national Supreme Decree that recognized the legal tenancy of territories. It comprises a settlement of 50 houses sheltering one or more families closely connected by lineage.

The community stands out for its interest in managing its resources in a sustainable manner and for having organized its members in committees for better management of the community as a whole. The people fully understand that the forest is of fundamental importance, since they obtain from it the materials to build their houses, the medicinal plants for their health care, and wildlife, fruits and roots for their food.

The community owns a portable mini-sawmill and three chainsaws to carry out logging operations. They produce planks, battens and sticks: 70% of products are traded in the regional market and 10% in the local market. The remaining 20% is used for consumption, minor sales or exchange (Burneo, Piber and Sologuren 2006).

This form of forest management is considered promising because it meets the international standards of the FSC Principles and Criteria. It is small in scale and has a low impact on the forest and its fauna and flora. Based on the community's management experience, it is evident that local capacity in technical, administrative and organizational skills has been developed.

Problems outside the community represent serious threats to the continuity of current low-impact practices:

- pressure from urban expansion;
- uncontrolled tree harvesting by illegal loggers and untrained operators;
- new forest concessions (4,089,926 ha in the region);
- overlapping land uses (e.g., oil concessions and community territories);
- indiscriminate hunting by outsiders;
- invasion of local water bodies by immigrant fishermen; and
- inadequate legal protection of forest and nature resources.

Overall, however, when comparing with conventional forest exploitation practices by other forest operators, this experience turns out to have been very positive for the local population, and for the conservation of the forest and its resources. The approach has enormous and sustainable potential for conserving biodiversity. If this type of management is maintained, it will protect the richness of the area and conserve the flora and fauna.

The certification process

Indigenous communities already manage the forest in their own way, but not as sustainably as possible. Their habits relate more to collection than to production, and their forest use is based on subsistence, not on the generation of wealth. These activities have very

little impact on the forest. This is why local people have difficulty comprehending the idea of a lack of natural resources. They only realize the impact of activities when the effects are evident and severe — and, as a consequence, difficult to remediate. So if they coexist with nature without "management" and "production" concepts, how can they understand sustainable management at a level that is profitable but still not harmful to the forest? The technical capacity of indigenous communities is extremely limited; given the issues local people face, how can they understand the concept of certification and criteria? This is why organizations such as WWF have to invest in capacity building for indigenous people.

Calleria Indigenous Community achieved FSC certification in 2005, but it was not an easy process. The community started its work in certification in 2000. It was supported by a local NGO, *Asociación para la Investigación y el Desarrollo Integral* (AIDER), which took the lead, and since 2002 by technical assistance from WWF's Peru Programme Office (WWF PPO), with funding support from the United States Agency of International Development (USAID).

AIDER guided the indigenous community through the process, coordinating all field work, collecting data, filling out reports and dealing with legal issues. WWF PPO carried out capacity-building activities, providing assistance and training in forestry issues. It also conducted workshops to teach and apply a step-by-step approach to forest certification, and to design an action plan that reduces environmental impacts.

This experience is intended to be replicated by other indigenous communities, but it requires financial support, time and hard work. Between 2000 and 2007, the CEDEFOR project, led by WWF PPO, provided almost US$250,000 (about US$7 per hectare for 35,000 ha) to the indigenous communities to achieve forest certification.

Conclusions

Sustainability remains uncertain even in well managed forests. This is especially clear for commercial tree species, vulnerable animal and plant species, and sensitive ecosystem functions. By and large, however, well-managed timber operations are expected to maintain the values and functions associated with forests at a much higher level than that achieved by most alternative land uses, such as intensive agriculture, pasture or mines. Certified forestry operations — because of improved planning of forest roads, increased controls and attention to direct and indirect impacts — also help reduce various aspects of forest degradation (Valqui 2010).

Although the annual operation plan includes activities related to environmental issues, implementing these in practice is a problem for indigenous people, mainly due to the lack of resources and capacity. Indigenous communities do not have clear measures to identify and manage high conservation value forests[5] (HCVFs). They also have difficulty in defining fauna monitoring and hunting periods. Neither indigenous communities nor forest concession managers have checklists or environmental monitoring plans to measure impacts. They do not have procedures for waste disposal either.

Most communities still rely on NGO support to elaborate or update the plan, and much of the time the document is developed without sufficient community input.

Experiences in a range of projects have revealed both benefits and disadvantages for indigenous communities regarding forest management and FSC certification. We strongly believe that positive results are possible, but certain changes are required:

- Forest certification demands monitoring (e.g., of hunting and intrusions by outsiders), but indigenous communities do not fully comprehend the importance of this work. Training is required.
- Hunting is not as productive as some years ago, not only because hunters must meet requirements related to the HCVF and fauna monitoring plans, but because most of the time logging activities keep animals away. Fauna monitoring activities and observing hunting seasons are required.
- The FSC certification process involves social aspects, but does not incorporate traditional knowledge about biodiversity. By using the knowledge and ideas of the indigenous people as a starting point, the certification process will better link to indigenous concepts of forest management. This is an important step toward meeting environmental standards.

Endnotes

1. See article 4.4 in this issue.
2. See http://info.fsc.org.
3. See DGFFS RJ-232-2006.
4. See http://ibcperu.org/sicnabd.
5. The HCVF concept was initially developed by the FSC for use in forest management certification. Within FSC certification, forest managers are required to identify any HCVF attribute that occurs within their individual FMUs and manage them in order to maintain or enhance the attributes identified. The FSC definition encompasses exceptional or critical ecological attributes, ecosystem and social functions (WWF Malaysia 2009). See article 5.1 in this issue.

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3.6 Certification, concessions and biodiversity in the Brazilian Amazon

MARK D. SCHULZE, MARCO W. LENTINI, ALEXANDER J. MACPHERSON and JAMES GROGAN

Can a market-based approach be wed to a large-scale government initiative?

In 2006 Brazil committed to a new strategy of forest conservation and rural economic development in the Brazilian Amazon by enacting a public forests law. The legislation seeks to bring order to Amazonian forests through land zoning and titling across large areas, including the creation of forest management concessions for industrial timber production. Government regulation is intended to guarantee minimum standards of forest management on concessions through implementation of reduced-impact logging (RIL) and compliance with contract terms. Financial incentives will encourage adoption of forest certification in order to further improve management practices. As 11–13 million hectares (ha) are expected to be granted during the first ten years of the initiative, certification could play a key role in achieving sustainability objectives on public lands. Implementation has proceeded more slowly than expected: four concessions totaling 145,000 ha have been allocated as of June 2010, but harvests have yet to begin due to the complex administrative procedures required.

Only by adapting to new conditions on the ground can certification actively contribute to conservation at the scale of the Amazon Basin.

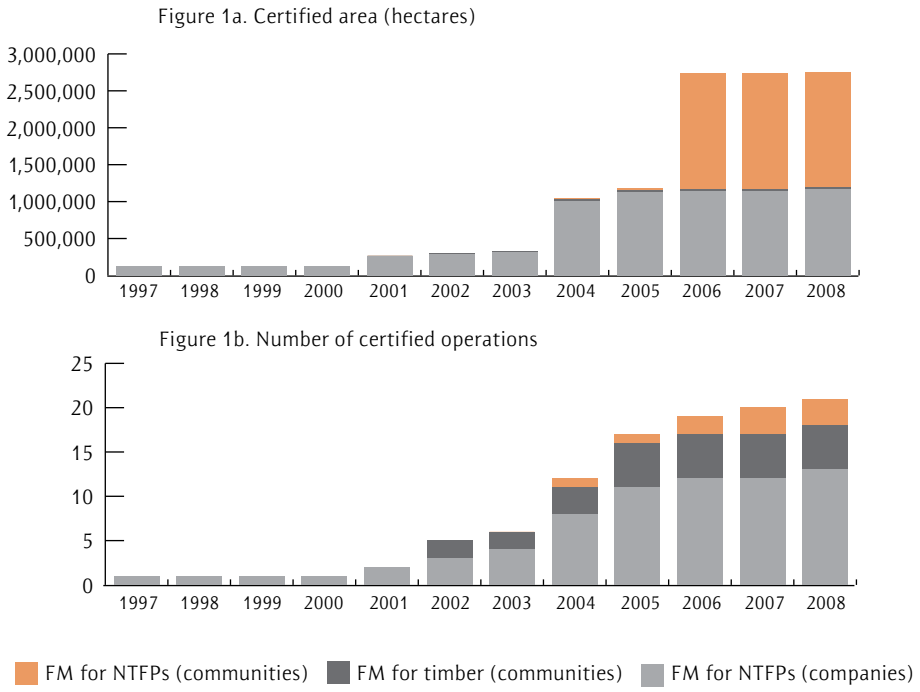
Setting out to transform the Amazonian timber industry is a bold gamble that legal timber supplies can overwhelm and eliminate illegal logging. The stakes are high for the certification movement and for certification's potential contributions to biodiversity conservation across the Amazon Basin. The total forest management area certified in Brazilian Amazonia has stagnated in recent years (Figure 1a), despite the fact that Forest Stewardship Council (FSC)-certified production forests globally expanded from 74 to 133 million ha from 2006 to 2010 (FSC 2010). This stagnation also applies to certification;

Mark D. Schulze works for the Department of Forest Ecosystems and Society, Oregon State University; **Marco W. Lentini** works for Instituto Floresta Tropical, Belém, Brazil; **Alexander J. Macpherson** lives in Raleigh, North Carolina; and **James Grogan** is an associate of Yale University School of Forestry and Environmental Studies. The authors' collective experience in the Brazilian Amazon is in conducting research in forest ecology, silviculture, economics, and public policy, providing training in best-practices forestry, and conducting formal and informal audits of forest management operations.

despite expansive standards and indicators that establish biodiversity conservation as the primary goal of certified logging operations, certification has thus far focused almost exclusively on adoption and minimal implementation of RIL and improving working conditions and respect for local communities.

We argue that the Brazilian government's heightened regulatory role in forest concessions makes it imperative that certification evolve and adapt to new conditions on the ground, especially in the case of the large-scale logging operations that are likely to take place in future concessions. Only by so doing can certification actively contribute to improved forest management practices and conservation at the scale of the Amazon Basin.

Figure 1a and b. Certified area and number of operations, Brazilian Amazon, 1997–2008



This article identifies key issues that must be addressed for certification within the context of public forest concessions to remain relevant in Brazil. This discussion does not address certification in community forests, as community forestry issues lie beyond our direct expertise. We advocate the development and implementation of relatively simple, clearly defined indicators that rely on easily measurable verifiers, which in turn focus on logging practices that will lead to the most significant biodiversity impacts.

The Brazilian Amazon

As of June 2010, 22 companies and communities were certified by the FSC in the Brazilian Amazon (Figure 1b). Many economic and institutional factors contribute to the relatively low growth of certification in recent years, and it is important to see these numbers in the context of logging trends. The most recent data indicate current timber production from the Brazilian Amazon to be around 14 m^3 annually, the lowest level since the late 1980s (IMAZON 2010). Although the global economic downturn of recent years has certainly eased the demand for timber, the increased effectiveness of government enforcement has also significantly reduced illegal timber supplies. This reduction has not been counterbalanced by an equivalent increase in legal timber production, primarily because of the lack of legally titled land. (The complicated and chaotic land-tenure situation in much of the Brazilian Amazon is beyond the scope of this article, but see Barreto et al. (2008) for review and analysis.)

FSC Principles and Criteria (P&C) adapted to forest management in natural Amazonian forests have not been updated since 2002 in spite of the fact that they are supposed to be reviewed and revised every five years. Of particular concern are those P&C that address ecological issues such as regeneration challenges associated with many high-value timber species, and the inevitable post-harvest stand-level changes that reduce the capacity of forests to support biodiversity. A clear consensus on trade-offs between sustained timber production and biodiversity conservation has yet to be reached among the many interests that influence the certification movement.

In collaboration with the Brazilian Forest Service (BFS), the Brazilian National Institute of Metrology, Standardization, and Industrial Quality (INMETRO) is developing standards for auditing compliance with federal and state forest management regulations and with contract terms in public forest concessions. INMETRO is also coordinating the development of a national certification scheme called Cerflor, which is affiliated with the Programme for Endorsement of Forest Certification Schemes (PEFC). Under the initiative, certified companies on concessions will likely receive better access to credit and face fewer challenges in obtaining certification on private lands. Company-community conflicts, which have been a source of difficulty in obtaining certification in the basin, should be reduced, if not eliminated, within public forests. From the perspective of biodiversity conservation, however, it is desirable that FSC certification remain an attractive option for forest management on concessions, since FSC will probably be the only framework with P&C that specifically addresses the issue.

Conclusions and recommendations

Benefits of good logging practices

Although biodiversity conservation should factor into management decisions, it is important to acknowledge that forest management for economic production requires accepting trade-offs between natural conditions and the increasing "domestication" (favouring marketable species over others) that timber production inevitably yields (de Graaf 2000). Thus far, RIL — broadly defined to include improved infrastructure design

and implementation, harvest planning and production, and protection of riparian buffers and high conservation value areas — has been the certification movement's operational response to this dilemma. The use of RIL is an attempt to mitigate the worst impacts of conventional logging. The short-term benefits of RIL are dramatic compared to conventional or predatory logging, which economically depletes stands in the best case but often results in complete forest loss. Collateral damages are mitigated under RIL operations, leaving forest stands with better prospects for future production and increasing the likelihood that they will survive.

Even the best RIL operations entail measurable impacts on biodiversity relative to a forest's "natural" state (i.e., in comparison to strict forest reserves). These impacts will vary according to the intensity of logging, the taxa and the temporal scale of observation (see Putz et al. 2000). But public forests that represent future certification opportunities in Brazilian Amazonia are not likely to supplant actual or potential forest reserves. Rather, they will be part of a regional mosaic that includes a relatively high percentage (as compared to the United States, for example) of parks and other protected areas.

Given the multiple and sometimes conflicting objectives of certification, at what point does the impact on biodiversity from forest management aimed at sustaining economic productivity reach an unacceptable level? Trade-offs include weighing the immediate stand-level impact of a silviculture treatment against the likelihood that it will improve sustainability and forest persistence over time. Many silvicultural interventions promote sustained yield, including liberation thinning, well-planned creation of large canopy openings for high-value, late-successional species and enrichment planting of nursery-grown seedlings into logging gaps. Yet all interventions have negative local impacts on biodiversity, although these will vary with the intensity and extent of the treatment. For example, liberation thinning has been shown to increase the growth of residual crop trees, potentially reducing the length of the cutting cycle for a given harvest volume (Peña-Claros et al. 2008; Wadsworth and Zweede 2006). Thinning also explicitly selects against the component of tree diversity that lacks economic value.

Sound management should not deplete populations of high-value timber species, as has occurred with big-leaf mahogany and is occurring with ipê (Grogan et al. 2008; Schulze et al. 2008), and relatively low-impact silviculture treatments (e.g., gap enrichment planting) to maintain these species should be required of any industrial operation that harvests them. This approach is consistent with the intent of Brazilian standards (Principle 6, Criterion 3, Indicator 2; FSC 2002) and would represent a major improvement in current practice. Moreover, high-value emergent species are themselves important components of biodiversity; they influence structure and dynamics and provide food and habitat for other species. We do not advocate indiscriminate use of more intensive treatments such as liberation thinning, although in some cases the benefits of improved sustainability —forest persisting as forest — might clearly outweigh localized impacts on biodiversity. There are many examples of an overemphasis on sustained yield leading to forest conversion to single-species plantations, and yet the rationale for using forest management as a conservation tool hinges on maintaining economic value over long periods in order for the forest

to continue to provide a broad range of ecosystem goods and services even as timber benefits are sustained (Pearce, Putz and Vanclay 2003).

Auditing

Auditor training and turnover are major constraints to forest management in the Brazilian Amazon. Although the forest engineers who typically serve as auditors in Brazil generally have ecology and agroforestry backgrounds, they are often unable to evaluate the quality and environmental impacts of logging operations as they relate to FSC Principle 6. Audits are expensive in remote environments, and auditors typically have only two days to a week in the field to collect data. The size of a given production site affects audit quality; a single auditor may be responsible for a small operation and teams of three to four auditors may review larger operations. Some auditors have no training in biodiversity conservation; others may selectively ignore biodiversity indicators (see Table 1 in Schulze, Grogan and Vidal 2008).

Almost as problematic, some auditors spend too much of their limited time evaluating indicators that are laborious to measure and associated only with minor forest impacts, stealing time from indicators related to more severe forest degradation. For example, we often observe auditors who are overly concerned about relatively minor issues such as tree stump height, width of forest roads or size of log loading patios, rather than more fundamental environmental management issues that have a far greater impact.

In our experience, certifiers and certification systems over-emphasize all-encompassing generalities about every conceivable impact of forest management and under-emphasize concrete auditing practices that ensure a consistent minimum standard of quality. Is biodiversity conservation better served if a company is requested to have a pollinator monitoring program (see review by Schulze, Grogan and Vidal 2008) or if directional felling is applied consistently across its management units? We strongly suggest the latter because the outcome is active and observable rather than implied.

We must acknowledge the real world trade-offs between evaluating management practices thoroughly versus glancing at a multitude of potential secondary indicators of impacts. Auditors cannot answer all questions about logging impacts on biodiversity in a few days, but with focused guidelines they can gather enough field data to consistently evaluate he quality of harvest operations across a given management area and assess whether management practices will achieve sustainability goals. For some indicator wildlife species, rapid assessment techniques might be useful in audits to detect population changes over time. However, in the context of large-scale industrial logging in public forest concessions, biodiversity conservation must largely be evaluated through inference by asking: are logging practices planned, professionally executed and adaptive? If so, then a framework for the best that can be done for biodiversity conservation may already be in place; it may be the auditing that needs to improve.

Monitoring

Biological monitoring, ranging from permanent growth and yield plots to more elaborate biodiversity programmes, is typically required for certification (see Schulze, Grogan and Vidal 2008 for a detailed discussion of the wide variation in specific auditor requests for monitoring). The fact remains, however, that logging companies operating in good faith generally do not know how to implement monitoring or how to incorporate the lessons learned from it in planning and production processes. Most monitoring efforts are poorly designed and generate problematic data. Expertise to guide the design, collection and analysis of growth and yield monitoring exists, but financial resources for training and rigorous auditing do not. For more exotic monitoring programs, it is not clear that we even know how to directly relate data to auditing conclusions. Unless certifiers can find an efficient and effective way to audit and improve the monitoring process, this information is not cost-effective in the context of certification. The current state of monitoring creates a veneer of rigour where none exists.

Next steps

In the Brazilian Amazon, the most realistic and effective biodiversity conservation measures may be those that create incentives for certified companies to implement harvest and post-harvest silviculture according to current best practices. Simpler, more easily observed and enforceable metrics would be cheaper for a company to abide by and an auditor to evaluate, thereby providing a powerful tool for improving environmental performance.

It is also crucial to reinforce the technical capacity of independent auditors and certifiers. We will not adequately meet the challenges discussed in this article without significant investment in training of auditors and related forestry professionals. A portion of the existing funds for promoting adoption of sound forest management practices in Amazonia should be allocated to increasing technical capacity in the forest certification sector.

Although many organizations promote certified timber within Brazil, the bulk of certified timber is exported. Meanwhile, the majority of Amazonian timber is delivered to construction markets in major Brazilian cities. Given the shortage of certified timber, there is little supply for these organizations to promote domestically. If public forest concessions and certification can be successfully wed, the supply of certified timber in the domestic market could be gradually increased. This increase could also lead to stronger market pressures on producers to manage forests sustainably, leading to the virtuous cycle envisioned by certification supporters.

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3.7 Certified jungles?

BART W. VAN ASSEN

Third-party certification of natural forest management in Indonesia

Third-party certification (TPC) is a service industry that verifies products and processes such as food safety and quality; good management practices; labour practices; and environmental standards (Hatanaka, Bain and Busch 2005). The industry requires on-site audits by disinterested organizations connected to neither buyer nor seller (Busch et al. 2005). In agribusiness, TPC became "a key institution for enforcing private (and public) standards that is both independent from producers … and from governments" (Hatanaka, Bain and Busch 2005) that provides an independent check on corporate responsibility and due diligence (Busch et al. 2005; Fischer et al. 2005; Hatanaka, Bain and Busch 2005).

FORESTRY CERTIFICATION IS A NEUTRAL EXERCISE THAT VERIFIES COMPLIANCE INDICATORS. DESPITE HIGH EXPECTATIONS, THERE'S LITTLE EVIDENCE OF ITS DIRECT IMPACT ON BIODIVERSITY CONSERVATION.

Certification in natural forest management (hereafter forestry certification)[1] is a relatively new form of TPC that took flight in 1993 with the founding of the Forest Stewardship Council (FSC). The concept verifies compliance to a broad array of national and international concerns, such as tenure rights and labour equity (social issues), deforestation and genetically modified organisms (environmental issues), and illegal wood and tax evasion (legal issues). Forestry certification aims to achieve pre-defined qualities of natural forest management, to differentiate products originating from such forests and to improve their market access (after Nussbaum and Simula 2005).

Forestry certification in Indonesia

In late 1990, the SmartWood Programme (SmartWood) of the Rainforest Alliance was the first forestry certification initiative to award a certificate in Indonesia. The leading local organization, the Indonesian Ecolabelling Institute (*Lembaga Ekolabel Indonesia* or LEI) emerged more or less parallel to the FSC. Ever since, FSC and LEI have engaged in a slow waltz toward mutual recognition. Today – two decades later – about half a dozen separate initiatives are active in Indonesia. In addition, forestry certification catalyzed new approaches and initiatives to improve forestry, including stepwise certification (Nussbaum and Simula 2005; White and Sharshar 2006), timber legality verification (Anonymous

Bart W. van Assen works with Gaia Commoditas, Bogor, Indonesia. He is an expert (lead) auditor in forestry, oil palm and agribusiness certification.

2004; van der Pol, Wit and Savenije 2005; TFF and FORM 2004), and high conservation value forests (HCVFs; see Jennings et al. 2003; Daryatun et al. 2002). This proliferation of initiatives indicates a serious and diverse interest in the business of forestry certification.

Informal figures suggest that since 1990, at least three dozen concessionaires have presented their credentials to certifiers, while at least a dozen others have or are engaged with consultants to work towards certification. (Some community timber plantations are, or are in the process of becoming, certified, but these are not discussed further here.) In spite of this, the number of certified forest managers in Indonesia remained near stagnant during the last decade. Indonesia's first certificate remained controversial (Peluso 1992), and was revoked in late 2001. Currently, only a handful of commercial forest managers — covering less than 2% of Indonesia's rainforests — are certified.

Two initiatives lead forestry certification in Indonesia:

- the Sustainable Natural Production Forest Management (SNPFM) scheme of the Indonesian Ecolabelling Institute has certified six forest managers; and
- SmartWood has certified four concessionaires.

These initiatives represent the bulk of initiatives in Indonesia today, and are used to illustrate performance in the field in two key areas: verification and standard-setting.

Verification

Initiatives regularly verify the actual performance of a forest management unit against defined standards, cross-referencing field observations, stakeholder concerns and expert advice. Public information on verification, due to its confidential nature, is limited to summaries by certifiers. The jumble of formats of and jargon make these summaries nearly inaccessible to the general public. They do, however, indicate substantial differences among initiatives.

SNPFM

SNPFM uses an expert panel to weigh each indicator and determine the actual score of a forest manager and the minimum score required for certification. Public information (e.g., Purbawiyatna 2002; MUTU 2006b) suggests that many forest managers are certified despite poor performance, mainly because of discriminatory weighing of indicators (strongly favouring good performance) and minimal margin for error (minor changes in the weighting void certification). Independent reviews do suggest, however, that this process is more participative than other initiatives (Hinrichs 2005).

SmartWood

SmartWood identifies major and minor gaps (non-compliances) against each indicator in its standard. Based on these gaps, experts determine whether or not to grant a certificate. Public discussions suggest that forest managers are certified despite serious weaknesses regarding tenure rights and boundary gazettement, forest conservation, community relations and stakeholder consultation (see Colchester, Sirait and Wijardjo 2003; DtE 2006; RA 2005, 2006; Sofyar et al. 2005). No independent review of SmartWood's local performance is available.

Standard setting

The discussion of verification identifies a crucial limitation of forestry certification: it verifies only compliance against a standard, with a strong focus on indicators. (Auditors mainly refer to principles and criteria when an indicator is unclear.) Significant differences in indicators (see Table 1) result in differences in standards and initiatives.

SNPFM

SNPFM uses a public standard that relies on existing forestry regulations and silviculture systems (Gale 2006; Muhtaman and Prasetyo 2006). The standard has significantly fewer performance indicators than other initiatives (Table 1), although some experts argue that SNPFM criteria are more like principles. This would suggest that the standard, with some 200 "indicators" (verifiers), is very similar to the FSC interim standards. It's not explicit about various international concerns, including tenure rights; free and prior informed consent; genetically modified or exotic organisms; or banned pesticides (Ginting and Counsell 2001; RA 2005; SGS 2005). Due to extensive consultation with local stakeholders (Hinrichs and Prasetyo 2007), the standard has strong local support.

Table 1. Initiatives servicing forestry certification in Indonesia

Initiative	Current update	Principles	Criteria	Indicators
Forest Management Certification Program (CU)	April 2010	9	47	112
Forest Conservation Program (SCS)	December 2009	9	47	147
Qualifor Programme (SGS)	December 2008	9	47	236
SmartWood Programme (RA)	November 2008	9	47	159
Sustainable Natural Production Forest Management/SNPFM (LEI)	December 2000	3	10	57
Woodmark Programme (SA)	April 2007	9	47	197

Sources: CU 2010, LEI 2000, RA 2008, SA 2007, SCS 2009, SGS 2008

SmartWood

SmartWood uses a private standard[2] (RA 2008), based on FSC principles and criteria. The standard has relatively few performance indicators compared to similar initiatives (see Table 1), but far more than, for instance, the FSC National Standard for the Netherlands (81; FSC-NL 2004). The additional indicators cover local issues (such as safeguarding the rights and resources of indigenous peoples and local value-added processing), signifying a considerable sensitivity to local circumstances. SmartWood staff adapt the generic standard, making only a token effort to consult stakeholders and follow up on concerns (van Assen 2006 versus RA 2006/2008). Consequently, local support for its standard is nonexistent.

Forestry certification in practice

Biodiversity conservation

The indicators concerned with biodiversity conservation in forestry certification standards differ greatly.

