

Forest Certification: Toward Common Standards?

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Abstract

The forestry industry provides a good illustration of the active roles that industry associations, environmental nongovernmental organizations (NGOs), national governments, and international organizations can play in developing and promoting codes of conduct that are formally sanctioned and certified. It also reflects some of the challenges of disseminating codes of conduct in developing countries and ensuring market benefits from certification. We describe the emergence of forest certification standards, outline current certification schemes, and discuss the role of major corporations in creating demand for certified products. We also discuss the limited success of certification and some of the obstacles to its adoption in developing countries. The current diversity of forest certification programs and ecolabeling schemes has created a costly, less-than-transparent system that has been largely ineffective in terms of the initial goals of reducing tropical deforestation and illegal logging. Some steps have been taken toward harmonization of different certification criteria as well as endorsement and mutual recognition among existing forest certification programs. However, it is unlikely that standardization alone can overcome other, more serious barriers to certification in developing countries.

Key Words: forest certification, codes of conduct, Forest Stewardship Council, PEFC, Sustainable Forestry Initiative, sustainable forest management

JEL Classification Numbers: Q23, Q56, L73, Q13

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Introduction

The forestry industry provides a good illustration of the active roles that industry associations, environmental nongovernmental organizations (NGOs), national governments, and international organizations can play in developing and promoting codes of conduct that are formally sanctioned and certified. It also reflects some of the challenges of disseminating codes of conduct in developing countries and ensuring market benefits from certification.

In the 1980s, the media and environmental NGOs raised public concerns about rapid deforestation, particularly the loss of rainforest in the Amazon and the illegal logging of tropical hardwoods, but also clear-cutting practices in North America. Forest certification and ecolabels for wood products emerged as a response and an alternative to timber boycott campaigns. Several national and international certification schemes developed standards to address the operation of the forestry industry, promising benefits to all stakeholders. Certification would provide consumers with desired information about the environmental impacts associated with the forest products they purchase. For corporations, forest managers, and landowners, certification and ecolabels would be tools for gaining market access or competitive advantage by demonstrating responsible forest management. For governments, certification and ecolabels offer soft policy instruments to promote environmentally sound practices through demand-side responses (Stevens et al. 1998, Eba'a Atyi and Simula 2002). However, although certification has gained popularity in practice, price premiums have been elusive for producers. And contrary to the original target of conserving forests in developing countries, these programs have overwhelmingly certified sustainable management practices in developed countries.

In this paper, we describe the emergence of forest certification standards, outline current certification schemes, and discuss the role of major corporations in creating demand for certified

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products. We also discuss the limited success of certification and some of the obstacles to its adoption in developing countries. We present this case to illustrate some of the important factors in the adoption and success of corporate social and environmental responsibility programs, drawing lessons not only for the forest industry but also for other industries whose production practices have repercussions for the environment.

In the next section, we compare the principal international forest certification standards, examining their origins, their major areas of impact, and any success in their adoption. In the third section, we turn to the demand for certified forest products, reviewing the empirical evidence on consumer perception and the prevalence of price premiums. Subsequently, we evaluate the supply of certified forest products, focusing on the costs of certification and identifying important barriers to the adoption of forest certification among producers in developing nations. In the fifth section, we consider the potential for harmonizing forest certification standards into a common global standard and review the current actions being taken toward mutual recognition of existing forest certification programs. In the conclusion, we draw lessons and offer suggestions for developing common standards of conduct with respect to environmental practices.

Major Forest Certification Programs

The World Trade Organization places forest certification standards in the category of process and production methods standards, which in this case specify how natural resources are managed and how harvesting is carried out. The forest products and timber industry has adopted different certification standards for sustainable management as a regulatory measure. These standards attempt to address the operation of the entire industry, rather than building niche markets for specialty products (e.g., organic produce). The programs are the result of the combined effort of NGOs, corporations, and other stakeholders, often with government support (Eba'a and Simula 2002, Bartley 2003).

Each certifying body sets guidelines to be followed by those seeking its certification—companies; individual landowners; or national, state, or community forests. These guidelines may be performance-based (with requirements for specific actions, practices, or outcomes, like limits on clearcutting) or systems-based (with criteria for a landowner to design a personalized management system for tracking environmental performance). Private organizations accredited by the certifier determine whether applicants meet the requirements. These third-party auditors conduct on-site visits to determine whether the applicant should proceed with a formal audit. During an audit, inspectors look for internal plans and documentation, field evidence of

sustainable forest management practices, interview personnel in the organization or community, review compliance records or internal monitoring, and conduct independent assessment and investigation (Sample et al. 2003).

The three most widely adopted international certification schemes—PEFC (originally Pan European Forest Certification, now Program for the Endorsement of Forest Certification), Forest Stewardship Council (FSC), and Sustainable Forestry Initiative (SFI)—account for 38%, 23%, and 17% of all certified forested land, respectively (Eba’a Atyi and Simula 2002). In countries that are members of the International Tropical Timber Organization, the most widely certificate adopted is the Keurhout certificate¹ (4.2 million hectares), followed by FSC (2.6 million hectares). The Keurhout figure includes 2.3 million hectares of certified forest in Malaysia that is also registered under the Malaysian Timber Certification Council system.