SNPFM

SNPFM regularly refers to biodiversity in its ecological indicators to verify implementation of legally required conservation areas and monitor the impacts of logging on biodiversity (LEI 2000). The standard has integrated the relevant legislation on biodiversity conservation, but the extent to which it goes beyond that is unclear. In practice, forest managers become certified despite having incomplete data on biodiversity and insufficient data on the impacts of forestry (MUTU 2006a/b).

SmartWood

SmartWood's standard contains surprisingly few indicators (2 of 159) on biodiversity. (In the 2003 standard, biodiversity featured only once in the definitions.) In effect, SmartWood depends on indirect indicators, such as protection of rare, threatened and endangered species (RTEs) and implementation of conservation zones, and associated concepts, such as reduced-impact logging (RIL) to verify biodiversity conservation. The only specific concept in the standard that strongly favours biodiversity conservation is identification and management of high conservation value forests (HCVFs).

HCVF is a relatively new tool in forestry certification, launched in 1999 by FSC. What started out as an idiom to consolidate related terms (such as virgin forest, old growth and primary forest) has developed into an international standard or definition supported by guidance documents and toolkits. HCVF's main strength lies in making a manager look beyond management boundaries and consider impacts on the surrounding environment.

HCV Toolkit

The local HCV toolkit (Konsorsium 2008)[3] went beyond forestry into estate and agricultural crops, and significantly revised the international standard. It downgraded thresholds in the standard; for instance, changing "outstanding significance/critical importance" to "important" (Indonesian: *"penting"*). The toolkit also heavily depends on theoretical and political models to identify HCVFs, including two GIS-based models for ecosystem proxies and biophysiographic regions.

Practitioners implement the toolkit as they would a local standard, using little if any common sense and often ignoring detailed field data from the forest manager (such as environmental impact analyses, satellite image analyses and forest inventories). In addition, fieldwork is limited to small selected areas.

The resulting assessments are downright shocking. In the large majority of some two dozen assessments reviewed, reports incorrectly classify ecosystems (in particular peat forests) and include areas (soccer fields, rubber plantations and swidden lands) as HCVF even though they have little if any natural tree cover. Riparian zones are set to fixed widths that poorly represent the actual floodplains. And with no practical recommendations to conserve HCVFs, reports have little or no impact on actual conservation.

In effect, forestry certification affects biodiversity conservation only through association with existing best management practices (such as RIL) and legal requirements (such as the Convention on Biological Diversity). This clearly illustrates that forestry certification only provides an independent check on corporate responsibility and due diligence; it remains neutral with regard to specific issues such as biodiversity conservation. Where initiatives promote new concepts (like HCVF), they become stakeholders and threaten the independence of forestry certification.

Key issues

The emergence of forestry certification led to high expectations that it would be a panacea for forest destruction and degradation, while improving corporate (social) responsibility and biodiversity conservation (Bayunanda 2005; Muhtaman and Prasetyo 2006). Has it lived up to these expectations?

The emergence of numerous initiatives for forestry certification and related initiatives shows strong dynamics. Recent progress linked to forestry certification includes the formalization of the timber legality verification system, the emergence of HCVF, increased consideration of indigenous people and improved access to international markets for community forest products (Hinrichs 2005; Tacconi, Obidzinski and Agung 2004; Konsorsium 2008). Claims that certification has come to a standstill (Colchester 2004) or is counterproductive (Lawrence, Toyoda and Lystiani 2003) were too harsh.

Nonetheless, forestry certification has fallen short of expectations, and there's little direct evidence of its direct impact on biodiversity conservation. Several issues are fundamental to this shortfall:

- lack of information;
- lack of transparency; and
- institutional entanglement.

Busch et al. (2005) found similar issues in agribusiness certification.

Lack of information

Basic knowledge of forestry certification — even among leading organizations — is still limited, and confusing terminology and conceptual misunderstanding remain common (Colchester 2004; Liedeker 2003). Allegations of collusion between auditors and industry ignore a long track record of credible verification under TPC.

Aggressive branding by civil society organizations exacerbates this lack of information. These "super brands" (Busch et al. 2005) surpass the status of industry, government and even academics, despite often dramatic facts regarding forestry and certification initiatives in Indonesia. For example, the scant empirical data used to suggest a race to the bottom among forestry certification initiatives (DtE 2006; Fischer et al. 2005; Tacconi, Obidzinski and Agung 2004) may equally support the opposite interpretation: a toil to the top. Similarly, there are insufficient facts to conclude that forestry certification promotes biodiversity conservation by Indonesian forest managers.

International and national research organizations can play a critical role: moving beyond facts and branding to the actual performance of certification initiatives in the forest. Most researchers (e.g., Hinrichs and Prasetyo 2007; Kartodihardjo 2002; Tacconi, Obidzinski and Agung 2004) theorize over macro-processes (such as principles and criteria and international trends) without verifying the underlying micro-processes (indicators and audits of forest managers). Muhtaman and Prasetyo (2006) were likely the first ones to link macro- to micro-processes, but were unable to include the latter in their study.

Lack of transparency

Transparency is essential to improving credibility, yet it is insufficient in all initiatives. English translations of local standards (including the HCV toolkit) lag years behind and are often of poor quality. Public summaries of assessments — especially on HCVF — are unavailable or incomplete, and stakeholders interviewed seldom receive information on how initiatives assessed their inputs. Concerns raised by stakeholders, such as tiger habitat destruction and forest degradation (DtE 2006; Ginting and Counsell 2001; Counsell and Loraas 2002), are not publicly addressed.

The solution for this lack of transparency is simple but tedious. Initiatives must strengthen their stakeholder consultation and follow-up with personal and clear reports to stakeholders that provide inputs and raise concerns. Initiatives must do so in a neutral way, weighing all relevant facts. TPC is required to be independent/neutral, and to assess performance objectively against performance indicators.

Institutional entanglement

Numerous public concerns regarding forestry certification can be traced back to institutional entanglement. Contradictory findings during SNPFM and Qualifor verifications by different branches of SGS led to accusations of collusion and fraud (Counsell and Loraas 2002; Ginting and Counsell 2001; Klein et al. 2004). SNPFM's genesis as a producer-led initiative (Muhtaman and Prasetyo 2006) with strong ties to the government is often noted (e.g., DtE 2006; Counsell and Loraas 2002; Gale 2006). In cases where initiatives develop private standards and also verify against these standards, follow-up on stakeholder concerns regarding the standard is poor.

This conflict of interest contrasts sharply with the accepted notion that TPC is independent (see also Hatanaka, Bain and Busch 2005). Quick and decisive action is needed to address this issue, through separating standard-setting and verification. Again the solution is relatively simple: either certifiers identify a joint (interim) standard or accreditation bodies (FSC) approve a local standard.

Conclusion

Forestry certification in Indonesia is highly dynamic, which is only to be expected given its young age. Several issues seriously hinder progress:

- only a handful of forest managers have been certified so far, which hampers a detailed analysis of actual impacts;
- conflicts of interest are the norm rather than the exception; and
- initiatives — and their supporters and critics — are not transparent.

The result is a largely emotional debate among stakeholders and academics that results in the status quo being maintained.

This jungle of forestry certification initiatives, conflicts of interest, inadequate transparency and lack of information does not create confidence. Instead, these issues cause a Babylonian confusion among friends and foes. A similar phenomenon occurred in agribusiness certification; Busch et al. (2005) observe that this defies "one of its *raisons d'être*." Key players in forestry certification, HCVF and similar initiatives would do well to take heed.

But these issues can be overcome with simple means. Scientifically justified information, based on field observations, provides a potential path out of this jungle.

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Endnotes

1. This is commonly called "forest certification," but it's the forest management (forestry) that is certified, not the forest itself.
2. The FSC has not yet accredited a local standard for Indonesia, and certifiers use private interim standards for verification (see Table 1).
3. Formally, this document is a toolkit/manual. But practitioners implement the toolkit as a standard when identifying HCVFs.

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3.8 Biodiversity conservation and forest management in Indonesia

TITIEK SETYAWATI

Introduction

Although Indonesia comprises only 1.3% of the earth's land surface, it harbours a disproportionately high share of its biodiversity, including 11% of the world's plant species, 10% of its mammals and 16% of its birds. Most of this diversity is found in the country's forests, which are locally and globally important sources of timber and other products. Unfortunately, Indonesia has also experienced massive forest exploitation for timber, as well as extensive conversion of forests, at great costs to biodiversity.

DECISIONS ABOUT MANAGEMENT RIGHTS AND RESPONSIBILITIES SHOULD BE MADE THROUGH PARTICIPATORY PROCESSES THAT RECOGNIZE CUSTOMARY RIGHTS.

In Indonesia the *Forest Management Act (Undang Undang Pokok Kehutanan)* No.41/1999 grants full authority to the state to manage the forest for the benefit of the Indonesian people. Within the act, forests are defined as containing natural resources belonging to the nation that should be protected and managed for the benefit of local communities. With the act focused mostly on timber, the question is how to improve biodiversity conservation in production areas.

Conserving biodiversity through forest certification in agroforests

The total area of private forest lands in Indonesia is about 1.5 million hectares (ha), with a potential yield of around 40 m^3/ha of timber. The timber yield potency in Java alone is about 23 m^3/ha. Less than 25,000 ha of the nation's private lands have now been certified, either using the mandatory national criteria and indicators of LEI (Indonesian Ecolabel Institute) or the voluntary programme of the Forest Stewardship Council (FSC). Both standards require areas of conservation importance within forest management units (FMUs) to be identified.

Much of these private lands are managed by local communities, which is common in Java. Most farmers practice agroforestry using timber species such as mahogany *(Swietenia*

Titiek Setyawati works with the Forest Research and Development Agency of the Indonesian Ministry of Forestry Her interest in this topic is primarily based on her field experience during forest assessments under voluntary sustainable forest management certification scheme in Indonesia.

mahogani), sengon *(Paraserianthes falcataria)* and jati *(Tectona grandis)*. Under many agroforestry schemes, local people are allowed to inter-plant food crops with the timber species required by the company. Farmers derive benefits from selling timber and from utilizing and managing non-timber forest products (NTFPs).

In this way, agroforestry systems have become an effective means of conserving and protecting forests while maximizing land use, improving public relations, reducing social conflicts and creating employment opportunities. Furthermore, groups of farmers are now seeking certification by working together in cooperative units. Unfortunately, these well-managed private agroforests are not classified as formal managed production forests by the Ministry of Forestry, but as "lands for other purposes."

A good example of a benefit of implementing sustainable forest management comes from the villages of Selopuro and Sumberejo in Kebumen, Central Java, which were certified in 2004. (Local smallholders such as these villages can join a cooperative scheme, which can then be certified).[1] Village residents report that they do not have problems of water scarcity as other villages do because they maintain their land by implementing agroforestry systems and managing the high conservation values that exist in nature reserves, protection forests, riparian zones and trees that are food sources for wildlife. For example, the local community believes that gayam (*Inocarpus fagiferus* Fosb.) trees from the *Leguminosae* family has the ability to conserve soil and ground water. Due to its root system, canopy shape and edible fruits (eaten by people and birds), this tree species is conserved by the local community.

Certification and Indonesia's biodiversity policy

In Indonesia, sustainable forest management (SFM) continues to be interpreted within the narrow context of sustained timber yield; forest managers focus on the total number of valuable or commercial tree species left after harvesting. Timber is highly valued while NTFPs are undervalued. In this and other aspects, national forestry policies are out of line with certification standards.

In general, although certification in Indonesia has almost certainly had benefits at the FMU level — including the conservation of biodiversity — it has not stimulated holistic changes towards coherent biodiversity conservation policies. Many forest managers continue to hope that certification will provide incentives for better management, but these aspirations have seldom been realized. This is partly because certification supporters are not well organized and mostly emphasize the technical aspects of certification. To be successful, certification needs to be coupled with policy change.

In the absence of effective biodiversity conservation policies, the pressure for short-term exploitation of natural resources will increase, especially given rapid human population

growth. Lack of comprehensive biodiversity protocols to identify areas of particular value has resulted in diffuse and ineffective approaches to evaluating biodiversity resources. Although certification has captured some biodiversity conservation values, the scientific community still needs to develop ways to assess the minimum biodiversity needed to meet the criteria for sustainable development. If under certain circumstances, for example, forest managers are instructed by the government to plant exotic species for particular purposes within the working areas, then the forest management unit should develop a system that is able to prevent spontaneous regeneration outside planted areas, insect outbreaks and other adverse environmental impacts as outlined in the FSC standard.

For certification and other conservation initiatives to become effective, we need to clarify who owns the rights to the environmental services provided by forests, including biodiversity, carbon sequestration and watershed functions. Decisions about management rights and responsibilities should be made through participatory processes that recognize customary rights. The people who have lived in and around forests for ages, wisely utilizing resources in traditional ways, see their rights being eroded. There has already been extensive loss of customary rights for tangible products such as land, timber and other forest products, and it can easily be imagined that such losses would be worse for less tangible values like biodiversity. With the central government taking the lead in carbon-based initiatives, the concern is that they will focus on generating income for the nation without due regard for the local people who benefit most directly from the sustainable use of biodiversity.

Given the small area of forests certified, it is hard to conclude that certification is an effective instrument for conserving biodiversity in Indonesia. In spite of this, forest certification remains among the few effective ways to slow the losses of rare, threatened and endangered species and the ecosystems on which they depend. From my perspective, one area that could have been better handled is the scientific-based policy approach. Although this area poses complex issues that are also not easily addressed, there are groups of decision-makers who do not care about science because of its long process and delay in results, while others see that research uses up lots of money even as its results remain unpredictable. The main lesson learned about applying such an approach is that in order to get close to the decision-making process and support law enforcement, more scientists should become politicians and strongly promote ecosystem management and conservation.

Endnote

1. Groups of farmers that have more than 1000 m^2 in land are pooled in a cooperative.

Section 4

Biodiversity benefits

Photo credits
p.103 Chameleon, Gabon. Precious Woods Europe BV.
p.105 Atlantic forest, Brazil. A. Svolenski
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4.1 The Nature Conservancy and tropical forest certification

FRAN PRICE

Contributors: GIOVANA BRUNS, ANITA DIEDERICHSEN, DAVID GANZ, JOAO GUIMARÃES, STEVEN PRICE; STEFFEN REICHLE and JERRY TOUVAL

Some positive results for conservation and reduced deforestation

The mission of The Nature Conservancy (TNC) is to preserve the plants, animal and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. In practice, TNC works to conserve habitats through a variety of means, including protected areas and well-managed working landscapes. Regardless of the conservation strategy, TNC endeavors to ensure that solutions benefit local people to ensure conservation success. TNC uses science to support conservation decision-making and to demonstrate proof of concept.

Although the science remains imperfect, TNC has seen FSC certification lead to positive changes in land management.

Because protected areas can only do so much to protect biodiversity, the sustainable harvest of natural resources will continue to be an important conservation strategy for TNC. In forested landscapes, this means continuing to support responsible forest management through third-party certification. This has proved to be the best means of independently verifying management practices that can lead to sustainable landscapes and conservation outcomes.

There is general agreement in the scientific and practitioner communities that rigorous forest certification programmes can contribute to improved biodiversity conservation within managed forests. TNC typically uses Forest Stewardship Council (FSC) certification in its efforts, as it aligns well with TNC's mission. FSC requirements — including strong provisions for retaining and restoring plant community diversity, limiting conversion of natural forests, protecting high conservation values (HCVs) and carrying out ecologically-oriented silviculture — can have a positive impact on biodiversity values.

Fran Price works with The Nature Conservancy, a solution-oriented conservation group that uses forest certification as a safeguard in working forests.

TNC supports certification in a variety of ways:

- providing HCV assessments in various places (the main focus);
- working on certification standards;
- facilitating market linkages; and
- managing our own FSC group certificate.[1]

In Bolivia and the Atlantic Forest region of Brazil, TNC has put together research programmes that provide information about the biodiversity impacts of FSC certification on tropical forests.

Natural forest management in three forest types in Bolivia

In Bolivia, biodiversity monitoring was carried out under the auspices of the BOLFOR II project[2] in research plots within FSC-certified forest concessions. Preliminary results show that the current logging intensity applied in these concessions produces no negative impacts on abundance or species composition of understorey birds, terrestrial amphibians or terrestrial reptiles.[3] The research effort was implemented by the Bolivian Institute for Forest Research (IBIF),[4] one of TNC's principal partners in the BOLFOR II project. From 2005–07 monitoring was carried out in research plots located in FSC-certified management areas in three different forest types in lowland Bolivia: Chiquitano dry forest and Amazon-Northern Chiquitano transitional forest in the Department of Santa Cruz; and Amazon rainforest in the Department of Pando.

IBIF's monitoring system was not developed to specifically test or study FSC-certified forest management; rather, its purpose was to see how current forest practices (principally, standard levels of timber harvest) promoted by BOLFOR II in Bolivia affect biodiversity. The plots were, however, set within actively managed certified forests and thus subject to the restrictions of certification. Although comparable studies of non-certified forests in these areas were not available, specific preliminary conclusions could be made regarding the impact of certified forest management on biodiversity.

In each of the three forest areas, species were monitored in four experimental research plots, each 20–27 hectares (ha) in size, which were subjected to different intensities (in terms of number of trees/ha) of timber harvest. Understorey birds and terrestrial herpetofauna were selected for monitoring in consultation with experts from the United States Forest Service and IBIF. One plot was a control where no harvesting occurred; although some selective logging of mahogany and other species has taken place in most lowland forests in Bolivia, this plot approximated primary forest habitat. The other three plots were subjected to different levels of timber harvest and other treatments between 2000 and 2003: 1) typical treatments (current logging intensity of certified forest concessions); 2) improved treatments (e.g., cutting of lianas); and 3) intensive treatments, with more than twice the number of trees being removed.[5]

While neither the abundance nor the diversity of species was significantly reduced in areas where logging intensity was consistent with that commonly applied in certified forest concessions, results indicated significantly negative impacts in the experimental

plots where the timber harvest was doubled. This suggests that caution is necessary when considering any increase in harvest intensities, especially in the Amazonian forests of northern Bolivia. Some of the preliminary results and the specific methodology used in the biodiversity monitoring system are reported in two Spanish-language technical documents produced by the BOLFOR II project (Flores and Martínez 2007; Maldonado 2007).[6]

Additional research funded by TNC in Bolivia examined deforestation in different types of managed forests and found that recent rates of all forms of deforestation were much lower in FSC-certified forests than non-certified concessions. The rate of forest loss in the FSC-certified forests was even lower than that observed in some of the country's national protected areas (Killeen et al. 2007; MHNNKM and FAMNK 2006). These results are consistent with comparative data on deforestation rates in other places where TNC and its partners are promoting forest certification, most notably the Maya Biosphere Reserve in Guatemala (Hughell and Butterfield 2008).

Forest remnants in certified plantations in Brazil's Atlantic Forest

In Brazil's Atlantic Forest region in São Paulo State, TNC carried out a study to assess the contribution of two FSC certified operations, Suzano Paper and Pulp and Fibria, both large Brazilian forest companies, to the "effective conservation"[7] of natural forests within the region. Higgins, Unnasch and Supples (2007) define effective conservation as occurring where biodiversity is expected to persist as a result of conservation actions. The properties evaluated in the study are situated in the eastern part of São Paulo State. The total research area, a subset of each company's holdings, was 176,040 hectares, and included 319 forested parcels consisting largely of stands of planted *Eucalyptus*.

The remaining natural areas inside the properties were first ranked according to the Brazilian official vegetation classification (IBGE 1992) and the ecological succession stages classification (CONAMA 1993). After that, two main analyses were carried out:

1. A comparative analysis of the proportion of natural areas[8] relative to the total property area, and the proportion of natural areas per watershed where the forests are located.
2. An "effective conservation" analysis to assess the ability of natural remnants to maintain their biological and ecosystem functions over time (Touval et al. 2009). This part of the study compared two scenarios:
   a. a hypothetical scenario, assuming the absence of conservation management required for natural areas under FSC standards; and
   b. the actual scenario, with natural areas being set aside as reserves and managed under FSC requirements (which can help abate threats to those areas).

The results for the first part of the analysis showed that the FSC certified areas had 56,272 ha of natural forest remnants within larger mosaics of *Eucalyptus* plantations. The percentage of natural areas for the watersheds where the forests are located ranged between 14.9% and 24.2%; the average proportion of natural remnants inside the FSC certified forests was about 32% (Table 1).[9] This suggests that certified plantations were more successful than non-certified areas in meeting Brazil's legal environmental threshold of 20%.

Table 1. Percentage of natural areas within certified forests and their watersheds

Total watershed area	Total natural remnants within watershed	Percentage of natural area
4,281,086 ha	780,270 ha	18.2%
Total area certified parcels within watershed	**Natural remnants within certified parcels**	**Percentage of natural area**
170,040 ha	56,272 ha	32.0%

Comparing the percentage of preserved areas inside the forest operations (about 32%) and that of natural areas in the watersheds where these farms are located (18.2%) it is apparent that FSC certified forests can contribute to natural area conservation within the region. Using an "effective conservation" analysis, it becomes clear that when natural areas within commercial forest operations are being managed to FSC standards, threats to those areas are abated; as a result, they attain a higher conservation status than without FSC requirements.[10]

Within the natural areas, the results of the Effective Conservation analysis (Table 2) showed that under the no-management scenario the percentage of effectively conserved remnants was 17.3%. Taking into account management scenarios required by FSC standards, the analysis showed an increase in the percentage of effectively conserved natural remnant forests to 55.8%.[11]

The certified areas resulted in improved conservation management status because under FSC, managers must develop a management plan for the area, monitor and inventory natural areas regularly and use the information derived from monitoring efforts to abate any threats (including fires and poaching). These areas scored well on other aspects of the analysis, since natural areas were managed expressly to conserve biodiversity and because adherence to the Brazilian forest code requires long-term land protection, particularly in areas along rivers.

Table 2. Results of Effective Conservation analysis

	Scenario 1: no management		Scenario 1: management according to FSC requirements	
Effective Conservation score	Remnants area (ha)	%	Remnants area (ha)	%
Good	12,780	17.3	41,349	55.8
Fair	32,235	43.5	13,934	18.8
Poor	29,058	39.2	18,790	25.4
Total	74,073	100.0	74,073	100.0

Although the long-term fate of these remnant natural ecosystems needs to be monitored, in certain cases, lands managed under FSC certification — with the support of strong national environmental legislation — can play a role in the effective conservation of Brazil's Atlantic Forest.

Conclusion

In Bolivia and the Atlantic Forest region of Brazil, where TNC has conducted research that relates indirectly to the impacts of forest certification on elements of biodiversity conservation, the results have been positive. Certified forestry had no significant negative impacts on species diversity or abundance in three certified forests in Bolivia. In portions of Brazil's Atlantic Forest, certified forests retained more natural area than other parts of the watersheds, largely due to standards that require compliance with legislation. This compliance, along with the requirements of the FSC standards, more effectively abated threats to these native ecosystem remnants.

While the body of research is growing about the impacts of certification, the scientific/certification community has not yet studied the broad impacts of forest certification on biodiversity conservation in a systematic, coordinated fashion. TNC has some key questions: What is the long-term fate of HCV set-asides in natural forest and plantations? Do international certified companies perform better (according to ecological, social, and economic criteria) than certified local companies and non-certified ones? How does biodiversity conservation fare under FSC standards compared to other certification programmes over the medium and long term?

Although the science remains imperfect, TNC has seen FSC certification lead to positive changes in land management. These changes are linked to biodiversity conservation, such as expanded riparian protection measures, identification and conservation of HCV areas, and protection for a broader range of rare species. While the results of more in-depth research in this area are anxiously awaited, from a practical standpoint, in many cases, FSC has provided land managers a viable alternative to conventional timber exploitation in the tropics.

Endnotes

1. For a case study of TNC's HCV work in Indonesia, please see the submission from the Responsible Asia Forestry and Trade (RAFT) Programme in this issue (article 3.3) or www.raftprogram.org.
2. See www.nature.org/success/art16394.html. The Bolivia Sustainable Forest Management Project (known as BOLFOR) was launched in 1993 by the U.S. Agency for International Development to help curtail this threat by promoting forest certification, a market-based solution to encourage legal logging and discourage illegal practices. In 2003, USAID selected The Nature Conservancy to coordinate the second phase of the project, known as BOLFOR II.
3. For other results from similar studies, see Barlow et al. 2007 and Gardner et al. 2007.
4. See www.ibifbolivia.org.bo.
5. The increase in logging intensity was achieved by harvesting a broader range of species rather than felling more trees with smaller diameters. These intensive treatments are not commonly practised in certified concessions, although the harvest levels were approved by national authorities. For more information about IBIF's experimental plots, see www.ibifbolivia.org.bo/uploads/Monitoreo/IBIFDiseno_ParcelasExperimentales.pdf.
6. See www.ibifbolivia.org.bo/index.php/Publicaciones/DocumentosTecnicos.
7. To gauge the conservation effectiveness of these natural forest remnants (found within mosaics of eucalyptus plantations), the study included: 1) biodiversity viability assessment; 2) an assessment of conservation management status; and 3) an assessment of threats.
8. Natural Areas are relatively intact forest remnants, composed of native species and regenerated naturally. Some of these areas have been selectively logged in the past, but are now off limits to harvesting activities.
9. Areas managed under FSC certification must comply with applicable environmental legislation. In the case of Brazil's Atlantic Forest region, the Forest Code requires 20% of natural areas to be set aside; protection of riparian areas and steep slopes; and maintenance of secondary or primary forests.
10. Given that this was a geographically limited study, replicating this type of study in other parts of the Atlantic Forest region and collecting more field-based evidence in the region studied would contribute to greater confidence in the results related to conservation management status.
11. The information for the actual scenario is based on field data, not a modeling exercise.

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4.2 Biodiversity in the Peruvian Amazon

LUCIO BROTTO, JOSIL MURRAY, DAVIDE PETTENELLA, LAURA SECCO and MAURO MASIERO

What effects will FSC have on biodiversity?

When the Forest Stewardship Council (FSC) was established in 1993 the intention was to create an instrument to ensure responsible management of the world's forests and to reduce tropical deforestation and forest degradation. After 15 years of forest certification and only a few studies on its real impacts on forests (Rametsteiner and Simula 2003; Nussbaum and Simula 2004; Cashore et al. 2006), how much has forest certification contributed to biodiversity conservation? This article provides evidence from the field on the differences in the biodiversity management systems of two forest concessions, one certified and one not certified, in the Madre de Dios region of Peru.

FSC certification allowed forest managers to obtain the REDD+ carbon payments needed to offset higher management costs.

Background

About 1% of Peru's 68.7 million hectares (ha) of forest (673,615 ha) are certified under FSC,[1] the only voluntary certification scheme operating in the country. The first FSC certificate was issued in 2005; since then, seven certificates for Forest Management/Chain of Custody (FM/CoC) and 20 for CoC have been issued. Historically Peru has been characterized by a low rate of deforestation (0.1% between 1990 and 2005), but there is evidence that the exploitation of forest land has increased recently. In response to the 2002 Forest Law, the average area of forest management units increased, as did the participation of foreign companies and the duration of title allocation (to 40 years).[2] All these developments favour large-scale commercial operations.

Lucio Brotto, **Davide Pettenella**, **Laura Secco** and **Mauro Masiero** are with the Department of Land and Agro-forestry Systems (TESAF), University of Padua and **Josil Murray** works for WWF-Malaysia. Since 1996 the TESAF Department is carrying out academic research on forest certification, primarily in Italy and Europe with further experiences in Madagascar and South America. Their focus is on the contribution of certification to multifunctional forest use and on payments for environmental services. All views presented in this paper are those of the authors and do not represent the views of the organizations they are affiliated with.

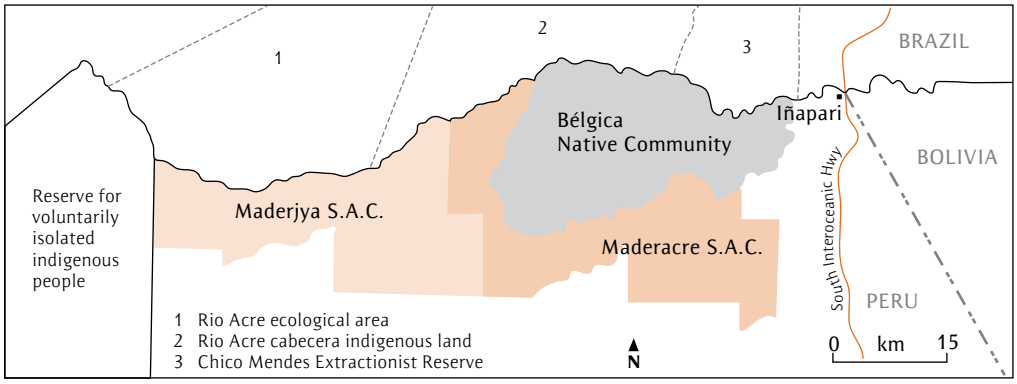
These recent changes in forest exploitation have had big impacts in the Madre de Dios region of southeast Peru (Figure 1). This relatively undisturbed area is changing rapidly, mostly due to the new South Interoceanic Highway that connects Brazil with the Pacific Ocean. Today, 13% of 1.3 million ha of logging concessions in Madre de Dios are FSC certified.

Figure 1. The Madre de Dios region of the Peruvian Amazon

The two logging concessions analyzed are close to the Peru-Brazil-Bolivia border near the South Interoceanic Highway (Figure 2):

- Maderacre and Maderyja (M&M) – FSC certified; and
- Bélgica Native Community Forest (Bélgica) – not certified, but interested in beginning the FSC certification process.

Figure 2. Logging concessions areas in M&M and Bélgica Native Community Forest



The study areas are different in terms of ownership, management and conservation efforts but have similar bio-climatic features (Table 1). Both are developing projects aimed at reducing emissions from deforestation and forest degradation (REDD+). Biodiversity is usually considered a co-benefit in REDD+ projects.

Table 1. Comparison of the two case studies analyzed

Name	Maderacre and Maderyja (M&M)	Bélgica Native Community Forest (Bélgica)
FSC certified	Yes, FM/CoC	No
Size (ha)	98,932	53,394
Forest owner	40-year concession title to Maderacre S.A.C.(small associated Peruvian forest owners), and Maderyja S.A.C. (branch of Chinese Nature Flooring)	Bélgica Native Community (holds the land title)
Activities in forest area	Timber harvesting for sawn wood and plywood	Timber harvesting for sawn wood, slash and burn cultivation, cattle ranching and hunting by community members
Timber market	USA and China	China and Brazil
REDD+ project	Yes	Yes
Status	Validated and first credits sold	Contracting phase
Carbon Standard	Climate Community and Biodiversity Standards	Climate Community and Biodiversity Standards; Voluntary Carbon Standard
Web site	www.climate-standards.org	www.asesorandes.com

Source: Schroeder (2009) and our elaboration.

Both forests contain species of conservation interest, such as ocelot (*Felis pardalis*), spider monkey *(Ateles chamek)*, tapir *(Tapirus terrestres)*, jaguarundi *(Herpailurus yaguarondi)*, pacarana *(Dinomys branickii)*, giant anteater *(Myrmecophaga tridactyla)* and puma *(Felis concolor)*, as well as trees such as cedar *(Cedrela odorata* L.*)* and mahogany *(Swietenia macrophylla* G. King*)*. According to Barrio (2005), 37 species of mammals and 172 species of birds have been identified in the certified forest concession area alone.

With and without certification

The "without certification" scenario relies on existing laws that govern forest and biodiversity in Peru. In 2000 the Peruvian government brought in a comprehensive new Forest and Wildlife Law *(Ley Forestal y de Fauna Silvestre, Ley No. 1090)*, which was revised

extensively in 2009. Nonetheless, the lack of enforcement on the ground leads to widespread illegalities in the trade of fishes, birds and insects and to poaching (World Bank 2006; Rendón Thompson et al. 2009). The "without certification" scenario requires a Forest Management Plan, which must include a General Forest Management Plan (PGMF) and an Annual Operational Plan (POA) to be approved by the Organization for Supervision of Forest and Fauna Resources (OSINFOR); compliance with the Convention on International Trade in Endangered Species (CITES) and a land-use plan.

The "with certification" scenario is based on the idea that a credible forest certification scheme would ensure that the forest is managed according to standards that surpass the requirements of Peruvian law. Biodiversity protection is covered under six principles of the FSC Peru Standard for forest management.[3] This places a potentially large burden of supervision, control, monitoring, evaluation and reporting on the forest manager with regard to biodiversity conservation. A national high conservation value forest (HCVF) toolkit has not been developed and applied yet.

Biodiversity protection

Bélgica

A forest management plan has never been developed for the Bélgica concession, and its biodiversity has never been studied. The only biodiversity information available comes from the land-use planning conducted for *Bélgica - Ordinamento Territorial* (*Proyecto Forestal Indígena* 2007) and a community diagnostics study or *Diagnóstico Comunal* (CESVI 2006). Both reports mention rare, threatened and endangered species in the area (all of which are also found in M&M concession) and note the extent of fishing and hunting activities carried out for endangered species such as spider monkey, tapir and other wildlife. The studies revealed a lack of large emergent trees in the forest, the effects of unsustainable harvesting of valuable timber species.

An area of 500 ha (1% of the forest area), close to the Bélgica village, is characterized by slash and burn activities; these, coupled with unsustainable fallow periods and cattle ranching, have caused clearing and further degradation of the forest and its biodiversity. The Bélgica community reported a decline in both hunting and fishing activities. While hunting is believed to have declined due to logging activities and the opening of new forest roads, the decline in fishing is due to the incursion of illegal fishermen. In the framework of the upcoming REDD+ project, plans have been drawn up to conduct biodiversity baseline assessments and a full HCVF assessment for the Bélgica forest.

Maderacre and Maderyja

WWF conducted a biodiversity assessment in M&M in 2005, prior to FSC certification (Barrio 2005). The study provided a biodiversity baseline for the M&M concession:

- identification of key areas critical for fauna, such as salt licks *(collpas)*, water sources, fruit trees, caves and hollow trees; and
- management prescriptions on how to reduce the negative effects caused by logging on areas important for wildlife (nesting, roosting and feeding).

Density studies were carried out using the software "Distance" to determine the most abundant fauna species. Additional studies were carried out to identify indicator species that would best predict the effects of logging on biodiversity, such as spider monkeys, bats, small mammals and some bird families *(Furnariidae, Thamnophilidae, Formicariidae* and *Picidae)*. HCVF assessment was also conducted according to FSC's Principle 9.

FSC certification directly promotes biodiversity protection in M&M in several ways:

- installation of road control posts at forest entry points;
- annual satellite monitoring of concessions;
- 100% delimitation of boundaries;
- creation of buffer zones in and surrounding the concession that act as conservation areas;
- periodic and annual patrolling of vulnerable areas to prevent illegal entry;
- prohibition of hunting and awareness raising among workers;
- annual work plan for monitoring biodiversity and indicator species; and
- mapping and protecting of water courses, buffer zones and HCVFs.

Historically, selective logging for high-priced timber species such as cedar and mahogany took place in both concessions. In the last five years the number of species harvested and inventoried increased. M&M and Bélgica now monitor a commercial species list of 26 and 21 species, respectively, and harvest 14 and 11 species, respectively. In 2006 and 2008 forestry operators contracted by Bélgica were found to have falsified declarations of harvested quantity of mahogany and *pumaquiro (Aspidosperma* spp.) and were fined by the National Institute of Natural Resources (INRENA).

M&M have carried out effective biodiversity monitoring in their concession area and therefore have maintained their current certificate. In its 2006 Forest Management Assessment Report,[4] SmartWood raised three issues:

- a corrective action request (CAR) due to inadequate safeguards of species protected under CITES,[5] such as mahogany and cedar;
- the absence of scientific and expert consultation in identifying HCVFs; and
- the need to implement an HCVF monitoring system.

These issues were addressed by forest managers in 2007 and 2008. M&M has developed the in-house capacity to manage and monitor biodiversity within its concession area and to implement the HCVF concept on the ground. Wildlife and ecological studies — as well as establishing systems to manage and monitor biodiversity — were carried out in M&M in 2005 (prior to the REDD+ project) during the FSC certification process. This shows that forest certification is able to make a substantial contribution to ensuring that biodiversity conservation systems are in place.

REDD+: reaction to investments

While neither concession has financial constraints, the risks of deforestation and forest degradation associated with the Interoceanic Highway[6] mean that forest managers will need to step up control, patrolling and monitoring within the forest boundary in order to ensure that biodiversity will be conserved. This will entail additional costs. The situation will be more critical for M&M, because the FSC system has a higher management cost, which is only partially compensated by gains in logging efficiency. In 2007 both concessions began to seek payments under the voluntary carbon market through the REDD+ mechanism. In order to do so both forests need to meet the requirements of the carbon standards they selected. Biodiversity is usually considered a co-benefit in REDD+ projects.

In early 2010 the Madre de Dios Amazon REDD+ project was established in M&M; the first carbon credits (40 000 t CO_2) were priced at US$7.[7] The REDD project in Bélgica is still in the contracting phase.

The natural synergy between the well-established FSC certification system and the CCB carbon standards allowed the M&M forest managers to develop their REDD+ project more rapidly. The FSC requirements cover almost 70% of the CCB requirements, especially requirements concerning the social, biodiversity and environmental credibility of the project.[8]

Conclusion: Is certification working?

One of the original goals of forest certification — to reduce deforestation and protect tropical biodiversity — has not been fully met globally; forest degradation and deforestation are continuing at alarming rate worldwide (FAO 2010). This case study shows that forest certification was the precursor to the establishment of a biodiversity conservation system in the M&M forest. Time spent in the forest with the forest managers showed that, with the increasing deforestation and degradation rate, the effort needed to obtain the certificate must be redoubled in order to retain it and to save the forest from being deforested and turned into cattle ranches, rubber plantation or agricultural land. Responsible forest management was thus becoming financially non-viable due to the high costs imposed by the drivers of deforestation and degradation. This is compounded by the fact that FSC certification requires lower intensity harvesting, but certified timber from Peru does not currently command a premium price.

At the same time, the FSC certification allowed forest managers to quickly develop their REDD+ project and thus to receive payments which allowed them to maintain the biodiversity conservation system that was established.

Forest certification as a conservation strategy is especially important in the tropics where biodiversity is higher than that of temperate and boreal forests, and governance and administration are relatively weak. When comparing M&M and Bélgica it is obvious that forest certification brings systems and provisions that require forest managers to know the biodiversity in their forest, and to identify, manage and monitor any changes in this biodiversity through systematic monitoring.

While certified forests have positive effects on biodiversity, these impacts are hard to measure, both in terms of data and value. It is therefore important to increase market opportunities for biodiversity by putting a price tag on it. This will capture the value of the timber value as well as the services provided by a well managed forest. Financial incentives could come in the form of a "green" premium for certified logs, payment for environmental services and REDD+ mechanisms.

For more information

For information about the Maderacre and Maderyja case study, contact José Luis Canchaya Toledo: jcanchaya@maderacre.com. For the Bélgica Community, contact Cecilia Persivale: cmpersivale@gmail.com.

Endnotes

1. See www.fsc-info.org.
2. Additional factors that increase the depletion of Peruvian forest lands are the stable 7.7% economic growth rate of the country (FAO 2009), infrastructure development, the 2009 free trade agreement with the United States and the allocation of oil and gas concessions in 2008, mainly located in 66 million ha of Amazon forest.
3. Forest Management Certification Standards for Wood Products from Forests in the Peruvian Amazon are available at www.gtz.de/de/dokumente/en-st16e-peru-wood-products-amazon.pdf.
4. See www.rainforest-alliance.org/forestry/public_documents_country.cfm?country=45. Please note that the information on the Smartwood web site is split into different reports for the two areas.
5. See www.cites.org.
6. Each day 300 new immigrants arrive in Madre de Dios from the Peruvian Sierra and Brazil via the Southern Interoceanic Highway. In the next 30 years the population is expected to increase from 110,000 to 630,000 inhabitants (Schroeder 2009; INEI 2008; Aramburú 2004).
7. See www.forestcarbonportal.com.
8. See also article 6.1 in this issue.

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4.3 Impacts of certified logging on great apes

ARNOLD VAN KREVELD and INGRID ROERHORST

How much scientific evidence do we need?

Is certification a good conservation tool in tropical forests? Are great apes better off in certified concessions than in conventionally managed concessions? Do we have sufficient information to provide a reliable answer to these questions? This article summarizes what we know about the impacts of certified logging on biodiversity, specifically on great apes. It also explores the questions of how much information we need, the reasons we need it, and how best to use it.

IUCN–The World Conservation Union lists all species of great apes as endangered or critically endangered. In the Congo Basin — habitat of chimpanzee, bonobo and gorilla — only 10 to 15% of the forests are legally protected as national parks or nature reserves. The figure for Southeast Asia, habitat of the orangutan, is about 20%.

MOVING FORWARD WITH CERTIFIED LOGGING SHOULD TAKE PRIORITY OVER WAITING FOR MORE SCIENTIFIC EVIDENCE.

In both regions a much higher percentage of forest is found in logging concessions. Although protected areas (PAs) play a key role in protecting great apes, the importance of logging concessions is attracting increasing attention (Tutin et al. 2005; Nelleman et al. 2007; Morgan and Sanz 2007; Meijaard and Sheil 2007). In both cases, the question of whether certification is a good conservation tool is highly relevant to great apes.

Effects of logging on orangutans

There has been much debate about the effects of logging on orangutans. Rijksen (1978) wrote: "The orangutan is a component of an intact ecosystem... Every form of commercial exploitation within this ecosystem is incompatible with the proposed goal of preserving the system." Later studies (Rao and van Schaik 1997; Felton et al. 2003; Morrogh-Bernard 2003) seemed to confirm this conclusion. A number of recent studies, however, conclude that orangutans do survive, sometimes in high numbers, in areas that have been selectively logged (Knop, Ward and Wich 2004). Ancrenaz et al. (2004, 2005) offered a possible explanation for these conflicting results. They found that a number of previous surveys

Arnold van Kreveld and **Ingrid Roerhorst** established Ulucus Consultancy, which works for governments, NGOs, FSC and private companies. They have been involved in certification since the early 1990s.

had been inadequately designed. The densities of great ape populations were most often determined by counting along transects; if the transects were not representative, the results cannot be used without qualification. Errors can also arise when the results are extrapolated from a relatively small sample, which magnifies any inaccuracies in the design.

Box 1. Certified logging and FSC

The Forest Stewardship Council (FSC) is the only forest certification scheme for which scientific impact studies relevant to great apes are available. Hence, the term "certified logging" in this article implies FSC certification. FSC has ten principles, five of which are relevant to biodiversity, particularly Principle 1 and 9. Principle 1 states that forest management should comply with legislation. Great apes are legally protected throughout their range; if concessionaires succeed in halting poaching and illegal logging in their forests, that alone would be a tremendous gain. Principle 9 concerns high conservation value forests (HCVFs), areas of prime importance to great apes. Under FSC, HCVFs receive stricter protection or are entirely set aside from logging.

An extensive study carried out in eastern Kalimantan (Marshall et al. 2006) correlated the population densities of orangutans with several factors, including logging intensity, distance to villages with hunting, fig tree density and height above sea level. Only hunting was shown to have an adverse effect on orangutans.

Like Ancrenaz et al. (2004, 2005), Husson et al. (2009) took a critical look at previous studies. They concluded that earlier studies were limited to comparisons between a small number of sites, and often did not take into account variation in survey methods between the sites. Husson et al. found little difference in orangutan numbers in areas that were not logged and those that were selectively logged. In conventionally logged areas, however, fewer orangutans were found. When adverse effects of selective logging were found, these turned out to be indirect (e.g., increased hunting via logging roads). Husson et al. (2009) did show that the Borneo orangutan can better withstand the direct effects of logging than its Sumatran counterpart, probably because the Borneo orangutan is less specialized in its feeding habits.

Payne and Prudente (2008) state that orangutans can survive well in responsibly logged areas. This is evidenced by the high orangutan density in the FSC certified Dermakot (Sabah) concession (55,000 ha). They conclude that responsible logging should be undertaken in all forests on Borneo and Sumatra where orangutans are found and where they cannot be transformed to PAs.

Effects of logging on African apes

Morgan and Sanz (2007) attempted to gain insight in the effects of logging on African great apes by looking at a large number of scientific studies published in the last 20 years. They found that conventional logging often had adverse effects. The effects of selective logging are more difficult to determine. Gorillas sometimes respond negatively, but often seem to respond positively and even increase in numbers due to the extensive regeneration of herbaceous plants and other pioneer vegetation. Chimpanzees appear to be more sensitive, with some exceptions (Putz et al. 2001).

A possible explanation may be found in the difference in the species' behaviour. Groups of gorillas live in overlapping areas. If a group (temporarily) flees from loggers, it does not run into conflicts with the other groups. Chimpanzees, by contrast, do not tolerate interlopers. If a group of chimpanzees flees from loggers and ends up in another group's territory, it can lead to serious, sometimes lethal disputes. Many studies have found that the felling of major food sources (fruit trees in particular) and disruption have adverse impacts on both species. As with orangutans, the conflicting results found in different studies appear to stem partly from poor research design.

Since the Morgan and Sanz report was published in 2007, several new studies on great apes in FSC concessions have appeared. These are summarized in van Kreveld and Roerhorst (2009) and confirm that chimpanzees are more sensitive than gorillas to certified logging.

Certified logging and protected areas

Clark et al. (2009) studied logging concessions (some FSC certified, some on the way to FSC certification) and PAs with restricted hunting in the Republic of Congo (Brazzaville). Some species were encountered in greater densities in concessions that had been logged than in forests that had not been logged (forest buffalo and elephant in particular). Furthermore, the diversity of large mammals increased with distance from roads and villages, and with time since logging had taken place. The most striking conclusion was that the total large mammal diversity is greater in concessions located closer to PAs than those farther away. Clark et al. therefore conclude that responsibly managed concessions can extend — but not replace — the conservation estate for many of central Africa's most threatened species.

Clearly, PAs need to be well managed in order to be effective. Mannan et al. (2008), in a limited survey, found that some large mammals occurred in greater numbers in the Dermakot FSC concession (Sabah, Malaysia) than in the surrounding PAs. The FSC concession, with its guarded access roads, may have offered better protection from hunting than did the PAs.

Great apes benefit from certified logging

There is no lack of scientifically supported information about the general effects of forest certification on great apes. Logging often has negative effects on great apes, but these effects are less significant in certified forests than in conventional concessions. Certified forests are a good supplement to well-managed PAs, but are no substitute. Clark et al. (2009) implicitly state that we know more than enough about the situation by saying that in view of the rate at which logging concessions are being granted, the conservation of the rainforest may depend far more on the rapid introduction of sustainable logging than on creating new PAs.

This conclusion is in line with ecological common sense and experience and is confirmed by a growing body of scientific evidence as presented above. Further scientific studies looking at the ecological impacts of certified logging are still needed, however; additional information can help to refine best practice guidelines on logging and be incorporated in FSC's indicators. But in the short term, conservation may well benefit more from studies on how to promote forest certification.

The economics of forest certification

The rapid introduction of sustainable logging through forest certification — a voluntary process — depends on the effectiveness of the incentives. Varying results are found regarding price premiums for FSC-certified timber. Some authors found price premiums (Kollert and Lagan 2006; PricewaterhouseCoopers 2007; Hughell and Butterfield 2008; FSC 2009), whereas others did not (Ota 2007; de Lima et al. 2008).

A price premium — which is in fact another term for a higher price — may be good for timber producers, but higher prices limit the sales of certified timber. All of the above studies mention improved market access (i.e., new customers) for FSC-certified timber as a strong incentive for certification. Improved brand image is also seen as an incentive. But there are obstacles to forest certification; these include — but are not limited to — high costs and rigid technical demands. It is no surprise, therefore, that certified forest area in most tropical countries has been slow to increase. A number of scientists who have found positive ecological impacts from FSC certification urge wider support for continued and accelerated growth of the certified forest area (van Kreveld and Roerhorst 2009).

How to increase the growth of certified logging

Much is needed to increase the growth of certified logging in the tropics. Ecological studies remain valuable, but economic studies may be more urgently needed, as are insights into how to stimulate certification through regulation, tax systems or other means. These should be the main actors and their priorities:

1. Governments in importing countries — scientific studies show that FSC certified logging clearly outperforms conventional logging in conserving biodiversity. Public procurement policies should therefore distinguish between FSC certified logging and conventional logging.

2. Governments in producer countries — these could reward certified concessions in various ways, such as fewer administrative demands, lower taxes, longer concession periods, or assistance in the battle against poaching.
3. NGOs, private, and public donors — they could explore ways to work with concessionaires in important biodiversity hotspots. For a relatively low cost, a high assurance can be obtained that certain species are effectively protected from poaching and a number of other threats. NGO and donor funds could be used to pay for extra set-asides within concessions, better inventories or expansion of the economic base of a concession (through CO_2 sequestration, wildlife viewing, etc.).

To make this happen, new ideas are indispensable. More cross-sector collaboration (ecology, law, governance, tax, etc.) may be an important way to move forward. And moving forward with certified logging should take priority over waiting for more scientific evidence. As existing studies clearly show, a more rapid transformation from conventional logging to certified logging would have positive impacts on great apes and many other species.

For further information

See www.ulucus.eu.

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4.4 Conserving the world's forests: steps along the journey

GEORGE WHITE

The struggle to preserve the planet's rich biodiversity will be won or lost in its remaining forests. By far, the largest threat to forest biodiversity is habitat destruction. Nearly half of the world's forest cover has already been lost, and if current rates of deforestation continue, huge areas of the world's natural tropical forests and a great many forest species will disappear within the next 100 years.

By engaging the forestry sector in responsible forest management through initiatives like GFTN, the power of the global marketplace can be harnessed to drive improvements in forest management.

The Worldwide Fund for Nature (WWF) believes that, outside of protected areas, this trajectory can be reversed if forests are managed responsibly. WWF considers independent, multi-stakeholder forest certification as a sure investment in improved forest stewardship. Certification is contributing to the greater recognition of the importance of environmentally and socially responsibly forestry practices, and is helping to clean up the timber industry by engaging producers, retailers and consumers in this effort. By engaging the forestry sector in responsible forest management through initiatives like WWF's Global Forest & Trade Network (GFTN), the power of the global marketplace can be harnessed to drive improvements in forest management. This helps to protect endangered species and preserve the planet's rich biodiversity for future generations.

Heading in the right direction

The conversion or degradation of a forest can happen very rapidly. Moreover, it is blindingly obvious when it is happening. One does not have to be an ecologist to see that many expedient and ill-conceived practices are not good forest management.

Forest certification attempts to infuse the principles of responsible forest management and to demonstrate evidence of an improvement against the possible alternatives—such as degradation, conversion and illegal logging—and perhaps most importantly, against no intervention at all. Although it has not been proved whether certification is a completely effective strategy for conserving biodiversity, if people waited until there was overwhelming evidence, there would be no forests left.

George White is Head of WWF's Global Forest & Trade Network, an initiative to eliminate illegal logging and drive improvements in forest management while transforming the global marketplace into a force for saving the world's valuable and threatened forests.

The need for some sort of positive action overrides waiting for perfection. Given the conversion rates in some places, there isn't the luxury of stopping and waiting 20 years to figure it all out. Certification is the best compromise, providing a foundation based on sound principles and a robust process. But it should not be used as proxy for protection — effective land-use planning is a prerequisite to forest certification. Certifying forests that should have been protected after a thorough multi-stakeholder land-use planning process is never a good place to start.

WWF believes that responsible forest management provides the necessary framework that will provide the analysis needed, utilizing certification as a system to adjust variables and get it right. To begin with, certification was a leap of faith; would anyone use it and would it offer conservation gains were the main fears. From WWF's experience in working with forest managers—from what can be seen and measured—it seems to be that we leaped in the right direction.

Protecting valuable and threatened forests

Although scientific studies evaluating the effect of forest certification on the conservation of tropical biodiversity are still greatly needed, an increasing wealth of practical experiences has emerged. This demonstrates that engaging industry as part of the solution, rather than only the problem, is yielding positive results. WWF's GFTN has seen countless examples of credible certification's ability to not only help meet the world's growing demand for timber responsibly, but also its capacity to safeguard the planet's valuable and threatened forests and the people and biodiversity that depend on them.

In central Africa, GFTN has witnessed the profound impact of certification on the vital rainforests of the Congo Basin. By engaging seven companies operating in the area — who collectively manage more than three million hectares (ha) of forest, of which about two million ha are certified by the Forest Stewardship Council (FSC) — in implementing environmentally and socially responsible forest management practices, GFTN is helping to conserve ecologically significant habitat for elephants and great apes.

GFTN and WWF are working with GFTN participants in the Congo Basin to promote reduced-impact logging (RIL) and management of high conservation values (HCVs) within their logging concessions. As a result of these efforts, wildlife inventories have been conducted and wildlife populations are being monitored regularly. These actions will ensure that the best forest practices are used to minimize the impact of logging on forest biodiversity while protecting HCVs, including threatened wildlife. HCV is still a relatively new concept and is evolving. When the assessment is done comprehensively and is reflected in the management plan and procedures, the HCV approach is a powerful tool. An effective assessment is one thing, but much of GFTN's work entails ensuring that the companies it works with know what to do next, both in actions that will take them closer to certification and in how they adapt their management plans to incorporate the assessments.

Box 1. Managing forests to protect wildlife

The FSC-certified concession of Danzer's *Industrie Forestière d'Ouesso* (IFO), a GFTN-central Africa participant in the Republic of Congo, was found to contain high population densities of gorillas, due to its proximity to the Odzala-Kokua National Park. IFO is cooperating with local NGOs and the Congolese government to prevent poaching and unsustainable hunting through the use of eco-guards. By employing these eco-guards, IFO is controlling the illegal hunting of rare and endangered mammals such as gorilla, elephant, chimpanzee, bongo and forest buffalo in the forest concession. The company also reduces the demand for bushmeat on the part of their workforce by importing cattle and fish from a nearby village every week. By engaging with companies like these, GFTN works to ensure that forests are responsibly managed in a way that maintains their high conservation values.

Certification has proved to be an effective tool in preserving the habitats of threatened species. A study conducted by WWF (van Kreveld and Roerhorst 2009; see article 4.3 in this issue) found that in contrast to other types of logging, responsible logging in accordance with the internationally recognized FSC principles is effective in preserving adequate living conditions for great apes. The study found that large mammal diversity in responsibly logged areas did not differ markedly from that of protected areas. While vast protected areas such as national parks and nature reserves offer ideal habitats for great apes, the report concludes that FSC-certified forests can be useful supplements to such protected areas, forming corridors between individual, isolated great ape habitats.

Sustaining biodiversity

GFTN is also working to conserve the rich biodiversity of one of the most threatened forest ecosystems in the world, in the heart of Borneo. The Sabah Forestry Department (SFD), a GFTN-Malaysia participant, has made a commitment to eliminate illegal logging in the Ulu Segama and Malua forest reserves by pledging 241,098 ha to FSC certification, setting aside the 34,000 ha Malua Forest Reserve for primate conservation.

These reserves provide critical habitat for 25 per cent of the total orangutan population of Sabah. This is the largest orangutan habitat in northeastern Borneo, and it is essential that management practices in the area provide for the survival of these endangered apes. Working collaboratively with GFTN-Malaysia, SFD has agreed to achieve forest certification and to demarcate strict conservation areas of this essential orangutan habitat. By working together to manage these biologically rich forests responsibly, GFTN and SFD are ensuring that they are conserved for a long-term and sustainable future.

In the same way, GFTN is working in South America to protect biodiversity in the Amazon. Providing support and guidance to participants attempting to achieve FSC certification, GFTN is training companies on measures such as RIL to reduce their environmental impact. A fauna monitoring study by WWF Peru (Ledesma and Zuñiga 2009) confirmed that these practices are paying off. The study compared large mammal

diversity in the certified forest concession of GFTN-Peru participant *Aserradero Espinoza* with mammal populations along the Madre de Dios River in the Tambopata Natural Reserve, finding that large mammal species, such as jaguars, were equally prevalent in both areas. These findings demonstrate that when forests are responsibly managed they can maintain the species richness that might be expected only in a protected area.

By engaging forest managers in working to conserve the rich biodiversity found in the forests of the Congo Basin, Borneo and the Amazon, GFTN is able to implement workable solutions that transform the forest products industry into a champion for sustaining biodiversity for future generations.

The best compromise

While we have seen countless examples of certification's ability to transform forest management practices, and their impact on the species living there, we also recognize that there is room for improvement. In terms of what's economically possible and what's scientifically understood, certification is the best compromise. Accepting that industry will continue business as usual whether we like it or not — choosing not to discontinue logging in areas for which concessions have been allocated — certification provides a way of modifying companies' behaviour in 99% of cases; the other one percent lose their certificate and pay the penalty. And the uptake of certification will increase when adequate capacity and investment are in place to overcome the technical challenges of certifying tropical forests, and when there is a clear and consistent demand for certified timber.

In our work with forestry companies and communities across Africa, Latin America, Asia and Europe, GFTN has witnessed the impact of industry in expanding the extent of certified forests; this drives improvements in forest management worldwide. Currently, GFTN participants manage more than 27.4 million ha of forests, 20.2 million of which are now credibly certified.

By working with these companies to implement responsible forest management practices, GFTN helps industry to recognize the title and rights of indigenous communities, carefully manage forests with significant concentrations of biodiversity and endemic species, maintain forests and determine harvest limits that maintain ecosystem integrity.

Credible forest certification is the most effective way for companies to prove that they are acting responsibly. It is a solution often chosen after a series of related drivers, occurring as a response to questions that could previously not be answered: such as, was this wood legally and responsibly harvested? Where markets, governments or investors do not ask too many questions, certification suffers. GFTN's role is to ensure that market influence is strong and that through engagement, forest management companies are better equipped to engage with stakeholders.

Working together

Does certification work? It's a valid question. The answer, today, with respect to WWF's conservation agenda is that it appears to. What is missing is the empirical evidence to show that certification delivers in every situation.

Ultimately, certification is a compromise, and a rare one; it has so far been able to bridge the historical gaps between forest managers, NGOs and local stakeholders. Credible certification schemes, such as FSC, are able to review and improve their own performance. However, there is still a great need for longer-term analyses of the effects on biodiversity before, during and after logging. This is an area where academia, organizations such as WWF and the companies it engages with must come together to continue driving improvements in the way conservation values are monitored, maintained and enhanced.

We live in an imperfect world and recognize that there is always room for improvement when are working with initiatives such as certification schemes. The evidence shows that things are pointing in the right direction. This may not sound that exciting until we consider the alternatives: no assessments, no monitoring, conversion, clearance and degradation leading to habitat loss.

At the very least, certification is giving the world's valuable and threatened forests and the people that manage them time until a better solution is found. In some cases, it's doing much, much more than that. And I'll take that when compared with the alternatives.

For more information

For more information about GFTN, please visit gftn.panda.org.

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4.5 An indirect way to evaluate the impact of certification

MARIELOS PEÑA-CLAROS and FRANS BONGERS

Measuring the impact of certification on biodiversity

The impact of forest management certification can be measured at different scales. Studies focusing on the level of the forest management unit (FMU) worldwide have found that certification results in the use of better management practices (Auld, Gulbrandsen and McDermott 2008 and references therein). On the other hand, researchers focusing on the landscape level argue that certification has not reduced the pressure on high conservation value forests (HCVFs) and has not decreased the deforestation rates in tropical countries (e.g., Gullison 2003, but see also Meijaard and Sheil 2007 and Hughell and Butterfield 2008 who showed that certified forests appear to be better protected from clearance). Studies at the landscape scale also include in their analysis other types of land use (e.g., non-managed forests, agricultural land, degraded areas, intensely human-inhabited areas) that are not under the direct control of certification. Consequently, it is not surprising to find less positive effects of certification at this larger scale.

CAR ANALYSIS CAN HELP DEFINE RESEARCH PRIORITIES AS IT IDENTIFIES THE MOST COMMON AND FREQUENT ISSUES BEING RAISED DURING THE EVALUATION PROCESS.

Although forest management certification is now considered an important multi-stakeholder governance process and its development is among the most advanced of the labelling initiatives (Auld, Gulbrandsen and McDermott 2008), its impact on the ground has yet to be fully evaluated. For example, there is little information available comparing areas before and after certification, or comparing certified areas with non-certified areas. Moreover, there is little information on the impact of certification on biodiversity (van Kuijk, Putz and Zagt 2009) or on the performance of community-owned FMUs (but see de Lima 2008).

This lack of on-the-ground studies may relate to the fact that such initiatives are costly, labour intensive and time consuming. Researchers have circumvented the need for such studies by assessing the impact of certification using the information available in the

Marielos Peña-Claros and **Frans Bongers** work for Forest Ecology and Forest Management, Wageningen University, the Netherlands.

public summaries of the certification reports, specifically the list of corrective action requests (CARs) given to FMUs by evaluation teams. The CARs included in the evaluation reports demand changes or improvements in specific measures related to the FSC Principles and Criteria. Therefore, the CAR list indicates the management actions that need to be improved. Given that FMUs have to respond to the CARs and improve their management accordingly to maintain their certification, evaluation of the CARs is an indirect way of measuring the impact of certification at the FMU level (Newsom et al. 2006).

We have used this indirect approach to assess the impact of certification on the economical, social and ecological aspects of forest management in the tropics. We included all 123 FMUs that were managing tropical natural forests which had been certified by October 2008, and for which public summaries were available on line.[1] We extracted from each public summary the criteria mentioned in the list of CARs as well as general information regarding the FMU (such as area certified, product harvested, type of certificate holder). We also followed the list of CARs given to 11 FMUs by looking at their annual audits. Additionally, we compared the performance of 13 FMUs over time by comparing the list of actions given to them in the initial evaluation and in the evaluation for recertification (five years after obtaining the first certificate). The results of this study are published elsewhere (Peña-Claros, Blommerde and Bongers 2009a,b). Here we focus on issues specifically related to the impact of certification on biodiversity.

The impact of certification on biodiversity

Of the 47 criteria used to evaluate the performance of FMUs (without considering Principle 10: Plantations), 20 are related to biodiversity issues in one way or the other. Some are directly related to biodiversity protection or conservation,[2] while others are best management practices[3] believed to have a positive impact on biodiversity. Some are related to monitoring activities of diverse issues, among them changes in species composition (Table 1).

In our sample, 22 criteria comprised 75% of the 3,102 problems reported; 11 of the 20 biodiversity-related criteria were included in these 22. These 11 biodiversity-related criteria were relatively common, reported by 44–76% of the FMUs in our sample (Table 1, see "distribution"). The most commonly mentioned biodiversity-related criterion (6.5 "Use of reduced-impact logging techniques to reduce impact to the forest") ranked third in the total sample (after 4.2 "health and safety for employees and families" and 7.1 "management plan"). Criterion 6.2 ("Rare, threatened and endangered species") is mentioned in 73% of all FMUs considered. This indicates that although this issue receives considerable attention worldwide (through e.g., CITES and widely operating conservation NGOs), forest managers are not considered to be dealing with it adequately (i.e., in terms of FSC standards) in the tropics. We suggest that FMUs need to be helped to make this transition (through education of FMU workers at all levels of the organization; definition of concrete on-the-ground activities that need to be carried out; better and more systematic monitoring; and improved rules and regulations).

Table 1. Ranking of biodiversity-related criteria mentioned in the list of CARs given to FMUs

Criterion	Description	Frequency	Distribution
6.5	Use of reduced-impact logging techniques to reduce impact to the forest	5.6	74
8.2	Monitoring of indicators, such as productivity, forest diversity, socioeconomic impacts	4.8	76
5.6	Harvesting regulations to assure long-term sustainability	4.5	61
6.2	Rare, threatened and endangered species	4.0	73
8.1	The frequency and intensity of monitoring	2.8	63
6.1	Assessment of environmental impact	2.7	54
1.5	Protection from illegal activities	2.6	54
6.3	Ecological functions and values	2.4	55
6.4	Protected areas	2.1	44
6.7	Waste (garbage)	2.0	54
9.1	Define existence of HCVFs	1.9	52
6.6	Avoid use of chemicals	1.5	28
8.4	Use and implementation of results	1.2	30
9.3	Measures for maintenance and enhancement, public summary	1.2	37
9.2	Consultation process	1.2	34
5.5	Forest services and resources	1.0	24
9.4	Monitoring	0.9	30
6.10	Forest conversion	0.3	9
6.9	Exotic species	0.1	3
6.8	Biological control agents	0.0	1

Data was extracted only from main reports (n=104). "Frequency" refers to the percentage of times a given criterion was mentioned in our sample (total of 3102 times). "Distribution" refers to the percentage of FMUs that had an issue raised at least once in the specific criterion. Criteria are listed based on their frequency.

Our monitoring sources (the annual audits and the recertification study) indicate that certification has a positive effect on biodiversity. FMUs were able to sufficiently address the CARs raised by the evaluators during the five annual audits after the main evaluation, and the number of problems (both general and biodiversity-related) had decreased during the second evaluation (Peña-Claros, Blommerde and Bongers 2009a).

The other nine biodiversity-related criteria (of the 20) were mentioned only a very few times and were also not commonly found among FMUs (Table 1). This may be related to the fact that several of them are not relevant to current management of tropical natural forests; for example, criterion 6.9 (Exotic species) was found in only 3% of the FMUs, Table 1) or are part of the process of incorporating the concept of high conservation value forests (HCVFs). The process of HCVF had only recently started when we carried out our survey in 2008 (all criteria related to Principle 9 – HCVF).

Lessons learned from the CAR analysis

The biodiversity-related criterion most frequently mentioned as a problem was 6.5 (Use of reduced-impact logging techniques to reduce impact to the forest). It is important to keep in mind that evaluators are not measuring the impact of reduced-impact logging (RIL) techniques on biodiversity, but are assessing whether the FMU is implementing the techniques properly. Given that RIL techniques have been widely encouraged by the certification movement (Peña-Claros et al. 2008; Putz et al. 2008), it is surprising to realize that so little research has been carried out on the actual impact of RIL techniques on biodiversity (van Kuijk, Putz and Zagt 2009). To address this lack of information, certification schemes will have to be more active in setting research priorities, defining a research agenda, and promoting research in certified areas (preferably through direct comparisons to non-certified areas). CAR analysis can help define research priorities as it identifies the most common and frequent issues being raised during the evaluation process (see Table 1 and Peña-Claros, Blommerde and Bongers 2009a for a list of most commonly raised issues).

As tropical forests become more fragmented and global changes increase the risk of wildfires even in moist tropical areas, it will become more important for FMUs to have effective plans for avoiding and controlling wildfires. Certification efforts can be an important part of those plans by requiring forest managers to design and implement them plans effectively. Certification could then have an even greater impact on biodiversity in the future, since wildfires have a negative effect on biodiversity.[4]

Another important positive impact of certification on biodiversity is due to the fact that FMUs have to control illegal activities in their management areas (Table 1, criterion 1.5). Illegal activities are broadly defined in the FSC principles and criteria, and range from hunting to invasion by third parties. Several studies have found that both hunting and land-use change have a severe negative impact on biodiversity (Stoner et al. 2007, and

references therein), probably much larger than that of logging. For example, although the effect was not formally quantified, an increase in wildlife was observed by researchers working in a certified Bolivian FMU after hunting was strictly prohibited and workers were supplied with meat by the company. Since then, sightings of jaguars, tapirs, monkeys have been very common in this area (Todd Fredericksen, pers. comm.). Documenting the effects of certification on reducing illegal activities is needed if we want to measure the impact of certification on the conservation of tropical forests.

The impact of certification on biodiversity could even become more substantial if the monitoring systems required by the FSC scheme are adequately implemented and are used to adjust management practices. CARs related to monitoring were common among FMUs (Table 1, criteria 8.2, 8.1 and 9.4), suggesting that there is ample room for improvement. Researchers and certifiers should assist FMUs in these tasks; defining a monitoring system to assess the impact of logging on forest diversity and species composition is a complex undertaking. Researchers would have a difficult time reaching consensus on questions such as "what aspect of biodiversity should be monitored?" and "what design should be used to obtain reliable data?" and coming up with an efficient and cost-effective monitoring system. It is, however, crucial to keep monitoring systems simple as they are already a substantial burden for FMUs. Managers are often asked to carry out a series of research activities for which they do not have the qualified staff or sufficient financial means. It has been questioned if this approach is the correct one to follow given that FMUs have also vested interests in the results (Schulze, Grogan and Vidal et al. 2008). Consequently, it has been suggested that the evaluation team promote strong partnerships between FMUs and independent research institutions. In that way the information required to assess the impact of logging on biodiversity can be defined, based on objective and long-term monitoring carried out by independent researchers (Schulze, Grogan and Vidal 2008; Putz et al. 2008). This type of partnership is probably crucial, given the fact that neither FMUs nor certification schemes are incorporating research results rapidly enough into their management practices or evaluation standards (Putz et al. 2008; Peña-Claros, pers. obs.).

Today, 15 years after the start of forest certification, we find that the management of tropical natural forests has improved. A continued focus on the certification of forest management (there are still large forest areas that are not certified), improvements to the certification process, and incorporation of research results in certification criteria are needed to make the transition to sustainable management of tropical forests. Assessing the real impact of certification on tropical forests will certainly help support the idea that sustainable forest management is a valuable conservation tool for tropical forests.

Endnotes

1. All FMUs included in our study have been certified by the Forest Stewardship Council.
2. See, e.g., criterion 6.2 (Rare, threatened and endangered species); and criterion 9.1 (Define existence of high conservation value forests).
3. See, e.g., criterion 6.5 (Use of reduced-impact logging techniques).
4. See article 6.3 in this issue.

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4.6 Exploring the impacts of certification systems

BEN CASHORE and MICHAEL VANDENBERGH

Businesses, NGOs and government agencies invest significant resources in certification systems that promise to promote environmental and social stewardship. Labels for products as diverse as furniture, food, electronics and buildings indicate the preferred status of items that meet standards of environmental sustainability, energy conservation or social justice. But as labels proliferate, businesses and consumers are confused about how to understand and compare the current and potential impacts of certification systems for global supply chains.

REGULATORS AND FOUNDATIONS WANT TO KNOW WHETHER THESE SYSTEMS ARE ACHIEVING SUSTAINABILITY OBJECTIVES AND HOW TO IMPROVE THEIR PERFORMANCE.

Regulators and foundations want to know whether these systems are achieving sustainability objectives and, how to improve their performance where necessary. Manufacturers and marketers require this information to support business decisions, including those relating to corporate social responsibility. Some people also worry that certification systems promoting sustainability in one realm may mask unsustainable practices in another. For instance, consumers and companies wonder whether sustainable forestry certification sufficiently promotes biodiversity conservation and fair labour practices.

In late 2009, the David and Lucile Packard Foundation, Walton Family Foundation, and MARS, Inc. contributed financial backing for an independent assessment of the impact and performance of certification systems in achieving more sustainable production and consumption. A neutral third party, RESOLVE, Inc., provides facilitation and organizational support for a 13-person steering committee, comprised of representatives from multinational corporations, leading environmental NGOs, certifying organizations, universities and scientists.[1]

The committee will draw on its multi-stakeholder, multi-disciplinary composition to identify and review key questions and evidence. It will focus on understanding and

Ben Cashore is Professor of Environmental Governance and Political Science, and director of the Program on Forest Policy and Governance, at Yale University. **Michael Vandenbergh** is a Tarkington Professor of Law and Director of the Climate Change Research Network at Vanderbilt University. Their research focuses on the role of certification and other forms of private governance in addressing environment and social challenges in ways that complement, or interact with, traditional forms of public regulation.

identifying complex but important causal relationships that have been uncovered by existing scholarly research and publications, while benefitting from the rich experience and conventional wisdom of practitioners. The committee will identify gaps and under-explored research questions relevant to the practice of sustainable certification. The diversity of the group will the study to examine broader questions than would otherwise be possible and to provide a range of perspectives in analyzing the findings.

The committee will soon commission "desktop reviews" of certification within three sectors: forestry, fisheries and agriculture. (A fourth review will explore cross-sector issues such as business incentives for incorporating certification schemes and how voluntary mechanisms relate to non-voluntary mechanisms such as government regulations.) The forestry review will examine environmental, social, and economic problems related to the sector to identify what is and isn't known about the historical, current and potential impacts of forest certification programmes (e.g., Forest Stewardship Council and Programme for the Endorsement of Certification) in promoting sustainable forest management. The review will explore both the direct impacts that certification may have in improving harvesting practices and its indirect impacts when combined with other voluntary and regulatory approaches.

These reviews will inform the steering committee as it identifies hypotheses about the factors that affect the performance of certification schemes. The committee will then commission original research to assess these hypotheses and will ultimately issue a report summarizing its findings and highlighting high-priority areas for continued research. This report will seek to identify the conditions that enable or constrain the uptake of certification schemes within certain sectors. It will also highlight opportunities (including research needs) to more effectively leverage voluntary systems in a way that further promotes sustainability.

The committee hopes the findings will inform corporate and consumer choices and foundations' grant decisions. It also hopes to assist certifiers seeking to refine their systems and government agencies who want to be involved through substantial purchases and regulation of these systems. The ETFRN community can expect the findings to offer insights about how to utilise and supplement certification of forestry to further promote biodiversity and other sustainability goals.

For more information

For information, or to register to receive updates, please visit the project web site (http://assessment.resolv.wikispaces.net/Assessment+of+Standards+and+Certification+Systems) or contact Abby Dilley at www.resolv.org.

Endnotes

1. The members of the steering committee are Mike Barry (Marks & Spencer), Scot Case (Terra Choice), Ben Cashore (Yale University), Jason Clay (World Wildlife Fund), Michael Fernandez (MARS, Inc.), Neil Hawkins (Dow Chemical Company), Louis Lebel (Chiang Mai University), Tom Lyon (University of Michigan), Patrick Mallet (ISEAL), Peter Melchett (Soil Association), Michael Vandenbergh (Vanderbilt University), Jan Kees Vis (Unilever) and Tensie Whelan (Rainforest Alliance).

Section 5

High conservation values in forests and plantations

Photo credits
p.139 Peatland forests, Kampar Peninsula. Kresno D. Santosa, Tropenbos International Indonesia
p.141 Mosaic of tree crowns, Venezuela. Jan Jansen
p.144 Butterflies at a certified concession in Bolivia. Roderick Zagt, Tropenbos International
p.146 Teak *(Tectona grandis)* plantations encroach onto farmland in central Panama. Wally Menne, Timberwatch
p.148 *Eucalyptus* plantation erosion near Sabie, South Africa. Wally Menne, Timberwatch
p.149 In Tanzania pine saplings have spread from plantations into adjacent grassland. Wally Menne, Timberwatch
p.150 *Eucalyptus* trees planted to the edge of a Mondi-owned wetland. Wally Menne, Timberwatch
p.151 A Sappi-owned FSC-certified *Eucalyptus* plantation clearcut/brush burn in the vicinity of the Sudwala Caves, a South African Natural Heritage Site. Wally Menne, Timberwatch
p.152 *Acacia* plantations and forest remnants in Sumatra, Indonesia. Kresno Santosa, TBI Indonesia

5.1 The HCV approach

CHRISTOPHER STEWART

Maintaining critical biodiversity values in tropical managed forests

The Forest Stewardship Council (FSC) introduced the concept of High Conservation Value (HCV) in 1999 to define forest areas of outstanding importance: high conservation value forests (HCVFs). The HCV approach describes six exceptional values or attributes of a forest area, which cover a broad range of biodiversity, ecosystem services and socio-cultural values (Box 1). The focus on conservation values enables stakeholders — ranging from local communities all the way up to international bodies — to define what is truly important to them. It also allows them to identify explicit management targets, while providing great flexibility for developing locally appropriate approaches.

By providing a common language for industry, conservationists, communities and financiers, the HCV approach offers significant opportunities for conserving critical conservation values within production landscapes.

FSC requires that forest managers identify HCVs within their forest management units (FMUs), manage these to maintain or enhance the values identified, and monitor conservation impacts. HCV areas are not necessarily set aside for conservation alone. Appropriate HCV management within natural forests can range from complete protection to extractive uses such as selective logging or harvesting of natural products. It always requires stakeholder consultation and a precautionary approach to managing HCV areas within a wider landscape context.

Published evidence regarding the biodiversity benefits of the HCV approach in tropical forests remains disappointingly scarce (van Kuijk, Putz and Zagt 2009). Nonetheless, application of HCV has prompted many companies to invest in high-quality conservation assessments and conservation management plans. There is ample circumstantial evidence that companies do modify their behaviour to meet HCV requirements of certification: in half of the certification reports for 104 tropical FMUs examined by Peña-Claros, Blommerde and Bongers (2009), corrective action requests (CARs) were issued against the requirement for defining HCVF, while recertification reports for the same FMUs

Christopher Stewart manages the HCV Resource Network, a multi-stakeholder organization that supports conservation as part of responsible land management through the use of the HCV approach, encouraging collaboration, providing information and supporting a consistent approach to HCV across many land-use sectors and applications.

demonstrate that over approximately five years the focus of managers shifts progressively from HCV identification through to management and monitoring. Globally, Newsom (2009) found a mean of 22% forest area (2.5 million ha) designated as HCVF, mostly to maintain biodiversity values, in a sample of 117 FSC-certified FMUs.

Box 1. The six high conservation values

High conservation value areas are critical areas in a landscape which need to be appropriately managed in order to maintain or enhance high conservation values. There are six main types of HCV area:

HCV1 Areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g., endemism, endangered species, refugia)

HCV2 Globally, regionally or nationally significant large landscape-level areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance

HCV3 Areas that are in or contain rare, threatened or endangered ecosystems.

HCV4 Areas that provide basic ecosystem services in critical situations (e.g., watershed protection, erosion control)

HCV5 Areas fundamental to meeting basic needs of local communities (e.g., subsistence, health)

HCV6 Areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities)

Source: HCV Resource Network Charter, adapted from the Forest Stewardship Council.

The HCV concept has been widely adopted beyond its original context of forest certification. It provides the cornerstone of standards for important tropical and subtropical crops such as oil palm, soy and sugar cane. The concept is also finding its way into the discourse on carbon and REDD+ though its inclusion in the Climate, Community and Biodiversity Alliance certification scheme, and in World Bank and IFC safeguard policies, as well as in the purchasing and investment policies of major companies and commercial banks. The HCV approach may also become a significant driver for land-use planning and plantation design (McCormick et al. 2009).

By providing a common language for industry, conservationists, communities and financiers, the HCV approach holds out a genuine opportunity to tackle difficult issues in land-use planning, cross-sector cooperation, landscape-scale conservation, and ecosystem payment mechanisms. Significant risks also arise from the concept's rapid emergence, however: poor understanding of the concept, inconsistent local interpretations and guidance, and potential misapplications in agricultural planning. These major challenges prompted concerned stakeholders to create the HCV Resource Network (www.hcvnetwork.org), which is dedicated to maintaining the integrity of the concept.

In order to achieve positive outcomes, the HCV approach needs to be much better understood by managers, practitioners and auditors. One problem is that most HCV assessments are seen only by certification bodies. The public summaries of HCV management plans too often lack the detail that auditors require, and too few companies recognize the presence of well-managed HCVs as an asset (including marketing value). However, some progressive companies publish detailed reports, recognizing the potential for constructive feedback and promoting novel partnerships. Greater openness — including peer reviews — would help us all to better understand how the concept is being applied. The HCV Network encourages transparency and has developed peer review templates (HCV Resource Network 2010), which are available to any third-party reviewer and which will be especially useful for large or potentially high-impact operations.

Conservation scientists need to engage with the implementation of the HCV approach; for example, by becoming actively involved with the HCV Network's efforts to integrate site-level HCV management with systematic conservation planning, develop robust guidance for implementing the HCV approach in plantations (pulpwood, palm oil or agricultural crops), and adapt the concept to non-forest ecosystems such as grasslands and wetlands.

Finally, the conservation benefits of the HCV approach within forests need to be demonstrated beyond the existing indirect and circumstantial evidence. There are significant challenges in disaggregating the impacts of different forest management operations, but useful research could include comparisons of HCV management prescriptions between FMUs, quantitative analyses of the nature and status of areas designated for HCV management, and short- to medium-term outcomes for specific conservation targets designated in HCV management plans.

The many large-scale processes that are now using the HCV concept for conservation planning demand better research and collaboration, and provide opportunities to influence and guide the development of major land use industries towards a more holistic approach to local- and landscape-scale conservation.

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5.2 Management of HCVFs in Bolivia

BONIFACIO MOSTACEDO
and LINCOLN QUEVEDO

Progress and challenges

Bolivia is one of the leading countries in voluntary forest certification in natural tropical forests, with 1,647,117 certified hectares. Certification has helped to solve some social problems, generated greater equity in economic benefits among workers in the forestry sector, and promoted several sustainable forest management (SFM) practices.

The identification and protection of high-conservation values (HCVs) is an additional step towards environmental sustainability. Identification of HCVFs is one of the first phases in the management process of certified forests, which started ten years ago. When a forest with HCVs (HCVF) is identified, managers must carry out environmental and social studies; they also must allow for input from different stakeholders, including social, scientific and academic organizations. They then design management practices and monitor HCVF attributes. These practices should be apparent in maps, work plans and practices in the field.

Further progress would be possible if more professionals were trained in HCVF management and more forest managers were more committed to it.

The success of these processes of consultation, dissemination and implementation is evaluated rigorously by certifiers. In the Bolivian Amazon ecosystems, for example, special written management protocols are required in order to protect tree species with high conservation value, such as Brazil nut *(Bertholletia excelsa)* and rubber *(Hevea brasiliensis)*. The protocols call for extra care during road construction, felling and extraction to reduce damage to these species.

HCVF management guidelines are also intended to protect threatened wildlife species. Certified concessionaires in the western Bolivian Amazon, for example, have to protect Goeldi's monkey *(Callimico goeldii)*, a species categorized by IUCN as vulnerable, by forbidding hunting and protecting bamboo forests. The monkey's population densities are lower than those of other South American primates, and bamboo forests are one of its most preferred habitats. Hunting pressure is severe outside of the concession areas, where

Bonifacio Mostacedo works for the *Instituto Boliviano de Investigación Forestal* (IBIF) and *Universidad Autónoma Gabriel René Moreno* (UAGRM), Bolivia and **Lincoln Quevedo** works for UAGRM. Their interest in this topic is based on extensive work as researchers and consultants in forest certification in tropical nations.

it is sometimes impossible to take protective action. Prior to the start of certification, it was common for concession workers to hunt wildlife. Since certification, rules about hunting have been instituted, workers are forbidden to have guns and concessions provide meals for workers. Workers can be fired if they do not follow the rules.

Further progress would be possible if there were more professionals trained in HCVF management and forest managers were more committed to it. Although Bolivia has developed guidelines for the identification of HCVFs, only about 30% of certified areas have detailed and accurate information about local HCVF attributes. If managers want to preserve the value of the HCVF, they need to obtain detailed field data within their management areas.

Many forest attributes — such as threatened, endemic and rare species, special habitat for fauna and flora, and environmentally fragile areas — are difficult to measure. Bringing in people with expertise to correctly identify these attributes would help managers develop appropriate strategies for the management and monitoring of HCVFs. Currently, identification is done using guidelines developed in Bolivia and elsewhere, and ProForest guides; expertise is sometimes provided by forest ecologists who work on this issue. Each certified concession company has a different approach to HCVF identification, which was developed according to the requirements of the evaluators.

Recommendations

This is a specialized topic, and we suggest that academic and research organizations conduct further research and training about HCVF attributes and their management. For example, updated information about the conservation status of threatened plant and animal species is required for most Bolivian ecosystems. Fieldwork training programs are also needed to build capacity; although several training workshops have been held in forest certification, none have been devoted to HCVFs. HCVF is one of the most challenging issues for certification and conservation management in Bolivia, but step by step, the concept is being better understood and implemented by forest managers.

5.3 FSC forest certification: promises or pretences?

WALLY MENNE

The question of whether or not Forest Stewardship Council (FSC) certification delivers on its claim of helping to protect or enhance biodiversity raises another critical question: Are underlying beliefs about certified forests valid to begin with? The main assumption made when justifying the use of certification to label timber products as coming from responsibly managed forests, is that the timber in question came from an actual forest.

The main alternative source of timber, apart from forests, is large monoculture plantations of alien — and often invasive — tree species in places that previously supported natural vegetation or farming. Tree plantations established for wood production almost exclusively comprise single species, even aged stands of trees that can be clear-cut after as little as seven years where conditions allow. These industrial plantations are clearly not intended to serve as havens for wildlife, let alone to substitute in any way for the diverse mix of species that they likely displaced. If they are certified as "forests" it creates the false impression that the biodiversity values normally associated with genuine forests will also apply to monoculture tree plantations.

From the perspective of biodiversity conservation, allowing the FSC — or any other certification organization — to continue to certify plantations as responsibly managed forests will lead to untold ecosystem damage and habitat loss.

Ever since FSC forest certification was introduced in 1994, a debate has raged about whether to certify what are often referred to as "planted forests." The timber industry — and its supporters within institutions such as the United Nations Forum on Forests (UNFF) and the Food and Agricultural Organization (FAO) — have persistently promoted the questionable notion that any assemblage of trees is some or other type of forest. On the other hand, there is a growing body of opinion, based on a broader and more detailed assessment of what constitutes a forest, as opposed to an industrial tree monoculture.

Wally Menne works with the Global Forest Coalition (GFC), a worldwide coalition of non-governmental organizations and indigenous peoples organizations. He is also project coordinator of the Timberwatch NGO Coalition in South Africa, which serves as the GFC focal point for NGOs in Africa. He has been involved in South African NGO work since 1975, but since participating at the Plantations Campaign meeting of the World Rainforest Movement in Montevideo in 1998 has become active in global plantation processes and campaigns.

Definitions of "forest" vary from those that emphasize protecting and preserving the biodiversity of forests to those that serve to exploit land and other resources. The Global Forest Coalition (GFC) subscribes to the first approach and broadly defines forests as follows: "Forests are complex tree-dominated ecosystems with particular structural biotic and abiotic components, assembled within temporal and spatial limits and with a self sustained successional dynamic determined by each forest's biodiversity."

While the FSC does not appear to have chosen any specific definition or set of definitions for forests, it does seem to rely on the open-ended and confusing definitions of the FAO, which include almost any tree grouping or coverage, including the crudest plantations, under the vague heading "all types of forest." To quote Miguel Lovera, former GFC chairperson: "(FAO) have been most instrumental in precluding the adoption of a clear and coherent forest definition that recognizes forests as an ecosystem and excludes monoculture plantations" (Lovera 2008).

The Association for Tropical Biology and Conservation recently called on the United Nations (which includes the FAO) to change its controversial definition of "forest."[1]

The FSC certification system

The FSC certification system (Box 1) was established in 1994 with nine forest certification principles. A tenth plantation principle, added in 1996, has led to a standoff between industry players and supporters (mainly certification bodies) that benefit financially from their involvement with the FSC system and other "green" groups that do not support the certification of environmentally and socially destructive industrial tree plantations under the FSC. This impasse has led to many NGO members withdrawing their support for FSC, but the organization continues to certify plantations that damage biodiversity.

Box 1. Summary of FSC principles and criteria

This is a summary of some of the FSC 10 principles and 56 criteria (Appendix 2). Many of these appear to be basic, but in many places even these basic requirements are not fulfilled. This is where FSC can have the biggest positive impact:

- prohibit conversion of forests or any other natural habitat;
- respect of international workers rights;
- respect of human rights with particular attention to indigenous peoples;
- prohibit the use of hazardous chemicals;
- no corruption – follow all applicable laws; and
- identification and appropriate management of areas that need special protection (e.g., cultural or sacred sites, habitat of endangered animals or plants).

Source: www.fsc.org/pc.html

Theoretically, timber products from responsibly managed forests that have been certified by FSC come with a promise that they comply with all ten principles of the FSC standard.

In reality, few tree plantations that have been certified by FSC meet all its criteria. In such cases it is nearly impossible to rectify the situation on the ground, and their certification continues to be renewed, subject to ineffective corrective action requests (CARs; see GFC and Timberwatch 2008).

The points listed in Box 1 are among the many ambitious objectives that FSC claims it helps achieve through certification, but they must be viewed against what really happens.

Prohibit conversion of forests or any other natural habitat

In every instance, tree plantations contribute directly or indirectly to the conversion or degradation of forests and other natural areas. Claims that plantations somehow reduce the pressure on forests have yet to be substantiated in a meaningful way.

Respect of international workers rights

Plantation workers rights are not well respected, mainly due to the contract labour system that is widely endorsed through FSC certification of industrial tree plantations. The system allows timber companies to limit their responsibilities in respect of providing even basic employment benefits such as paid leave and medical insurance.

Respect of human rights, with particular attention to indigenous peoples

Indigenous people's access to land, water and biodiversity resources is undermined by tree plantations on or adjacent to their territories, because plantations have a direct impact on natural water sources such as springs and streams, and reduce the area available for subsistence hunting and gathering.

Prohibit the use of hazardous chemicals

FSC certification still permits the use of toxic substances in plantations and forests. The use of harmful chemical herbicides also reduces potential employment opportunities for local people who carry out manual eradication of alien invasive plants that are introduced and spread by plantation management activities.

No corruption – follow all applicable laws

Obeying the laws of a country should not be dependent on FSC certification. In South Africa, certification indirectly stimulates the establishment of illegal plantations in sensitive no-go areas, and in areas where planting licences or permits are required, due to the local lack of supply due to increased exports of certified wood products. In the country's timber plantation areas, the transgression of wildlife and agricultural resource conservation laws is more the rule than the exception.

From a timber company perspective, FSC certification mainly relates to lucrative export markets driven by high consumption of timber in industrialized regions such as Europe. Local markets are generally not very fussy and buy up the remaining wood (from uncertified sources) that has not been processed or exported. This increases the pressure for more plantations, which in turn destroys more natural habitat. In South Africa this has led to the establishment of a substantial area of illegal timber plantations, especially in ecologically sensitive grassland, wetland and riparian zones. Efforts by the government to address this problem have not been effective.

Effects of plantations

In general, monocultures of alien trees destroy the original vegetation where they are planted. In addition, due to their high level of water consumption, plantations affect adjacent natural habitat or farmland in numerous ways, with negative consequences for both local people and biodiversity.

To be economically viable, industrial tree plantations require well-watered, reasonably fertile land that would previously have supported natural vegetation or agriculture. The argument used to justify expanding plantations — that the land used had already been degraded or converted to agricultural uses — makes no sense, because new plantations push the agricultural frontier deeper into natural areas, as is the case with teak plantations in Panama.

To add to the problem, the invasion of trees from plantations into adjacent forests, grasslands and wetlands is a significant issue. It appears, however, that negative impacts in areas outside of the so-called forest management unit (FMU), including soil erosion and siltation of streams and wetlands, are usually ignored during certification audits.

It is common for exaggerated claims to be made about FSC-certified plantations. As well as claims made by FSC itself, the World Wide Fund for Nature (WWF), a member of the FSC environment chamber, has been instrumental in setting up a partnership with participants in the timber industry in various countries to promote what it calls "New Generation Plantations."[2]

In South Africa, WWF and Mondi have had a mutually beneficial funding agreement since 2001, but it appears that WWF has made some compromises in trying to convert Mondi to a less environmentally harmful corporate ethos. But when looking beyond the optimism of the WWF web site, a rather bleak picture emerges. On the ground, Mondi tends to go for window-dressing, creating public relations showpieces, and sponsoring projects by South African NGOs such as WESSA, in order to create a positive view of itself.

Although plantations on Mondi-owned land are FSC-certified, the company, together with its competitor Sappi, has effective ownership of large areas of poorly managed pulpwood

plantations in the form of woodlots on community land. Like the "myth" that sustainable forest management (SFM) will produce biodiversity benefits, WWF's New Generation Plantations are unlikely to alter the fact that planting alien invasive trees, FSC-certified or not, will damage ecosystems and undermine local livelihoods, with dire consequences for biodiversity.

FSC-type certification appears to have succeeded in misleading much of the world about the true nature of tree plantations. Real forests are natural entities, wholly or part of an ecosystem, while tree plantations are monocultures designed by people, established for the singular purpose of producing industrial materials to feed human consumption.

FSC promises continuous improvement in the false "forests" it has certified, but with few exceptions, these planted forests are usually in a state of continuous deterioration. There is continuous loss of soil and natural species, and pollution by toxic chemicals in the form of fertilizers, pesticides and herbicides.

With every clear-cut and subsequent burning of brush — which in the case of *Eucalyptus* can be as often as every seven to eight years — more and more precious topsoil is lost from the steeper slopes of plantations. Eventually, trees need to be planted into exposed shale or subsoil, with heavy applications of fertilizer and with silica gel to help to retain moisture around the roots. Topsoil that is lost from plantation sites has to go somewhere, and it usually ends up deposited into a watercourse, wetland, farm dam or even a coastal estuary. Silt-laden run-off scours stream banks, loosening the roots of plants that stabilize the soil in these sensitive areas. In theory, certification should help to reverse the effects of bad plantation management, but once the damage is done, there is little likelihood of this happening, as the high costs involved discourage efforts to rectify the situation.

The FSC system allows for CARs, which should theoretically result in actions that resolve the problems they identify. In practice, however, this amounts to little more than cosmetic changes and does not effectively address the bad practices that led to the problem in the first place. Timber companies can also avoid dealing with difficult problems by excising portions of a plantation or forest while retaining certification of the remaining area.

Then there is the question of what happens after a plantation is decertified (yes, it can happen) or the owner simply chooses not to extend the certification. In cases where possible future FSC certification is used as a way to legitimize the expansion of plantations, as with the Norwegian company Green Resources Ltd. in Tanzania, it creates another set of problems.[3]

From the perspective of biodiversity conservation, allowing the FSC — or any other certification organization — to continue to certify plantations as responsibly managed forests will lead to untold ecosystem damage and habitat loss. It will also result in

negative effects from the secondary, off-site and cumulative impacts of industrial wood production: desertification and wildfires; soil erosion and siltation; air, soil and water pollution; alien species invasion; soil carbon depletion and $C0_2$ emissions; transportation emissions; methane emissions from waste generation; and increased human pressure on forest land.

The differences between forests and plantations extend far beyond their simple physical structure and species composition. They include cultural, aesthetic and spiritual values that can be found only in actual forests. Indigenous knowledge, particularly that related to the uses of local plants, is a critical element in the struggle to protect and to preserve forest biodiversity, yet FSC certification of plantations effectively destroys this knowledge at a local scale. By misrepresenting plantations as forests that can be substituted for the real thing, FSC helps replace the biological heritage of forest-dependent peoples with sterile fake forests.

Is it ecologically or morally acceptable for FSC certification to allow huge forest clear-cuts and shockingly bad tree plantations to be called responsibly managed forests? Tree plantations are part of the harsh reality that exists due to the notion of endless economic growth, a system based on greed that drives wasteful consumption. For the moment, tree plantations may be considered a necessary evil. If they are in fact to be used as a source of industrial wood, then perhaps a form of certification — which recognizes and measures the harm that they inflict — could serve a useful purpose.

For more information

See www.globalforestcoalition.org; www.timberwatch.org; www.wrm.org.uy; www.fsc-watch.org; and www.biofuelwatch.org.

Endnotes

1. See: http://news.mongabay.com/2010/0624-hance_atbc_forests.html.
2. See www.panda.org/what_we_do/footprint/forestry/sustainablepulppaper/sustainable_plantations/newgenerationplantations.
3. See http://timberwatch.org/uploads/Draft%20Plantation_Projects_under%20CDM%20-%20Blessing%20&%20Wally(1).pdf.

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5.4 Tropical forest rehabilitation and certification

DAVID LAMB

Poorly managed logging and unsustainable land-use practices have created large areas of degraded secondary forest and abandoned agricultural land throughout the tropics, which has drastically reduced biodiversity. This raises two questions: first, can some of this degraded and under-used land be reforested? Second, can this be done in a way that generates some conservation benefits?

Tree planting is expensive to carry out and it often has a substantial opportunity cost. This means that many land-owners are likely to find other land uses more attractive. Any financial incentive, including certification, could have substantial benefits if it was able to help tip the balance in favour of reforesting degraded land and away from alternatives such as oil palm plantations.

THERE SHOULD BE SCOPE ... TO REWARD PLANTATION OWNERS WHO MANAGE THEIR PLANTATIONS TO IMPROVE CONSERVATION OUTCOMES AT BOTH A SITE AND LANDSCAPE LEVEL.

Forest rehabilitation can take many forms. Not all of these are equally valuable from a biodiversity conservation viewpoint. Most people would agree, for example, that a simple monoculture established by clearing secondary forest is a poor trade-off. Under the rules of most certification schemes such a forest would not be certified. On the other hand, a monoculture established at a degraded grassland site might qualify for certification, although it would probably not generate as many conservation benefits as a mixed-species planting. The landscape context is also important, however, and perhaps has not been given as much attention as it deserves.

A timber plantation in Sabah, Malaysia illustrates the importance of this issue. The plantation uses *Acacia mangium or Eucalyptus grandis*, both exotics grown in simple monocultures on short rotations. Most of the timber produced is used for wood pulp, although some areas will also be used to produce sawlogs. The plantations are being established on land presently occupied by logged-over tropical rainforest. This would normally prevent any certification from being achieved, but there appear to be extenuating circumstances.

David Lamb is with the University of Queensland, Australia. His interest this theme arises from an interest in forest restoration and research into finding ways of undertaking reforestation that improve livelihoods while also generating conservation benefits.

The logging operation in much of the area was so poorly managed that there is little likelihood of a second cutting cycle being carried out in the immediate future. In addition, the structure of the forest has been dramatically changed by logging, and its conservation value is now unknown. The concession held by the company covers 288,000 hectares; the new plantation will occupy 38 percent of this area, leaving 62 percent as permanent natural forest. The unplanted component includes hilly areas and riverine strips. In these locations the logged-over forest will be protected and allowed to recover (Woof 2009).

The company has been refused certification under the Malaysian scheme because natural forest is being cleared to establish the plantation. This is regarded as having a negative effect on local biodiversity. The company's view is that the forest they propose to clear has been badly damaged by government-sanctioned logging carried out by other organizations, not them, and that its present biodiversity value is limited. They also argue that the 38:62 ratio represents a good compromise between production and conservation, and that further conservation benefits will be generated across the landscape as the now-protected remnant forests are allowed to regenerate.

Needless to say, their approach stands in stark contrast to that of companies who plant oil palm in areas where all remnant forest is completely removed. The timber plantations will not affect logging in natural forests elsewhere (most of which is now complete) but they will act to protect some large areas of secondary forest.

The dilemma is that nobody knows exactly what conservation value these secondary forests actually have. What can be said, however, is that the concession area will conserve some substantial patches of regrowth forest and these patches will be linked by a network of corridors. Both of these factors should help conserve biodiversity across the landscape and allow the area to become an increasingly important conservation reserve as the logged-over forests recover. Might not these advantages be taken into account when assessing whether to certify these plantations?

Many ecological processes operate at a landscape scale and the populations of many species depend on access to large forest areas. As noted earlier, rehabilitation is expensive and often has high opportunity costs for land-holders. Other things being equal, there should be scope within a certification scheme to reward plantation owners who manage their plantations to improve conservation outcomes at both a site and landscape level.

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Section 6

Beyond current concepts

Photo credits
p.155 Sari Bumi Kusuma concession, Indonesia. Marieke Wit, Tropenbos International
p.157 Forest in Kakum. Tropenbos International Ghana
p.161 Tropical forest at Brownsberg, Suriname. Roderick Zagt, Tropenbos International
p.163 Boy and vervet *(Chlorocebus aethiops)*, Cameroon. Elizabeth Bennett, WCS
p.167 Bushmeat seller and vervet *(Chlorocebus aethiops)*, Cameroon. Elizabeth Bennett, WCS
p.170 Understorey wild fire at Jari, Brazil. Jos Barlow
p.172 A visit to a logging company, East Kalimantan, Indonesia. Intu Boedhihartono
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p.175 Directional felling in Cameroon. Romain Pirard
p.176 Controlled directional felling in FSC-certified tropical rainforest, Malaysia. Edward Parker/WWF-Canon
p.182 Kodagu landscape mosaic in Southern India. Smitha Krishnan
p.185 A range of labelled products marketed under the Entlebuch Biosphere label.
UNESCO Biosphere Entlebuch (UBE)

6.1 Certification of REDD+ pilot projects for biodiversity conservation

STEFFEN ENTENMANN

Introduction

Conservation and monitoring of forest biodiversity in protected areas is often restricted due to a lack of funding and trained staff. There is a chance, however, that a mechanism targeted at climate mitigation by reducing emissions from deforestation and forest degradation in developing countries (REDD+) — currently being negotiated by the parties of the United Nations Framework Convention on Climate Change (UNFCCC) — will provide additional long-term funding for conservation activities.

In recent years a number of REDD+ pilot projects aiming to reduce deforestation and forest degradation have been established. These projects are strongly focused on maintaining or increasing forest carbon stocks. Additionally, they often incorporated biodiversity conservation objectives in their project designs.

To some degree, certification of the non-carbon benefits of REDD+ pilot projects can contribute to biodiversity conservation by assuring that this target has been incorporated in the project design.

Selling carbon certificates in the voluntary market has become an important source of funding for REDD+ pilot projects. Besides carbon certification, additional certification by a recognized standard that evaluates socio-economic and ecological impacts is highly important for the financial viability of these projects (EcoSecurities 2010).

Although there is not yet any clear agreement on how biodiversity should be considered under the international REDD+ framework, some of the standards designed for carbon mitigation projects provide guidelines on how to assess and monitor biodiversity in the project area. Within the context of these standards, the conservation activities within REDD+ pilot projects have a range of objectives and apply various approaches to assess their impacts.

Steffen Entenmann works at the Institute for Landscape Management, University of Freiburg. He has an academic interest in the possibilities of integrating biodiversity aspects in the REDD+ mechanism.

The conservation objectives of REDD+ pilot projects are likely to provide an idea of the conservation priorities to be addressed in future REDD+ activities. This article reviews the Project Design Documents (PDDs) of REDD+ pilot projects and identifies and discusses the implications, potential problems and challenges of the conservation activities associated with these initiatives.

Project Design Documents

The preparation of a PDD is central to the certification process of a REDD+ pilot project. The PDDs contain detailed project descriptions, including the pre-project state of biodiversity, the anticipated ecological effects of the project activities and a monitoring plan.

PDDs of REDD+ projects under Climate, Community and Biodiversity Alliance (CCBA)[1] certification are the most comprehensive source of information on biodiversity conservation priorities under REDD+, since the CCB Standard (CCBS) has the most detailed provisions for the biodiversity targets that projects must address in order to obtain certification. As of June 2010, eight avoided deforestation/forest degradation projects had submitted their PDDs to CCBA (Table 1). For the purpose of this article, I reviewed these eight PDDs, identifying and summarizing the sections of the documents that describe ecosystems, species, ecosystem services and anticipated net impacts on biodiversity, as well as the monitoring plans.

Table 1. Eight REDD+ pilot projects audited under the CCBS

Project	Country
Genesis Forest Project: Reforestation of Brazilian Savannah Native Species in the State of Tocantins	Brazil
Juma Sustainable Development Reserve Project: Reducing Greenhouse Gas Emissions from Deforestation in the State of Amazonas	Brazil
Kasigau Corridor REDD Project Phase 1 – Rukinga Sanctuary	Kenya
Madre de Dios Amazon REDD Project[2]	Peru
Mitigation of Greenhouse Gas Emissions through Avoided Deforestation of Tropical Rainforests on Privately-owned Lands in High Conservation Value Areas of Costa Rica	Costa Rica
Peñablanca Sustainable Reforestation Project	Philippines
Reduced Emissions from Deforestation and Forest Degradation in Oddar Meanchey Province	Cambodia
Reducing Carbon Emissions from Deforestation in the Ulu Masen Ecosystem, Aceh	Indonesia

Project PDDs are available at www.climate-standards.org/projects/index.html.

Biodiversity and REDD+ pilot projects

Pre-project description of biodiversity

The projects generally assess biodiversity by the presence or abundance of particular plant and animal species, forest habitats, area of forest cover, share of forest cover in the total area and forest structure, such as degree of forest fragmentation. An assessment of the pre-project condition of biodiversity is the basis for monitoring activities. Although some ecological studies have been carried out in the projects, mostly for the preparation of the PDD, in most cases no continuous monitoring has taken place.

An important conceptual framework — with which five of the eight projects identified crucial forest areas for conservation — is that of high conservation values (HCVs), a forest management designation of the Forest Stewardship Council (FSC) to describe forests that meet its criteria (Jennings et al. 2003). This concept recognizes six types of HCV forests[3] and provides guidelines for monitoring the ecological conditions and changes in forests (FSC 2009). Four of the projects claimed to have HCVs because the project areas provide important habitats for species listed as threatened in the IUCN Red List of Threatened Species as well as important ecosystem services. Provision and storage of water and protection of soil against erosion were among the most important environmental services identified in these areas. The Kasigau Project described its project area as comprising a complete ecosystem. Other types of HCVs recognized included the provision of basic resources for the people living inside or adjacent to the project area. PPDs did not always unambiguously describe the kind of data they used to designate HCVs. In the Costa Rican project, HCVs are only mentioned in the project title and not further described in the PDD.

The projects that did not refer explicitly to the HCV concept used comparable ecosystem characteristics to identify conservation priorities, including endemism of species, uniqueness of habitats and the presence of threatened IUCN Red List species.

Biodiversity targets of the project

The REDD+ pilot projects often described biodiversity impacts by quantifying the population dynamics of certain species. Projects must generate exceptional biodiversity benefits in order to receive the gold level of the CCB Standard and must prove that species listed as threatened in the IUCN Red List are protected or that project activities include the protection of irreplaceable sites according to the Key Biodiversity Area (KBA) framework (CCBA 2008).[4] Other conservation objectives of the projects included the reduction of pressures on HCV sites or on sites important for the provision of ecosystem services.

Bushmeat consumption and collection of firewood were regarded as significant threats to biodiversity, although the provision of these goods counts as HCVs if local communities depend on them for subsistence. Consequently, the development of alternative livelihood strategies for local people as a project activity was considered to be a biodiversity benefit. This includes engaging rural communities as project managers.

All projects considered reduction of deforestation and forest degradation (according to modeled deforestation rates) and the corresponding conservation of forest habitat as crucial benefits for biodiversity. Some projects were not restricted to avoided deforestation, but also included areas with timber production (for example, the Peñablanca and Madre de Dios projects). In such cases, positive impacts on biodiversity were expected if, whenever applicable, the projects used native trees for afforestation and increased forest connectivity within the project area. No project used genetically modified plant material or invasive species for reforestation or for the production of non-timber forest products; the CCB Standard interprets this as a biodiversity benefit.

Monitoring tools and methods

Participatory monitoring methods used to assess project impacts — as, for example, described in detail in the PDD of the Oddar Meanchey project — encompass the quantification of wildlife populations by fixed point photography, analyses of field diaries and line transect methods. They also include focus group discussions, where community groups report on developments in resource use, species populations and other environmental conditions (Danielsen et al. 2000). The Juma project uses a different participatory monitoring approach to create awareness and improve the capacity of community members (Marinelli et al. 2007). The Kasigau project employs professionally educated rangers to monitor the population dynamics of certain species.

In addition to fieldwork methods, projects describe pre-project biodiversity using remote sensing to characterize land cover, vegetation and forest structure of the area. Geographic information systems (GIS) are used to manage, visualize and evaluate data on species sightings, changes in forest structure and ecosystem services.

Discussion and recommendations

The ability to describe and assess changes in biodiversity in REDD+ pilot projects is often restricted, due to the complexity inherent to the concept of biodiversity, the related requirements for biological and technical expertise and the financial investments needed to employ trained staff and set up monitoring systems.

Certification of REDD+ projects cannot alone eliminate these problems. It also remains unclear if REDD+ can provide the resources for comprehensive conservation approaches. Nonetheless, existing standards provide some guidance for describing and managing biodiversity. To some degree, certification of the non-carbon benefits of REDD+ projects can contribute to biodiversity conservation by assuring that this target has been incorporated in the project design.

Some PDDs state that the additional money that is expected to be generated by selling certified carbon credits can improve the performance of the project's monitoring schemes. The Kasigau project, for example, has explicit objectives to increase the number of staff members for patrolling and to establish a GIS centre.

The certification of biodiversity benefits in REDD+ pilot projects is constrained by methodological difficulties. Whereas the standard document of the CCBA (CCBA 2008) includes

a comprehensive list of tools, methods and background information regarding biodiversity monitoring, project approaches to monitor biodiversity are generally more simplistic. For instance, although the CCB Standard (CCBA 2008) provides several resources for classifying invasive species, none of the PDDs explains which criteria are used to identify invasive plants.

The decision about whether a project satisfies the certification requirements is based on indicators that are measurable by specific methods and tools at a given time. In general, charismatic animal species are chosen as indicator species. The higher the degree of endemism or threat of extinction, the higher the resulting conservation value created by the project when populations of these species increase or stop declining.

Although the use of such species as biodiversity indicators might be convenient and economic, different species respond differently to forest management practices; the response of single species is not necessarily indicative of other elements of biodiversity (Lindenmayer, Margules and Botkin 2000). Only a few PDDs described ecological functions of the indicator species or explained the designation of certain species as biological indicators. If project managers do not understand the relationships between indicator species and specific biological processes, it will be impossible to respond to ecological changes or unexpected threats with appropriate management decisions.

Concentration of conservation activities in hotspots with a high concentration of threatened animals or other biologically unique characteristics comes at the expense of biodiversity conservation at the landscape scale. Conservation activities that take into account processes on very large scales are crucial within REDD+, especially in reducing the risk of spatial dislocation of deforestation. This becomes especially important when biodiversity objectives are integrated in sub-national REDD+ strategies.

It might be advisable to combine the use of straightforward indicators with the use of more elaborate indicators that are expensive but potentially able to describe more complex ecological processes. This might allow attempts to conserve (or re-establish) the "natural" ecosystem conditions to be assessed and the more specific protection objectives to be measured.

In some projects local community surveys have identified locally valued biodiversity components. The measurement of such indicators, which reflect trends in locally important biodiversity, should be promoted strongly in the future. In addition, the biodiversity objectives of REDD+ projects should be categorized into more discrete and clearly measurable components, such as, for example, water quality, protection of threatened species or game species values. This would help to streamline decision-making processes and facilitate appropriate responses to measured trends in the data.

Further information

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Endnotes

1. The CCBA is a partnership among research institutions, corporations and non-governmental organizations. CCBA has developed and is promoting standards for evaluating land-based carbon projects. The Climate, Community and Biodiversity Project Design Standard (CCB Standard) has been developed by the CCBA and evaluates land-based carbon mitigation projects in the early stages of development (www.climate-standards.org).
2. See article 4.2 in this issue.
3. For a list of HCVs, see Appendix 3.
4. According to the KBA framework, irreplaceability of a site applies when a defined minimum proportion of a species' global population occurs there (Langhammer et al. 2007).

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6.2 Addressing the bushmeat crisis through certification

TIM CHRISTOPHERSEN, CAROLINE BELAIR and ROBERT NASI

Forestry operations in the tropics have been linked to promoting unsustainable levels of hunting for consumption or trade by increasing access to and human densities in remote forest areas (Bennett 2001). The unsustainable hunting of bushmeat[1] has been shown to create "empty forests" (Redford 1992). This has grave consequences for the food security and livelihoods of many forest-dependent people. It also affects important fauna-dependent ecological processes such as pollination and seed dispersal (Wright 2003, Wright et al. 2007). Among the various recommendations or guidelines put forward to mitigate the negative impacts of hunting (e.g., ITTO/ATO 2003, ITTO/IUCN 2009, CIC/FAO 2008, and CBD 2009), forest certification appears to be a promising but overlooked measure in the context of production forests. Indeed, the Convention on Biological Diversity (CBD) recently recognized the importance of appropriate voluntary market-based certification schemes to the conservation and sustainable use of forest biodiversity (decision IX/5).

FOREST CERTIFICATION HAS THE POTENTIAL TO CONTRIBUTE TO THE CONSERVATION AND SUSTAINABLE MANAGEMENT OF SPECIES PRESENTLY HUNTED AT UNSUSTAINABLE LEVELS IN TROPICAL FORESTS.

This article briefly reviews the recent inclusion of bushmeat-related provisions in the certification schemes of the Programme for the Endorsement of Forest Certification (PEFC) and the Forest Stewardship Council (FSC). It also examines the coherence of these provisions with CBD Bushmeat Liaison Group's recommendations (CBD 2009), and the potential of certification schemes to contribute to national and international implementation of these recommendations.

Tim Christophersen and **Caroline Belair** work for the Secretariat of the Convention on Biological Diversity (CBD), Montreal, Canada and **Robert Nasi** works for the Center for International Forestry Research (CIFOR), Bogor, Indonesia. Their interest in the topic is based on the recent identification of the unsustainable hunting and trade of bushmeat as a priority issue by the Parties to the CBD.

Impacts of timber harvesting on bushmeat hunting

Timber operations facilitate access to remote forests by opening roads in previously isolated areas. Roads provide access to markets and bushmeat can become a commodity, transforming hunting from a largely subsistence activity into a commercial one (Poulsen et al. 2009). Infrastructure and equipment linked to logging, such as camps, cars and trucks, have in several instances been used for the commercial trade of hunted species, often protected ones.

Settlements and camps linked to forestry company infrastructure attract large numbers of people (workers, family members and traders) to areas that were formerly sparsely populated. Logging in remote areas has been shown to drive human population growth in those areas, with increased immigration intensifying the bushmeat trade (Poulsen et al. 2009). A recent study estimates that 29% of forested areas in central Africa is likely to have increased wildlife hunting pressures due to the access and market opportunities provided by new logging towns (Laporte et al. 2007).

Although the negative impacts of timber operations on forest biodiversity are well documented, the potential of well-managed logging concessions to be "wildlife reservoirs" — compared with unsustainably managed forests — is also increasingly recognized (Clark et al. 2009). Well-managed and certified production forests can be an important addition to protected areas, which are often too small, fragmented or ineffectively managed to support wide-ranging or rare species. Forest industries can promote the sustainable use of biodiversity and human livelihoods by engaging in sustainable practices that explicitly consider the direct and indirect effects of their activities on wildlife (Aviram, Bass and Parker 2003; Bass, Aviram and Parker 2003).

Forest industries can mitigate the negative impacts of their operations on wildlife by controlling and managing bushmeat hunting in their concessions (Nasi et al. 2008). Many of these measures are outlined in article 3.1 in this issue. Other practices suggested in the literature include banning commercial hunting in concessions, establishing conservation zones within concessions where hunting is forbidden, prohibiting nonselective hunting methods such as snare hunting and trap hunting, and producing educational and information materials for both the public and staff (Meijaard et al. 2005). Wherever possible, local governance structures and customary sustainable use by indigenous and local communities should be strengthened, in addition to other measures to achieve sustainable levels of hunting.

The CBD Liaison Group on Bushmeat

The CBD Liaison Group on Bushmeat met in October 2009 at the World Forestry Congress in Buenos Aires and elaborated national and international recommendations for the sustainable use of bushmeat (CBD 2009). The eleven national-level and nine international-level recommendations cut across various themes such as climate change, health, science and alternative means of subsistence. The recommendations highlight the need to engage the private sector and extractive industries and recognize the requirement for forest

certification schemes to take into account the conservation and sustainable use of wildlife to maintain healthy forest ecosystems:

- Whenever possible, the responsibility for wildlife management should be transferred to local stakeholders, who have a vested interest in maintaining the resources, and the capacity of these empowered local communities should be built and strengthened to ensure that they have the capacity to exercise these rights.
- National governments should increase their capacity to monitor levels of bushmeat harvesting and consumption and incorporate this information in national statistics to inform policy decisions and planning.
- While an effective network of protected areas is critical to ensure the conservation of wildlife, wildlife populations outside protected areas are also essential, and management should encompass the largest possible landscape scale.
- The development of alternative food and income sources is necessary, as wildlife cannot sustainably support current or future livelihood needs, but these palliative measures alone (such as farming, ranching and captive breeding) are unlikely to be effective in conserving wildlife resources. In the long term, there is no substitute for effective management of the resource for protection and production.
- To achieve conservation and the sustainable use of wildlife resources, capacity building and public awareness are needed at national and local levels, including governance and law enforcement, wildlife monitoring and management and livelihood alternatives; collaboration across government, private and public sectors is also required.
- The conservation and sustainable use of wildlife resources are enhanced through the use of the most ecologically benign (e.g., species-specific), cost-efficient and humane hunting methods.

Since the recommendations are targeted at national and international levels, they are also relevant to national or global forest certification schemes. Forest industries should work collaboratively with governments and other stakeholders to implement these recommendations by, for instance, contributing to monitoring activities, capacity-building, awareness-raising, landscape-scale wildlife management, and the provision of alternative food sources. These and other recommendations of the liaison group should be included in major forest certification schemes to mitigate the impacts of logging concessions on bushmeat hunting.

Forest certification schemes and bushmeat hunting

Several major global certification schemes include provisions to mitigate the impacts of timber operations on bushmeat hunting.

Forest Stewardship Council

Several FSC principles and criteria are relevant to bushmeat hunting:

- a requirement to respect national laws and international agreements (principle 1);
- the protection of rare and endangered species and the control of inappropriate hunting (principle 6, criterion 6.2);

- monitoring of changes in fauna (principle 8, criterion 8.2); and
- the maintenance of high conservation value forests (principle 9, criterion 9.3).

The principles and criteria (FSC 1996 and Appendix 2 of this issue) thus offer opportunities for synergies between forest operator activities and the national and international activities recommended by the Liaison Group on Bushmeat. For example, through monitoring, information on the scale of hunting occurring within the forest concession can be used in national statistics for improved management, policy and planning. It can also contribute to further research, monitoring systems and information management related to bushmeat harvest and trade.

Regional FSC standards include more explicit indicators to address bushmeat hunting. The draft Congo Basin Sub-Regional Standard, for instance, requires that timber operators prohibit their staff from hunting or transporting wildlife on company vehicles and that they control illegal hunting.

FSC principles and criteria could further address certain recommendations of the liaison group, including providing alternative means of subsistence for employees or local populations; prohibiting non-selective and inhumane hunting methods such as snares; and awareness-raising for staff, as well as blocking of non-essential roads to reduce access to remote areas.

Examples from the field have shown that responsible logging — including that achieved through FSC certification — provides, in comparison to other forms of logging, a better assurance of suitable living conditions for great apes in logging concessions, in large part due to reduced hunting pressure (van Kreveld and Roerhorst 2009; also see article 4.3 in this issue).

Programme for the Endorsement of Forestry Certification

PEFC has in its membership 35 independent national forest certification systems, 28 of which to date have been endorsed by the PEFC council. Most of the required elements for endorsement are based on intergovernmental processes for promoting sustainable forest management. For example, national certification schemes in countries covered by the African Timber Organization (ATO) must be compatible with the joint ATO and International Tropical Timber Organization (ITTO) Principles, Criteria and Indicators for the sustainable forest management of African natural tropical forests (ATO/ITTO PC&I). For ITTO member countries not covered by the ATO/ITTO PC&I, forest certification criteria for management of natural tropical forests must be compatible with the ITTO guidelines on the sustainable management of natural tropical forests (1992) and the ITTO/IUCN guidelines on the conservation and sustainable use of biodiversity in tropical timber production forests (ITTO/IUCN 2009).

The ATO/ITTO PC&I include many measures related to bushmeat, such as forbidding the use of forest concessionaire vehicles for bushmeat hunting, closing unnecessary roads after harvesting, and forbidding non-selective hunting methods. The PC&I also address

livelihood concerns through the use of indicators such as no noted scarcity in the supply of bushmeat for subsistence living in the village settlements and the presence of a store well-stocked with alternative food sources for employees and their families.

ITTO/IUCN guideline 36 includes measures to avoid unsustainable levels of hunting. The guideline specifies that relevant stakeholders should assess local communities' level of dependence on bushmeat and seek ways of reducing this; collaborate to increase awareness of the risks posed to biodiversity by unsustainable hunting; compile and share information on commonly-hunted threatened species; determine the drivers of the bushmeat trade and increase consumer access to domestically-raised meat; and — through participatory processes — establish hunting zones and employ local people and private companies to help control these areas. The guideline also recommends that timber companies provide forest employees with meat and fish obtained from sustainable sources. This approach emphasizes sustainable livelihoods, awareness-raising and monitoring.

Although these guidelines provide a strong basis for including bushmeat-related measures in certification schemes, the measures of PEFC-endorsed schemes are not necessarily consistent across regions. Some countries with prominent national PEFC-endorsed certification schemes, such as Chile, are not covered by the ATO/ITTO PC&I or the ITTO/IUCN guidelines.

Conclusions

Forest certification has the potential to contribute to the conservation and sustainable management of species presently hunted at unsustainable levels in tropical forests. The most widely used forest certification systems, PEFC and FSC, include several provisions related to mitigating the effects of logging on bushmeat hunting. Both these systems are currently revising their criteria and indicators, and it is recommended that they both apply the CBD Bushmeat Liaison Group recommendations (CBD 2009) during this process. They should also consider ways in which to further mitigate the impacts of logging on bushmeat hunting and trade. In particular, certification schemes could improve their consideration of livelihoods aspects by including provisions for alternative food sources and for capacity-building and management systems that support legal and sustainable hunting.

An assessment of the impacts of forest certification on the hunting of wildlife would help evaluate the effectiveness of provisions related to hunting. As van Kuijk, Putz and Zagt (2009) conclude, there is little information, if any, on whether certification has reduced hunting pressure in logging concessions, despite the fact that certification systems include specific measures targeted to unsustainable hunting. Research and data collection on the hunting of wildlife in certified and uncertified production forests, by identifying effective provisions, would help further improve certification systems to better address the unsustainable use of wildlife.

In addition to timber companies, many different stakeholders are moving towards the more sustainable use of bushmeat, including indigenous and other local communities, governments, non-government organizations, applied research centres, and others. Collaboration and shared responsibility among these stakeholders is essential. For instance, cost-effective and harmonized methods to monitor wildlife and bushmeat trade in logging concessions can only be achieved as a result of cooperation among applied research centres, non-government organizations, governments and timber companies. Promising examples exist, including some from Cameroon,[2] Ghana[3] and northern Congo.[4] They show that it is possible for logging operators, conservation NGOs, research bodies, and local populations to work together to conserve and manage wildlife. Certification now needs to step in to consolidate these examples and set standards.

Endnotes

1. The Convention on Biological Diversity Liaison Group on bushmeat defines bushmeat (or wild meat) hunting as the harvesting of wild animals in tropical and sub-tropical forests for food and for non-food purposes, including for medicinal use.
2. Wildlife Wood Project of the Zoological Society of London; www.zsl.org/conservation/regions/africa/wildlife-wood-project.
3. Wildlife Wood Project of the Zoological Society of London; www.zsl.org/conservation/regions/africa/wildlife-wood-project.
4. PROGEPP project with *Congolaise Industrielle des Bois*, WCS and ITTO; www.wcs-congo.org/projects/progepp.htm.

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6.3 Biodiversity in burned concession areas

FERRY SLIK

What should be done?

Even the best managed tropical forests may be vulnerable to fire after major droughts. What are the implications for biodiversity conservation values? Should management allow burned forest areas to remain within a certified timber operation?

In 1997–98 large tracts of forest were burned in eastern Borneo, including many logging concession areas. The Indonesian government's initial reaction was to allow dead trees to be harvested from the burned concession area. This salvage logging was done with heavy machinery and caused a lot of additional damage to the burned forests (van Nieuwstadt, Sheil and Kartawinata 2001).

Management actions such as salvage logging — which further degrade burned forests after fires — can make regeneration of the burned forest extremely difficult.

Recent insights from the area show that most tree species are still present in the burned forest matrix, even after repeated fires (van Nieuwstadt 2002; Slik, Verburg and Kessler 2002; Slik and Eichhorn 2003; Eichhorn 2006; Slik et al. 2008). This means that these forests are still valuable as biodiversity storehouses. In addition, fire damage mainly affected small-diameter trees, indicating that the fire acted as a large-scale thinning process that might actually stimulate the growth of surviving harvestable stock, even though it is likely that many large trees suffered bark damage that might eventually lead to rot of stem heartwood. The research also showed that due to the mast fruiting[1] of most Asian tree species and the almost complete elimination of the forest understorey by fire, re-establishment of old-growth forest species in burned forests is slow. Initial recovery of a closed canopy depended almost entirely on the quick establishment of pioneer tree species.

There was no major mast flowering-fruiting in Borneo in the first seven years after the 1997–98 fires. The regeneration of old-growth tree species during this period depended almost completely on resprouting and seeds produced by surviving trees in the burned

Ferry Slik works as a professor in the Ecological Evolution group for the Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Yunnan, China. As well as working on general tropical tree diversity and biomass studies, he is also involved in monitoring the regeneration of the forests in eastern Borneo that burned during the 1997–98 fires.

forest, with no significant contribution from the neighbouring unburned forest. Management actions such as salvage logging — which further degrade burned forests after fires — can make regeneration of the burned forest extremely difficult.

Current codes of practice and certification standards make no clear stipulations about what should happen to burned areas of high forest. This makes it hard for managers to know what is required of them. If fires occur in a certified concession there is likely to be much discussion concerning what should be done next.

Conclusions

Before we set clear standards we should recognize the principles of good biodiversity-preserving practice:

1. Good practice needs to be defined for areas of forest that have been affected by fires and similar events (e.g., hurricanes).
2. The initial phase of recovery in burned forest depends almost entirely on tree sprouting and seed rain from surviving trees within the burned forest, so if salvage logging is undertaken extreme care has to be taken to reduce damage to the forest understorey. This can be done by minimizing skidding activity or by planning skid trails to avoid forest patches with a large number of climax species. On–site harvesting and processing of dead trees (by means of chainsaw milling or mobile milling) may be another option.
3. Since burned forests are slow to recover, it is recommended that they be closed to logging for a period of 35 years (or whatever the local logging interval is).
4. Efforts must be made to prevent further fires; burned forests have an increased risk of catching fire again (Cochrane 2003).

Endnote

1. Mast fruiting is the synchronized production of large seed crops by certain tree species.

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6.4 ITTO-IUCN guidelines for biodiversity conservation

JEFF SAYER, STEWART MAGINNIS, EDUARDO MANSUR and AGNI BOEDHIHARTONO

It is well established that good forest management can maintain much of the biodiversity of undisturbed natural forests. The problem is that many logging operations do not employ sound management practices. The International Tropical Timber Organization (ITTO) and the International Union for the Conservation of Nature (IUCN) have long sought to provide guidance and incentives for forest companies to improve their management and introduce practices in favour of biodiversity.

Instead of always being seen as the problem, forest management can be an important part of the solution.

The logic is pretty simple. Protected areas in poor tropical nations are often under-resourced and weakly supported by governments and local people alike. Logging, for all its problems, does create jobs and generate economic activity in remote areas. If biodiversity objectives could be met in these managed forests then there is potential for a positive outcome: jobs for local people; income for governments and the private sector; and biodiversity objectives being met at a lower cost than in conventional protected areas.

There are plenty of precedents. In industrialized countries most forests are under management and a great deal of forest biodiversity is found there. Many countries — including Germany and the United States — report managed forests as part of their protected area estate in the official lists of protected areas that IUCN maintains for the United Nations. The question is how to encourage and help loggers in tropical developing countries to follow this example and maintain their biodiversity. This issue of ETFRN News contains many examples of where progress has been made.

IUCN and ITTO are both international intergovernmental organizations and IUCN also boasts almost a thousand non-governmental member bodies. Both organizations have an important role in fostering dialogue and establishing norms for good practice.

Jeff Sayer and **Agni Boedhihartono** are with James Cook University, Cairns, Australia; **Stewart Maginnis** is Director of the Environment and Development Group, IUCN, Switzerland; and **Eduardo Mansur** is Assistant Director, Reforestation and Forest Management, ITTO, Yokohama, Japan. They collaborated to prepare and field-test these guidelines based on their conviction that sustainably managed forests have a major but under-recognized role in meeting biodiversity conservation goals.

Starting in 2002 the two organizations agreed to collaborate in developing a consensus among their members and interested civil society stakeholders on what loggers of tropical forests might reasonably be asked to do in the interests of biodiversity conservation. (An earlier set of guidelines, published by ITTO in 1993, addressed more purely technical issues.)

What we set out to do this time was engage stakeholders from diverse interest groups to establish not only ideal technical solutions but also develop a more pragmatic account of what was reasonable to expect of a commercial timber operator. A series of meetings were held involving representatives of commercial companies, conservation NGOs, national forest agencies and concerned scientists. A preliminary set of guidelines was drafted; this was then taken to the field in Indonesia, Cameroon, Guyana and Brazil.

We worked with several logging companies in each of the countries to evaluate the practicalities of applying these best practices. The draft guidelines were translated into the appropriate languages and workshops were held with a wide range of interested parties in each country. Only then were the guidelines taken to the formal sessions of the ITTO and made available for scrutiny by the state party members. At that point the members had the opportunity to satisfy themselves that all issues of national interest had been addressed and that the guidelines were consistent with national laws and policies. Only then, in April 2009, were the guidelines published (ITTO/IUCN 2009). The guidelines can now be downloaded from the web sites of both IUCN and the ITTO in English, French and Spanish. Both IUCN and ITTO continue to actively help countries and their logging companies to apply the guidelines in their forestry operations.

At least three of the companies that took part in the development of the guidelines have now achieved independent FSC certification. The biodiversity gains that have occurred in their forests are documented but only in very general terms. ITTO is developing a reporting framework that will enable it to track companies' performance in applying the guidelines.

The guidelines can only be applied selectively, since much depends upon local conditions. They are not intended to be a set of rules but rather a source of ideas and inspiration. They also provide a reference point for those who wish to judge the performance of loggers. They articulate the arguments in favour of the role of good forest management in conservation. The public and environmental NGOs can refer to them as a widely accepted reference point. Certification bodies can draw on them in establishing their criteria and indicators.

Difficulties remain and much remains to be done but at least in a number of forestry operations in countries in South East Asia, central Africa and South America the case has effectively been made that good forest management is good for conservation. Instead of always being seen as the problem, forest management can be an important part of the solution.

Unfortunately, when we looked for instances where companies have applied the guidelines in a systematic manner we found only a few examples. One of the best is the Surigao Del Sur Development Corporation in Mindanao in the Philippines. The company based its management largely on the original biodiversity guidelines published in 1993, and now has a 25-year monitoring plan in place. It is clear that knowledge of biodiversity in the management unit has improved greatly but it is still too early to say if genuine long-term conservation gains have been achieved.

In a number of forest concessions in Cameroon, Congo and Indonesia — where the guidelines were developed — the ideas that they contain have now been fully incorporated into forest management planning. The guidelines have not been implemented as a package, but clearly their message is getting through. A quick search of the ITTO project database shows that the words "biodiversity" and "guidelines" are found together in 54 projects with a total budget of US$28,500,000. This is quite an achievement for what is fundamentally a commodity agreement.

A number of companies are beginning to use the guidelines: SGM Suka Jaya Makmur, with a 174,000-hectare concession in Bukit Perai, West Kalimantan, Indonesia, is seeking certification for its concession, which contains a population of orangutans. They have indicated to us that they intend to use the guidelines in the development of their management plan. Sinarmas Forestry in Sumatra has used the guidelines in planning its plantation forestry operations. Several ideas from the guidelines have been incorporated into the new forestry regulations in Brazil and there is widespread uptake of some elements of the guidelines in Congo Basin countries. We are now embarking on a review of progress in the application of the guidelines.

A lot remains to be done. ITTO has recently signed a Memorandum of Understanding with the secretariat of the Convention on Biodiversity that commits the two organizations to collaborate on further promotion of the guidelines. Now, a year after their publication, IUCN and ITTO will be inviting a number of forestry companies who have been using the guidelines to come to the Conference of the Parties of the Convention on Biodiversity in Nagoya to report on their experiences. Side events will be held to create some momentum behind the need to do more to make biodiversity conservation a major objective of forest management in the tropics.

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6.5 Economic implications of biodiversity conservation for timber producers

ROMAIN PIRARD

The ITTO/IUCN voluntary guidelines

Government regulations for timber production — as related to sustainability of practices, biodiversity retention, and other matters — differ among countries. Unfortunately, as acknowledged by the International Tropical Timber Organization (ITTO): "Determining the level of attainment of SFM is extremely difficult ... measuring the effects of management on [ecological] values is beyond the resources of many, if not all, tropical forest managers" (ITTO 2006). To promote biodiversity conservation in managed forests, ITTO (with IUCN) published guidelines (ITTO/IUCN 2009) for the conservation and sustainable use of biodiversity in tropical timber production forests (hereafter, "guidelines").[1]

If taxes were reduced on species with low market prospects (but high population densities), companies would be more likely to diversify their production.

Content and cost implications

The guidelines comprise eleven principles – such as political commitments and land use and spatial planning – that are further divided into priority actions that are required of timber producers, e.g., mobilize the capacity of NGOs for biodiversity surveys and maintain databases on forest ownership. They cover a very broad range of actions, evidence of the need for a coherent strategy from planning to effective logging.

Compliance with the guidelines is likely to be costly, as it generally is to convert from conventional logging to more sustainable forest management practices (Pearce, Putz and Vanclay 2003) and to achieve certification (Durst et al. 2006). Producers may resist their implementation if they do not receive financial support. Investments are beneficial insofar as they generate economic benefits for producers (through a better corporate image in the market place), people living in and around the concessions (through sustained sources of food or medicinal plants), national governments (fewer conflicts), and people outside the country (satisfaction that their purchases have contributed to conservation).

Romain Pirard works for the Institute for Sustainable Development and International Relations, Paris. He has a primarily academic interest in increasing understanding of the economic issues related to forestry and biodiversity conservation in the tropics. It is part of a body of work on the economics of the forest industry in Indonesia, REDD and various conservation approaches.

In 2007 I studied the implementation costs that timber producers face to comply with the guidelines. I performed a desk study, followed by field visits and administration of a questionnaire to stakeholders in Brazil (mostly organizations and communities), Cameroon (forest concessionaires) and Indonesia (forest concessionaires and industrial plantations). This article summarizes my findings.

Preliminary cost estimations and their implications

Literature review and desk study

Three baselines underlie calculations of the incremental costs to comply with the guidelines:

1. the most common practices (including illegal activities when relevant);
2. the national regulations with which compliance is required; and
3. certification requirements if one assumes the guidelines would be applied only by companies which already maintain certification standards in their operations.

In the literature search I found few sources of information that were helpful in calculating the cost of compliance with the guidelines. What I did find was often conflicting. To illustrate: Kumari (1996) estimated the incremental costs of alternative modes of transportation for logs and timber in Malaysian concessions and reported a net positive social benefit. Similarly, in a comparison of the costs of reduced-impact and conventional logging in Amazonian Brazil, Holmes et al. (2000) reported that the former was substantially more profitable due to reduced waste, lower damage to valuable trees in the residual stand, and efficiency gains. In a study on reduced-impact logging (RIL) in Guyana, van der Hout (1999) similarly found that "there are strong indications that the cost of felling will be reduced in the future, when the operators have gained more experience in using the felling method and directional felling is carried out with greater flexibility." This conclusion was confirmed by Bull et al. (2001), who studied 266 publications on the topic. In contrast, Healey, Price and Tay (2000), in a comparative study of RIL and conventional logging in Sabah, Malaysia, reported quite the opposite; RIL was substantially less profitable than conventional harvesting, mostly because the former avoided logging on steep slopes and in stream-side buffer zones.

These few examples indicate that calculating the incremental costs of the guidelines is not straightforward. As summarized by Dennis et al. (2007): "Although the recommended actions are quite detailed, many of them are phrased in rather vague terms and leave potential implementers with the question on how these actions should be implemented." This observation has substantial implications for estimating incremental costs; in other words, the costs depend on how the guidelines are interpreted. This is not surprising, as the guidelines' vagueness is due to political interference, and they should not be seen only as a checklist for operators.

Field data

Field studies confirmed the uncertainty about estimating the costs of following the guidelines:

- activities are often inter-connected, so estimating their separate costs is frequently misleading (e.g., partnerships with external organizations to conduct field surveys);
- compliance varies according to the willingness and understanding of the timber producers (e.g., the number of timber species included in inventories);
- the costs of compliance depend on specific local conditions (e.g., timber producers' financial costs per hectare (ha) for setting aside areas and the costs of fighting poaching);
- no general rules can be applied in all contexts, because whether costs are additional or business-as-usual, scenarios vary greatly, depending on national regulations, law enforcement, involvement in the certification process, and the standards followed by the certification bodies;
- an accurate estimation of incremental costs would require a long-term study with baseline cases for comparison (e.g., RIL vs. conventional logging); and
- the associated benefits of compliance are hard to assess, but should be part of the estimate (e.g., use of local knowledge in marketing non-timber forest products (NTFPs) by the timber company).

To help timber producers choose the right way to implement components of the guidelines, I separated them into broad categories.

Surveys and inventories

These costs are related to such things as recruiting or training company staff to identify biodiversity resources, purchasing of equipment and data processing. In Cameroon, the costs of standard and multi-resource inventories are US$1/ha and US$2.5/ha, respectively. The purchase of Geographic Positioning System (GPS) units for the inventories amounted to about US$0.15/ha. In Indonesia, fauna and flora inventories, coupled with mapping and reporting, cost US$30 and US$10/ha, respectively.

Opportunity costs

Timber production can be either reduced (fewer trees harvested) or modified (different species harvested), or both. Opportunity costs can be calculated in two ways: if some trees are left in harvested plots (e.g., emblematic species), then opportunity costs will equal the sale price minus operational costs. If entire plots are set aside (e.g., as corridors), then opportunity costs equal the profit margin per unit area. It is important to note that companies interested in a voluntary application of the guidelines are those with above-standard practices (usually certified) but often limited profit margins.

Transaction costs

Collaborations and partnerships are formed between timber producers and external organizations, other nearby timber producers (within the same forest) or local populations. Companies included in the study reported costs for preliminary meetings of less than US$10/event (Cameroon); assistance during inventories of a few cents per ha

(Cameroon); and for meetings to inform villagers at US$50/village in Indonesia and less than US$5/village in Cameroon.

Modification of forest management plans

This includes modifications to road networks or setting aside areas previously allocated for production. Too many activities could fit in this category. In the delineation of protection areas, which requires staff time and the use of paint, cost estimates from Indonesia and Cameroon were quite different (US$85/km against US$7/km, respectively).

Implementation of new activities or modification of usual activities

This includes measures to combat poaching and the establishment of permanent sample plots. According to one Indonesian company, it spends roughly the same amount every year on anti-poaching measures (publication and dissemination of pocket books at US$45/book); erection of information boards to provide information about protected species (US$10/board); establishment of permanent sample plots (US$100/ha) and on repeated observations and avoidance of encroachment.

Implications: finding synergies

Due to the numerous problems encountered in estimating the costs of compliance, it might help to use a novel logical framework (Figure 1). This framework could help clarify the logical links; for example, paying attention to trees that provide habitat for key animal species during harvesting operations is recommended in combination with promoting complete inventories and thematic maps. Stressing such links is essential in convincing timber producers to comply with the guidelines through reducing the costs of implementation.

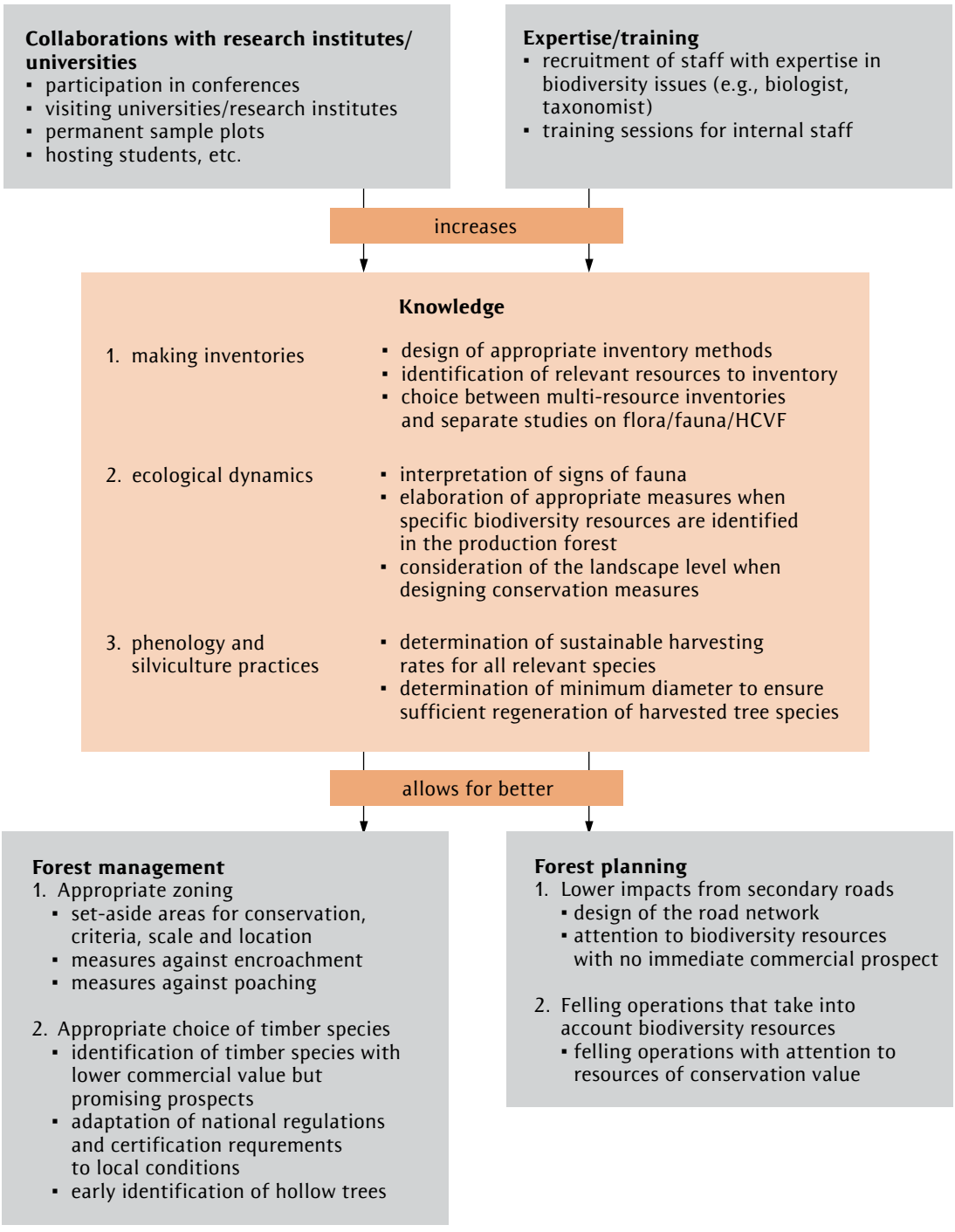
Designing the appropriate financial support

Reducing the costs of implementing the guidelines is a priority. As stated by Ichiro Fujikake (2007): "Japanese forestry has shifted to the species that are desirable from the economic perspective at the expense of the ecological functions of the forests."

Timber producers cannot be expected to deliver biodiversity conservation without appropriate incentives and financial support. In addition to the usual incentives — market-like mechanisms and certification schemes — there are two promising alternatives. First, in response to timber companies that complained about officials' repeated and abusive interference in their operations, Jarvis and Jacobson (2006) propose that in Indonesia certified companies should not be subject to administrative controls over the annual plans they submit to the Ministry of Forestry (they make "self assessments" so as to avoid abusive corruption fees). This same line of thought could be applied to other aspects of the adoption of the guidelines.

Second, tax systems can be used to prioritize taxes on production instead of land and to reduce taxes on species with less commercial value compared to those subject to high harvesting rates. As the field study observed in Cameroon, the annual land taxes paid by the companies on their concessions represent a perverse incentive to increase annual production.

Figure 1. Logical framework



These fixed costs are a financial burden that often prevents companies from reducing their timber production because of the high opportunity costs of doing so. As noticed by the Indonesian partners, area-based fees are a disincentive to set aside conservation areas unless land taxes are reduced accordingly. The proposition made by the Association of Indonesian Timber Producers (APHI) to not pay taxes on protected lands is a case in point.

Homogeneous taxes for all species are a disincentive to explore the commercial opportunities of lesser-known timbers, especially when overall production is limited by mandatory government regulations. If taxes were reduced on species with low market prospects (but high population densities), companies would be more likely to diversify their production, which aligns with the guidelines and otherwise reduces harvesting pressure on key species. Furthermore, this shift in attention to lesser-known species would result in inventories including more species and would indirectly lead to better forest planning.

Past studies highlight the fact that tropical production forests can be managed more effectively for conservation when managers consider not only consumer premiums as paid by certification systems, but also public action beyond management regulations. Indeed, obstacles and disincentives not under the control of companies can be identified and eliminated by the authorities.

Although my study was exploratory in nature and was focused on the ITTO/IUCN guidelines, it highlights more generally the need for and value of more detailed examinations of the incentives that might be able to benefit good conservation practices in production forests. That is the way forward.

Endnote

1. See article 6.4, this issue.

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6.6 Extending certification to landscape mosaics

JABOURY GHAZOUL

Are we fiddling while Rome is burning? Are we preoccupied with the details of certification schemes while all around us forests are being degraded and destroyed and their biodiversity is being lost? Only a tiny fraction of the remaining tropical and sub-tropical forests — less than 1.5% as of April 2008 — has been certified (Bennett 2008). The certification of natural forests has been slow to be adopted in most developing countries, where the biggest impact for biodiversity conservation might be realized (Cashore et al. 2006). Undoubtedly, individual successes have been achieved and widely noted, and local environmental benefits within most existing certified forests appear to be substantial. Nevertheless, as a broader tool for securing sustainable forest management and biodiversity conservation on regional or global scales, I suspect the approach has limited value, simply because huge areas of previously forested land are now human-dominated landscape mosaics in which forests are an important but patchy land cover type.

A landscape label potentially permits producer communities to improve market recognition, secure premium payments, gain access to niche markets, and attain market benefits for natural resource and agricultural products.

Smallholders and smallholder communities own lands that consist of a mosaic of forest patches and areas next to the forest that are used for agriculture. Yet smallholders are often excluded from participation in forest certification by its high transaction costs (Grieg-Gran, Porras and Wunder 2005). Around 37% of forests in developing countries is managed by individuals or communities (Sunderlin, Hatcher and Liddle 2008), a proportion that is expected to rise to 50% by 2020 (White and Martin 2005; data extracted from Table 1, with Australia excluded).

Jaboury Ghazoul is a professor of Ecosystem Management with the Institute of Terrestrial Ecosystems, ETH Zurich, Switzerland. His interests in certification and ecosystem service approaches stem from his research with farmers and community organizations in tropical landscape mosaics where multiple objectives of biodiversity conservation, forest management and food production and income generation intersect.

Although FSC has developed new certification procedures and guidelines that specifically target smallholders; for example, small and low-intensity managed forests (SLIMF), these initiatives are largely limited to developed countries (Humphries and Kainer 2006). Other forms of certification seek to address conservation in complex and diverse agroforestry systems that retain tropical forest elements such as native trees within the landscape matrix. Examples include organic, fair trade and bird-friendly labels for crops such as coffee and cocoa. Experience shows that although these schemes increase access to niche markets and provide some degree of income stability, price premiums and large markets are often limited in the tropics, providing few incentives and low rates of seeking and gaining eco-certification.

Timber production through the logging of natural forests continues to make an important contribution to local and national economies, and is likely to do so for the foreseeable future despite the worldwide expansion of plantations. It is imperative that logging be economically and environmentally sustainable.

Forest certification is one of a number of approaches to this goal. In addition to refining, improving and promoting forest certification, we should extend the certification concept to the broader forested landscape mosaic. I advocate this on the basis that a significant proportion of tropical forests in many tropical countries have been transformed into landscape mosaics which continue to support a considerable richness of biodiversity and rural livelihoods. The landscape mosaic area will only increase since incursions into forested regions continue more or less unabated. It is important to recognize the value of diverse landscape mosaics in terms of their biodiversity, the ecosystem services they provide and the human social cultures they often encompass. Forest certification provides good ideas on how this might be done.

Due to this increased expansion of forested landscape mosaics — which support people in both agricultural and forest-related activities, and which continue to sustain a substantial level of biodiversity — certification systems are required that encompass not just forests and logging, but also other habitats and activities within the landscape. I propose that adapted concepts of forest certification need to be applied to landscape mosaics to limit further degradation of these often-diverse areas and provide greater market access to smallholders.

Definitions of what constitutes a landscape vary depending on context, but here it means a region across which land use, administrative structure and human culture are relatively homogeneous and discrete from other surrounding regions, and in which land is predominantly owned by individuals or communities. It does not necessarily exclude publicly owned lands, including protected areas.

Landscape labels

I propose combining the certification concept with that of payments for ecosystem service (PES) and applying this "landscape label" approach to landscape mosaics rather than just forest stands. Managed rural landscapes that deliver ecosystem services — according to

relevant criteria and based on local and regional evaluation by appropriate institutions — would be acknowledged by a landscape label that applied across the whole landscape (Ghazoul, Garcia and Kushalappa 2009; Ghazoul, in press).

The administrative structure through which to evaluate landscapes and grant labels would most appropriately be implemented by an international organization such as the United Nations Environment Programme (UNEP), which has experience with related approaches. The label could be linked to the delivery of ecosystem services (e.g., biodiversity, carbon sequestration, provision of clean water or a combination of these) and to an associated mechanism for receiving payments for these services.

A landscape label could identify a good (e.g., timber, non-timber forest product or agricultural crop) as originating from a region that provides specific quantified ecosystem services to identified beneficiaries. A landscape label could also represent and publicize the cultural and symbolic attributes of the landscape — as defined by local communities — thereby helping to define its value for people beyond the landscape. This would promote landscape recognition that could generate new livelihood opportunities (through tourism, for example). Funds from the PES element would be invested in community-based projects. The label itself could be applied to a variety of products sourced from the labelled landscape that might directly benefit land-owners through price premiums or product differentiation.

A landscape label potentially permits producer communities to improve market recognition, secure premium payments, gain access to niche markets and attain market benefits for natural resource and agricultural products. The benefits derived would provide an incentive to manage the landscape in a way that meets the ecosystem service criteria for certification. To secure and retain a landscape label, communities would need to maintain the services against which the label was granted. This would require independent verification of performance against criteria in much the same way as in existing forest certification.

Precursors to landscape labelling

The concept of a landscape label is preceded by other approaches to increase the recognition of products, services and values generated by landscapes, and to improve the economic well-being of landscape inhabitants. Two of these approaches are Geographic Indications and biosphere reserves.

Geographic Indications

Geographic Indications (GIs) differentiate products originating from specific localities. Examples include Champagne, Florida oranges and Melton Mowbray pork pies. The provisions for GIs are stipulated by the World Trade Organization's Agreement on Trade-Related Aspects of Intellectual Property Rights, and legal protection is afforded by national and international law. A GI is a marketing tool; it adds value to agricultural products by creating an identity based on place of origin and on specific knowledge and/or natural resources used in the growth and production processes. The GI concept has been

extended to include environmental, cultural and biological diversity. The link to environmental quality remains weak, however, as the GI value derives solely from the reputation of the product.

Biosphere Reserves

Biosphere Reserves combine core protected areas with zones where sustainable development is fostered by local individuals and enterprises. A certification scheme backed by UNESCO confers international visibility (UNESCO 1996). Designation of a locality as a biosphere reserve raises awareness among local people, other citizens and government authorities. The biosphere label can also be used to market a variety of goods produced within Biosphere Reserves, but this is not linked to any verifiable environmental criteria.

Both of these schemes provide benefits through increased recognition of products and product locality, but they are not directly or verifiably linked to assessments of the environmental quality of the landscape.

The benefits of landscape labelling

Landscape labelling borrows ideas from these initiatives and integrates them into a single approach that rewards the delivery of ecosystem services at the landscape scale and across communities rather than at the farm-unit scale and to individuals. This approach retains many of the benefits of GIs and biosphere reserves and has several additional advantages:[1]

- The landscape perspective allows local communities, conservationists, ecosystem service beneficiaries and governments to incorporate a wide variety of landscape values into management and verification systems. Retention of a landscape label would be conditional on the development of a verifiable management plan that seeks to maintain the ecosystem services and conservation benefits provided by the landscape. Several environmental goods and services might be included within management objectives, and the management system itself would need to be inclusive; its effective delivery would rely on the participation of a wide variety of local stakeholders. Forest certification, in contrast, often recognizes only a limited number of goods and services, usually from only one habitat type (forests), and often (although not always) fails to consider the surrounding habitat matrix and associated stakeholders.
- Landscape labelling is not restricted to a particular product, as is the case with forest certification or GIs. Any product derived from a landscape could use the label to signify that it was produced under a management system that conserved biodiversity and/or provided ecosystem services. For example, if Kodagu District in southern India — a heavily wooded landscape mosaic that includes rich agroforestry systems and sacred grove forests — was granted a landscape label, it could be used for Kodagu coffee. Due to coffee's large export market, this label would also increase market recognition of a host of other Kodagu products, such as pepper, palm oil and ginger. The Kodagu name would achieve higher national and international

recognition, helping facilitate the development of a tourism industry. The concept could be extended to labels for other forms of economic activity, including tourism, artisanal commodities and other small industries. Under a landscape label scheme any Kodagu product would benefit directly or by association with the Kodagu name.

- A landscape label could even represent non-market values — including the cultural and spiritual importance of landscape features — as well as natural heritage, notably biodiversity. Many tropical landscapes are rich in biodiversity that has little present economic value; they may harbour species that have local religious or spiritual symbolism but little significance for global buyers of ecosystem services. In Kodagu, sacred forest groves and trees have immense importance. A landscape label could identify and catalogue such features, encouraging local communities to conserve these features in the face of development pressures.

The success of a product certificate relies on consumers' trust in what it represents. If forest cover is accepted as an appropriate proxy for ecosystem service delivery, then consumers of labelled products from landscape mosaics could use widely available software such as Google Earth to make their own verification.

Barriers to adoption and implementation

The landscape label approach also inevitably has some disadvantages, which will challenge its implementation. Implementing and ensuring adherence to landscape label requirements is likely to be complex, necessitating interaction and agreement by many individuals, villages and community-based institutions. Transaction costs might therefore be high. The success of landscape-wide community schemes depends on effective institutional structures. Conflict and corruption within community-based organizations are perhaps the most significant threats to the successful implementation of landscape labelling.

There are, however, many examples of effective community-based organizations. One is the Kodagu Model Forest Trust (KMFT), representing diverse groups including coffee planters, community organizations, and representatives of local government. All of them have interests in the environment and management of the Kodagu landscape. It includes groups that represent local landholders, non-governmental organizations, the Karnataka Forest Department, community groups and research institutions. For the last five years KMFT has been implementing programmes related to integrated landscape management, including promotion of organic farming, revival of community-based sacred forest management and management of human-animal conflicts. KMFT could provide an inclusive platform that allows innovative new certification schemes to be developed and managed.

Other concerns are also common to forest certification and PES schemes. They include dealing with free-riders, managing conditionality, avoiding leakage (displacement of degrading activities to a different location), ensuring the effective functioning of cooperative institutions, and dealing with disturbances beyond the control of the communities (e.g., atmospheric pollution or climate change). Peer pressure may minimize freeloading, but may also create or exacerbate conflict. Opt-out agreements for individual landowners

allow for flexibility in decision-making, but may erode the landscape label concept if they allow too much leeway. Leakage is less likely in a landscape labelling approach than in other approaches, since the assessment of the delivery of services is made at the landscape scale, but displacement beyond the boundaries of the landscape could still occur.

Conclusion

The landscape label concept differs from forest certification approaches: it specifies a landscape-wide certification scheme and incorporates a PES element. Landscape labelling offers several advantages over existing incentive systems, particularly in that it covers a breadth of products and habitats across a defined landscape. There are, however, major obstacles to be overcome. Even so, the extensive area of forest-agriculture landscape mosaics throughout the world compels us to develop alternative certification strategies that will ensure the continued maintenance of these human-dominated yet biologically and culturally rich landscapes. Our equivalent of Rome constitutes more than just the forests we seek to certify, but the wider landscapes within which those forests are found. It also encompasses the diverse land-use systems with which people are engaged, and which often provide environmental benefits far beyond the landscape's boundaries.

Endnote

1. For a full consideration of advantages and disadvantages, see Ghazoul, Garcia and Kushalappa (2009) and Ghazoul (in press).

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Appendix 1. Overview of survey questions and results

1. Do you agree with the statement "Forest management certification has helped to reduce biodiversity loss in the tropics"? (n=127 valid answers)

Strongly agree	11.0%	Disagree	11.0%
Agree	46.5%	Strongly disagree	8.7%
Don't agree or disagree	18.1%	Don't know	4.7%

2. Based on your professional experience, how has forest management certification contributed to conservation? (n=125; strongly agree [5] ...strongly disagree [1])

It has contributed to direct species conservation in forest management units (outcomes)	3.58
It has improved management practices (processes)	3.93
It has created awareness of the importance of biodiversity conservation among forest managers	4.01
It has created awareness of the importance of biodiversity conservation among government officials and policy makers	3.55
It has created awareness of the importance of biodiversity conservation among timber consumers	3.43
It has indirectly led to regulatory change	3.38
It has reduced deforestation rates	2.89
Other	—

3. Is it important to be able to PROVE the effect of certification on biodiversity in terms of species richness and abundance? (n=122)

very important	33.6%	not important	9.8%
important	54.1%	no opinion	2.5%

4. Forests managed for timber are not equivalent to undisturbed forests in terms of biodiversity. Based on your professional experience, how do you rate the changes in biodiversity in certified forests that have been logged, compared with unlogged forest in the same region? (n=113)

the losses are insignificant	11.5%
there are losses but in general these are acceptable	48.7%
losses as found in certified forests are too high and avoidable	23.0%
losses as found in certified forests are too high but unavoidable	16.8%

5. Do you agree with the statement "Forest certification is a critical instrument for biodiversity conservation in tropical forests" (n=123)

Yes, it is a critical instrument that makes a major contribution	46.3%
No, it is not critical because it is generally ineffective	17.1%
Forest certification is made inefficient due to time and costs involved in addressing conservation measures	4.9%
It plays a relatively minor role with other instruments being more important	17.9%
Other, namely...	13.8%

6. What should be the objective of biodiversity conservation in managed tropical forests? (n=120)

Maintain (virtually) all species that were present prior to logging	17.5%
Maintain (virtually) all species at that were present prior to logging at comparable levels of abundance	30.0%
Maintain the abundance of certain identified key plant and animal species	30.0%
Don't worry about species, but focus on maintaining selected ecological processes	15.8%
Other, namely…	6.7%

7. How important is, IN PRACTICE, the role of the following stakeholders in determining the objectives of biodiversity conservation in certified production forests? (n=120; very important [5] … has no role [1])

Experts with established qualifications (university staff, government scientists, etc.)	4.23
International NGOs	3.83
Local NGOs	3.96
Politicians/Government	3.93
Local people	4.24
Timber companies	3.94
Those who buy certified timber	3.37
Citizens of the tropical country involved	3.50
Certification body (auditing agency, certification scheme)	3.89
Multilateral agreements/processes (such as ITTO, CBD, UNFF)	3.64
Other, namely …	—

8. Who should, IDEALLY, set biodiversity objectives for certified production forests? (n=120; very important [5] … has no role [1])

Experts with established qualifications (university staff, government scientists, etc.)	4.34
International NGOs	3.56
Local NGOs	3.88
Politicians/government	3.27
Local people	4.19
Timber companies	3.38
Those who buy certified timber	2.97
Citizens of the tropical country involved	3.57
Certification body (auditing agency, certification scheme)	3.57
Multilateral agreements/processes (such as ITTO, CBD, UNFF)	3.59
Other, namely …	—

9. How important are GENERAL biodiversity standards and targets for certified production forests? (n=119)

Global biodiversity standards should be defined to be comparable across sites and regions – local adjustments should be discouraged	14.3%
Global biodiversity standards are required but should be interpreted with some limited flexibility	37.0%
Standards must be flexible so as to best suit local needs and capacities	44.5%
Other, namely...	4.2%

10. Forest managers' experiences: Indicate to what extent you agree with each statement. (n=90; strongly agree [5] ...strongly disagree [1])

Measures required by certification agencies for conservation and monitoring of biodiversity are unduly costly in terms of time and productivity	3.64
I find it easy to comply with measures required by certification agencies for conservation and monitoring of biodiversity	3.19
I try to comply with biodiversity guidelines but I don't see much effect of it	2.66

11. Based on your professional experience, what management practices are most effective for biodiversity conservation? (n=106; very effective [5] ...counter-effective [1])

Management of High Conservation Values	3.96
Reducing logging intensity	3.71
Protection of stream-side corridors	4.12
Avoidance of the use of chemicals	3.80
Protection of set aside areas (biodiversity reserves)	4.19
Prevention of hunting	3.30
Application of reduced-impact logging	3.91
other, namely...	—

12. What modifications would be required to CURRENT CERTIFICATION PRACTICES in order to improve them as a tool for biodiversity conservation? (n=103; strongly agree [5] ...strongly disagree [1])

Certification standards should be adjusted by changing/adding criteria and/or indicators	3.84
Standards are satisfactory but should be applied more stringently	3.49
There should be more involvement of biodiversity experts during audits	3.75
Quality of monitoring programmes in forest management units should be improved	4.15
Other, namely...	—

13. Based on your professional judgment, how useful is biodiversity information gathered in monitoring programs required by certifiers? (n=98)

very useful	44.9%
somewhat useful	48.0%
not useful at all	7.1%

14. If any, what are the most common problems associated with monitoring biodiversity? (n=98; strongly agree [5] ... strongly disagree [1])

The right species are not monitored	3.47
Poor monitoring protocols	3.75
Poor quality of implementation	3.91
Species identification is not reliable	3.40
Experts are not involved in the field work	3.45
Inappropriate statistical design	3.38
Inadequate spatial coverage	3.65
Duration of monitoring series tends to be too short	3.89
Inadequate baseline information	4.07
Uncertain or contested interpretation of the data	3.65
High variability in species responses prevents detection of trends	3.65
Proper monitoring is a specialists' job	3.70
Inadequate resources are invested in these activities	4.04
Data collections are often used for PR rather than for guiding actions	3.80
We seldom know enough about local ecology to guide management	3.75
Other, namely...	—

15. What are the key issues to be addressed to increase and clarify the impact of forest certification on biodiversity and improve the ability of certification to provide conservation benefits? You may make suggestions on any or all of the following: research questions that can clarify certification impacts, policy issues, operational issues (open; n=52)

16. Describe your involvement with the subject "Biodiversity and forest certification." I am a(n)... (n=109)

Researcher	40.4%
Auditor	2.8%
Forest manager (large-scale timber producer)	1.8%
Forest manager (community/small-scale producer)	1.8%
Conservationist/environmentalist (NGO)	18.3%
Other NGO	3.7%
Employee of government	8.3%
Employee of an accrediting organization	1.8%
Employee of international/ multilateral organization	6.4%
Other, namely...	14.7%

17. In which (tropical) country(ies) do you do most of your work related to biodiversity certification and/or forest certification? (n=87)

Indonesia	12.66%	Republic of Congo	5.06%
Cameroon	8.86%	Gabon	4.43%
Brazil	5.06%	47 others	63.92%

18. Your field experience (field research, forest management and/or auditing in tropical forests) during the past 5 years (n=107)

Substantial and direct (>10% of my time)	30.8%
Some and direct (<10% but more than occasional field visits)	19.6%
Indirect (office job with some field visits)	31.8%
Little/none	15.0%
Other, namely…	2.8%

19. Familiarity with certified natural forest operations in the tropics during the past 5 years (n=106; multiple answers possible)

I have worked in/with large scale certified operations	19.8%
I have worked in/with small scale and/or community-based operations	31.1%
Familiar with such operation(s) in a single country	29.2%
Familiar with such operation(s) in multiple countries	33.0%
Indirect experience with certified operations (desk studies, office level certification activities, etc.)	47.2%
No experience with certified operations	10.4%
Other, namely…	4.7%

20. Can you qualify your attitude towards forest management certification? (n=107)

I am a skeptic	9.3%
I look at it in an open way	33.6%
I am a supporter of forest management certification	51.4%
Other, namely…	5.6%

Appendix 2. FSC's 10 Principles of Forest Stewardship

1. Compliance with Laws and FSC Principles
Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory, and comply with all FSC Principles and Criteria.

2. Tenure and Use Rights and Responsibilities
Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.

3. Indigenous Peoples' Rights
The legal and customary rights of indigenous peoples to own, use and manage their lands, territories, and resources shall be recognised and respected.

4. Community Relations and Worker's Rights
Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.

5. Benefits from the Forest
Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.

6. Environmental Impact
Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and the integrity of the forest.

7. Management Plan
A management plan — appropriate to the scale and intensity of the operations — shall be written, implemented, and kept up to date. The long term objectives of management, and the means of achieving them, shall be clearly stated.

8. Monitoring and Assessment
Monitoring shall be conducted — appropriate to the scale and intensity of forest management — to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts.

9. Maintenance of High Conservation Value Forests
Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.

10. Plantations
Plantations shall be planned and managed in accordance with Principles and Criteria 1–9, and Principle 10 and its Criteria. While plantations can provide an array of social and economic benefits, and can contribute to satisfying the world's needs for forest products, they should complement the management of, reduce pressures on, and promote the restoration and conservation of natural forests.

Source: www.fsc-uk.org/?page_id=14). For a full account with all criteria see www.fsc.org/fileadmin/web-data/public/document_center/international_FSC_policies/standards/FSC_STD_01_001_V4_0_EN_FSC_Principles_and_Criteria.pdf.

Appendix 3. High Conservation Values

High conservation value areas are critical areas in a landscape which need to be appropriately managed in order to maintain or enhance high conservation values (HCVs). There are six main types of HCV area, based on the definition originally developed by the Forest Stewardship Council for certification of forest ecosystems.

HCV1 Areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g., endemism, endangered species, refugia).

HCV2 Globally, regionally or nationally significant large landscape-level areas where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.

HCV3 Areas that are in or contain rare, threatened or endangered ecosystems.

HCV4 Areas that provide basic ecosystem services in critical situations (e.g., watershed protection, erosion control).

HCV5 Areas fundamental to meeting basic needs of local communities (e.g., subsistence, health).

HCV6 Areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

Source: www.hcvnetwork.org/resource-network/the-network-charter-May-2010

Appendix 4. List of contacts

Overview: Biodiversity conservation in certified forests			
Zagt, Roderick J.		Programme Coordinator	Tropenbos International (TBI) P.O. Box 232, 6700 AE Wageningen, the Netherlands tel: +31-317-481418 e: roderick.zagt@tropenbos.org web: www.tropenbos.org
Sheil, Douglas		Director	Institute of Tropical Forest Conservation (ITFC) Bwindi Impenetrable National Park (at Ruhija), P.O. Box 44, Kabale, Uganda tel: +256 39 2709753 e: douglassheil@itfc.org web: www.itfc.org
Putz, Francis E. (Jack)		Professor	Department of Botany, University of Florida Gainesville, Florida USA 32611-8526 tel: +1-352-392-1486 e: fep@ufl.edu web: www.botany.ufl.edu
Section 1. Certification standards			
1.1	Karmann, Marion	Monitoring and Evaluation Program Manager	FSC International Center GmbH Charles de Gaulle Strasse 5 53113 Bonn, Germany tel: +49 (0)228 367 66-77 e: m.karmann@fsc.org web: www.fsc.org
	de Freitas, Andre	Director General FSC Group	FSC International Center GmbH Charles de Gaulle Strasse 5 53113 Bonn, Germany tel: ++49 (0)228 367 66-78 e: director.office@fsc.org web: www.fsc.org
	Droste, Hans-Joachim	Head, Policy and Standards Unit	FSC International Center GmbH Charles de Gaulle Strasse 5 53113 Bonn, Germany tel: ++49 (0)228 367 66-17 e: hj.droste@fsc.org web: www.fsc.org
1.2	Lammerts van Bueren, Erik	Director, Isafor	Burg. Röell laan 1B 3925 BB Scherpenzeel, the Netherlands tel: +31 33 2867145 e: elvb@isafor.nl web: www.isafor.nl

1.3	Wiersum, Freerk	Associate Professor	Forest and Nature Conservation Policy group Wageningen University P.O. Box 47, 6700 AA Wageningen, the Netherlands tel: +31 317 486201 e: Freerk.Wiersum@wur.nl web: www.fnp.wur.nl
	Shrestra, Kumud	FSC contact person and independent consultant	FSC Nepal P.O. Box 2761, Kathmandu, Nepal tel: 977-1-4220401 m: 977-1-9841-220-144 e: kumudshrestha2000@yahoo.com web: www.nfa.org.np
Section 2. Monitoring: options and challenges			
2.1	Gardner, Toby	NERC Fellow	Conservation Science Group Dept. of Zoology, University of Cambridge Downing Street, CB2 3EJ, Cambridge, United Kingdom e: tobyagardner@gmail.com web: www.tropicalforestresearch.org
2.2	Mekembom, Yves Nathan	Technical Officer	Limbe Botanic Garden P.O. Box 437 Limbe, South West Region, Cameroon tel: +237 33332620 m: +237 99971022 e: mekembom@yahoo.fr
2.3	Fry, Ben Palmer	Doctoral researcher	The Centre for Environmental Policy Imperial College London Exhibition Road, London SW7 2AZ, United Kingdom m: +44 785 222 8458 e: benjamin.fry08@imperial.ac.uk web: www.naturenegotiations.blogspot.com
2.4	Armstrong, Simon	Director	Simon Armstrong & Associates. The Melting Pot, 5 Rose Street, Edinburgh, EH2 2PR, United Kingdom m: + 44 794 1316418 simon@simon-armstrong.co.uk web: www.simon-armstrong.co.uk

2.5	de Iongh, Hans	Associate Professor	Faculty of Natural Sciences, Institute of Environmental Sciences (CML), Leiden University, Einsteinweg 2 P.O. Box 9518, 2300 RA Leiden, the Netherlands m: +31-653972498 e: hans.deiongh@gmail.com Iongh@cml.leidenuniv.nl web: http://cml.leiden.edu/
	Persoon, Gerard	IIAS chair for Environment and Development	Faculty of Social Sciences, Institute of Cultural Anthropology and Development Sociology, Leiden University P.O. Box 9555, 2300 RB Leiden, the Netherlands e: persoonga@fsw.leidenuniv.nl web: http://socialsciences.leiden.edu/
2.6	Vantomme, Paul	Senior Forestry Officer, Forest Economics, Policy and Products Division	Forestry Department, Food and Agriculture Organization Via Terme di Caracalla, 00100 Rome, Italy tel: +39 06 570 54730 e: Paul.Vantomme@fao.org web: www.fao.org/forestry/nwfp/en/
Section 3. Practical experiences			
3.1	Poulsen, John	Assistant scientist	Woods Hole Research Center 149 Woods Hole Road Falmouth, MA USA 02540-1644 tel: +1-508-540-9900 e: jpoulsen@whrc.org web: www.wcs-congo.org/
	Clark, Connie	Assistant scientist	Woods Hole Research Center 149 Woods Hole Road Falmouth, MA USA 02540-1644 tel: +1-508-540-9900 e: cclark@whrc.org web: www.wcs-congo.org
3.2	Wanders, Tieme	Senior forestry consultant	FORM International Bevrijdingsweg 3, 8051 EN Hattem, the Netherlands tel: +31 38 4448990 e: twanders@forminternational.nl web: www.forminternational.nl

3.3	Bleaney, Allison	Communications/ Partnership Manager Responsible Asia Forestry & Trade Program (RAFT)	The Nature Conservancy 63 Soi Prompong, Sukhumvit 39 Bangkok 10110, Thailand tel: +66 81 847 2234 e: allison@iucnt.org web: www.responsibleasia.org.
3.4	Ball, Steve	International Coordinator	Mpingo Conservation & Development Initiative P.O. Box 49, Kilwa Masoko, Tanzania tel: +255 (0)23 201 3093 e: steve.ball@mpingoconservation.org web: www.mpingoconservation.org
3.5	Rodríguez, Alfredo	GFTN Coordinator	WWF Peru Trinidad Moran 853 Lince, Lima 14, Peru tel: +51.1.4405550 e: alfredo.rodriguez@wwf.panda.org web: http://peru.panda.org/
	Cubas, Carlos	Forest Certification Specialist	WWF Peru Trinidad Moran 853 Lince, Lima 14, Peru tel: +51.1.4405550 e: carlos.cubas@wwf.panda.org web: http://peru.panda.org/
3.6	Schulze, Mark	Department of Forest Ecosystems and Society	Oregon State University 321 Richardson Hall, Corvallis, Oregon, USA tel: +1-541-822-6336 e: mark.schulze@oregonstate.edu
	Lentini, Marco W.	Executive Director Instituto Floresta Tropical (IFT)	Rua dos Mundurucus 1613, Belém, Pará, Brazil Belém, Brazil, CEP 66025-660 tel: +55-91-3202-8300 e: geral@ift.org.br web: http://ift.org.br
	Macpherson, Alexander J.		e: ajmacpherson.nc@gmail.com
	Grogan, James	Yale University School of Forestry and Environmental Studies	360 Prospect St., Sage Hall New Haven, Connecticut, USA tel: +1-413-548-8180 e: james.grogan@yale.edu
3.7	van Assen, Bart W.	General Manager, Gaiacommoditas	Taman Eden, Jl Salak #10 Bogor 16151, Indonesia tel: +62 251 9313131 m: +62 813 11442202 e: bart@gaiacommoditas.com web: www.gaiacommoditas.com

3.8	Setyawati, Titiek	Senior Researcher, Botany and Forest Ecology Division	Centre for Forest and Nature Conservation Research and Development, Forest Research and Development Agency, Ministry of Forestry Jalan Gunung Batu No.5, Bogor 16610, West Java, Indonesia tel: +62 251 8633234 e: titiek29@yahoo.com
Section 4. Biodiversity benefits			
4.1	Price, Fran	Director, Forest Certification Programs	The Nature Conservancy 140 Fairfield Road, Princeton, NJ USA 08540 tel: +1-609-921-6387 m: +1-202-841-4875 e: fprice@tnc.org web: www.tnc.org
4.2	Brotto, Lucio	External collaborator	Faculty of Agriculture Dept. of Land and Agro-forestry Systems University of Padua, Italy m: +39 3389769637 e: luciobrotto@gmail.com
	Murray, Josil Philomena	Officer, High Conservation Value Forest (HCVF)	WWF-Malaysia 47, Jalan SS23/15, 47400 Petaling Jaya, Selangor, Malaysia m: +6012-6536237 e: jmurray@wwf.org.my web: www.wwf.org.my
	Pettenella, Davide	Professor of Forest Products Econonomics	Faculty of Agriculture Dept. of Land and Agro-forestry Systems University of Padua, Italy m: +39 49 827 2741 (secr.: 2717) e: davide.pettenella@unipd.it web: www.tesaf.unipd.it/pettenella
	Secco, Laura	Researcher in Societal Marketing applied to Forest Products	Faculty of Agriculture Dept. of Land and Agro-forestry Systems University of Padua, Italy e: laura.secco@unipd.it
	Masiero, Mauro	External Collaborator	Faculty of Agriculture Dept. of Land and Agro-forestry Systems University of Padua, Italy e: mauro.masiero@unipd.it

4.3	van Kreveld, Arnold	Co-owner, Ulucus Consultancy	tel: +31 30 296 2050 e: a.kreveld@xs4all.nl web: www.ulucus.eu
	Roerhorst, Ingrid	Co-owner, Ulucus Consultancy	tel: +31 30 296 2050 e: ingrid.roerhorst@xs4all.nl web: www.ulucus.eu
4.4	White, George	Head, Global Forest & Trade Network	WWF International Avenue du Mont-Blanc, 1196 Gland, Switzerland tel: +44 1394 420 518 e: george.white@wwf.panda.org web: www.gftn.panda.org
4.5	Peña-Claros, Marielos	Researcher	Forest Ecology and Forest Management Group Centre for Ecosystem Studies Wageningen University and Research Centre P.O. Box 47, 6700 AA Wageningen, the Netherlands tel: +31 317 486353 e: Marielos.PenaClaros@wur.nl web: www.fem.wur.nl/United Kingdom/
	Bongers, Frans	Professor	Forest Ecology and Forest Management Group Centre for Ecosystem Studies Wageningen University and Research Centre P.O. Box 47, 6700 AA Wageningen, the Netherlands tel: +31 317 48 62 17 e: Frans.Bongers@wur.nl web: www.fem.wur.nl/United Kingdom/
4.6	Cashore, Ben	Professor of Environmental Governance and Political Science/ Director, Program on Forest Policy and Governance	Yale University 195 Prospect Street (Kroon Hall), Room 225, New Haven, Connecticut, USA 06511-2104 tel: +1-203-432-3009 web: http://environment.yale.edu/profile/cashore/
	Vandenbergh, Michael	Tarkington Professor of Law and Director of the Climate Change Research Network	Vanderbilt University School of Law 131 21st Avenue South, Nashville, Tennesee USA 37203 tel: +1-615-322-6763 web: http://law.vanderbilt.edu/faculty/faculty-detail/index.aspx?faculty_id=195

Section 5. High conservation values in forests and plantations			
5.1	Stewart, Christopher	Network manager	HCV Resource Network South Suite, Frewin Chambers, Frewin Court, Oxford OX1 3HZ United Kingdom tel: +44 1865 304046 e: christopher@hcvnetwork.org web: www.hcvnetwork.org
5.2	Mostacedo, Bonifacio	Researcher, Forest Ecology	*Instituto Boliviano de Investigación Forestal* Km 9 Carretera Norte, "El Vallecito, UAGRM" Casilla 6204, Santa Cruz, Bolivia tel: +591-3-3411171 e: bmostacedo@ibifbolivia.org.bo web: www.ibifbolivia.org.bo
	Quevedo, Lincoln	Executive Director	*Centro de Investigación y Manejo de Recursos Naturales, Universidad Autónoma Gabriel René Moreno* Avenida Irala # 565, Casilla 2489 Santa Cruz, Bolivia tel: +591-3-3362593 e: lquevedo@cotas.com.bo web: www.uagrm.edu.bo
5.3	Menne, Wally	Project Coordinator and Global Forest Coalition NGO focal point for Africa	Timberwatch Coalition P.O. Box 30577, Mayville 4058, South Africa tel: +27 (0)82 4442083 e: wally.menne@globalforestcoalition.org web: www.globalforestcoalition.org www.timberwatch.org
5.4	Lamb, David	Research consultant	Centre for Mined Land Rehabilitation University of Queensland St. Lucia, QLD 4072, Australia tel: +61 7 33786547 e: d.lamb@uq.edu.au web: www.cmlr.uq.edu.au/

6. Beyond current concepts			
6.1	Entenmann, Steffen	M.Sc. Integrated Natural Resource Management	University of Freiburg Institute for Landscape Management Tennenbacher Strasse 4 D-79106 Freiburg im Breisgau, Germany tel: +49-(0)761-203-3636 e: steffen.entenmann@landespflege.uni-freiburg.de web: www.landespflege-freiburg.de
6.2	Christophersen, Tim	Programme Officer for Forest Biodiversity	Secretariat of the Convention on Biological Diversity 413 St. Jacques St. West, Suite 800 Montreal, Quebec H2Y 1N9 Canada tel: +1-514-287-7036 e: tim.christophersen@cbd.int web: www.cbd.int
	Bélair, Caroline	Programme Assistant for Forest Biodiversity and Sustainable Use	Secretariat of the Convention on Biological Diversity 413 St. Jacques St. West, Suite 800 Montreal, Quebec H2Y 1N9 Canada tel: +1-514-287-6674 e: caroline.belair@cbd.int web: www.cbd.int
	Nasi, Robert	Programme Director, Environmental Services and Sustainable Use of Forests	CIFOR P.O. Box 0113 BOCBD Bogor 16000, Indonesia tel: +62 251 8 622 622 e: r.nasi@cgiar.org web: www.cifor.cgiar.org
6.3	Slik, Ferry	Professor, Ecological Evolution Group	Xishuangbanna Tropical Botanical Garden Chinese Academy of Sciences Menglun, Mengla, Yunnan 666303, China tel: +86 1596 9470 367 e: ferryslik@hotmail.com web: www.phylodiversity.net/fslik/

6.4	Sayer, Jeffrey	Professor, Development Practice	School of Earth and Environmental Science James Cook University P.O. Box 6811, Cairns, Qld 4870 Australia tel: +61 7 40421663 e: jeffrey.sayer@jcu.edu.au web: www.jcu.edu.au/ees/
	Maginnis, Stewart	Director, Environment and Development Group	IUCN–The World Conservation Union Rue Mauverney 28, 1196 Gland, Switzerland tel: +41 22 9990000 e: Stewart.Maginnis@iucn.org web: www.iucn.org
	Mansur, Eduardo	Assistant Director, Reforestation and Forest Management	International Tropical Timber Organization International Organizations Center, 5th Floor Pacifico-Yokohama 1-1-1, Minato-Mirai, Nishi-ku, Yokohama, 220-0012 Japan tel: +81-45-223-1110 e: mansur@itto.or.jp web: www.itto.int
	Boedhihartono, Agni	Senior Lecturer, Tropical Livelihoods	School of Earth and Environmental Science James Cook University P.O. Box 6811, Cairns, Qld 4870, Australia tel: +61 7 40421256 e: agni.boedhihartono@jcu.edu.au web: www.jcu.edu.au/ees/
6.5	Pirard, Romain	Project Manager Forests and Climate	Institute of Sustainable Development and International Relations (IDDRI) 27, rue Saint Guillaume, 75337 Paris Cedex 07 France tel: +33 (0)1 45 49 76 69 m: +33 (0)6 99 45 32 05 e: romain.pirard@iddri.org web: www.iddri.org
6.6	Ghazoul, Jaboury	Professor of Ecosystem Management	ETH Zurich Universitätsstrasse 16 8092 Zurich, Switzerland tel: +41 (0)44 632 8627 e: jaboury.ghazoul@env.ethz.ch web: www.ecology.ethz.ch

Established in 1991, the European Tropical Forest Research Network (ETFRN) aims to ensure that European research contributes to conservation and sustainable use of forest and tree resources in tropical and subtropical countries.

ETFRN promotes a dialogue between researchers, policy-makers and forest users, the increased coherence of European tropical forest research, and the increased collaboration with researchers in developing countries through partnerships and other forms of capacity building.

ETFRN provides a range of services, including ETFRN News, which comprises theme-based issues on research relevant to the international development agenda. This issue of ETFRN News provides information on the impacts of forest certification on biodiversity conservation in tropical forests.

The mission of Tropenbos International (TBI) is to improve tropical forest management for the benefit of people, conservation and sustainable development. By making knowledge work for forests and people, TBI contributes to well-informed decision making for improved management and governance of tropical forests. TBI's longstanding local presence and ability to bring together local, national and international partners make it a trusted partner in sustainable development. TBI is ETFRN's coordinating member and national focal point in the Netherlands.

ETFRN
c/o Tropenbos International
P.O. Box 232, 6700 AE Wageningen, the Netherlands
tel: +31 317 48 14 16
e-mail: etfrn@etfrn.org
www.etfrn.org

ITFC
Development Cooperation
Ministry of Foreign Affairs
UKaid
from the Department for International Development
Ministerie van Landbouw, Natuur en Voedselkwaliteit
gtz
commissioned by
Federal Ministry for Economic Cooperation and Development