FSC was founded in 1993 in response to public concerns about deforestation and demand for an international wood-labeling scheme. FSC International is an association of voting members composed of three chambers: economic, for commercial interests (e.g., Home Depot); social, for socially beneficial forest management interests (e.g., FERN [Forests and the European Union Resource Network] Foundation); and environmental, for environmentally friendly forest stewardship (e.g., Greenpeace). Through multiple stakeholder negotiations, FSC crafted a model code of conduct for forestry operations. The resulting 10 principles are used to define national certification criteria (Table 1, on the next page). Despite an emphasis on performance-based criteria, FSC principles allow countries to customize specific standards to local conditions.

As an umbrella organization, FSC sets certification standards for numerous independent certifiers. Before they can market their wood as “FSC certified” and use the FSC logo, harvesters of timber-producing lands must prove to auditors that they meet the set of standards for sustainable management. Of the major international programs, FSC currently has the greatest penetration into developing countries. About 19% of forest certified under FSC standards is located in the developing world. One-third of FSC-certified tropical forests are commercial plantations, and the other two-thirds correspond to natural forests.

¹ The Keurhout certificate is a standard developed by the Keurhout Foundation in the Netherlands to certify timber coming from sustainably managed forests.

Table 1. FSC Principles for Forest Management

1.	Forest management shall respect all applicable laws of the country in which it takes place, abide by all international treaties and agreements to which that country is a signatory, and comply with all <i>FSC Principles and Criteria</i> .
2.	Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented, and legally established.
3.	The legal and customary rights of indigenous peoples to own, use, and manage their lands, territories, and resources shall be recognized and respected.
4.	Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.
5.	Forest management operations shall encourage the efficient use of the forest's various products and services to ensure economic viability and a wide range of environmental and social benefits.
6.	Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes; by so doing, it shall maintain the ecological functions and the integrity of the forest.
7.	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 appropriate to the scale and intensity of forest management shall be conducted to assess the condition of the forest, yields of forest products, chain of custody, ^a management activities, and the social and environmental impacts of these activities.
9.	Management activities in forests with high conservation value shall maintain or enhance the attributes that define such forests. Decisions regarding forests with high conservation value shall always be considered in the context of a precautionary approach.
10.	Plantations shall be planned and managed in accordance with the <i>Principles and Criteria</i> . Although 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.

^a *Chain of custody* Chain of custody refers to the ability to track products from the forest to the final consumer. The tracking process documents processing and transportation, through all phases of ownership. A chain of custody is implemented to assure consumers that ecolabeled products come from environmentally certified forests (Anderson and Hansen 2004a).

Source: FSC–United States 2000.

PEFC was originally created as Pan European Forest Certification by the European forest products industry as an alternative to FSC certification. In contrast to the performance-oriented standards of FSC, PEFC offers a system-based standard, establishing a framework for the development and recognition of national or subnational forest certification schemes. These programs are developed locally, according to internationally recognized requirements for sustainable forest management, and are certified by independent third parties. Since its inception, PEFC has been adopted by both European and non-European countries such as Australia and Chile. To better reflect its global scope, the name was changed to Program for the Endorsement of Forest Certification in 2003.

SFI, in the United States and Canada, began as a voluntary self-regulatory program with “Principles and Implementation Guidelines” promoted by the American Forest & Paper Association (AF&PA). The program quickly progressed to involve rigorous management standards with third-party certification and participation by company members of AF&PA. Subsequently, an independent not-for-profit corporation, the Sustainable Forestry Board, was established, involving environmental organizations as well as industry members. SFI was launched in 1995 and currently is the major certifier in North America (Fletcher et al. 2002, Wallinger 2003). The SFI standard is a hybrid of systems- and performance-based requirements with third-party certification, and it allows companies to select optional indicators that they consider appropriate for their management systems and conditions.

Table 2 below is a matrix that compares geographic distribution, market share, strengths, and weaknesses of each of these three major certification schemes.

Several country-based certification standards also exist. The Canadian Standard Association (CSA) Sustainable Forest Management Program (CAN/CSA Z809) is the leading certifier in Canada. The CSA program originated with the Forest Products Association of Canada and developed to involve third-party certification that operates under the National Standards System. CSA bases its performance requirements on the Canadian Council of Forest Ministers’ Criteria for Sustainable Forest Management, which links to the Montreal Processes criteria and indicators. Other national systems include the Malaysian Timber Certification Council, Lembaga Ekolabel Indonesia, and the Finnish Forest Certification Scheme. (For a detailed list of certification schemes and a comparative analysis, see Rupert 2001.)

Table 2. Features of Major Forest Certification Programs

<i>Scheme</i>	<i>Geographic Distribution</i>	<i>Market Share by 2002</i>	<i>Strengths</i>	<i>Weaknesses</i>
FSC	Global	23%	<ul style="list-style-type: none"> ▪ Comprehensive scheme, rigorous in requiring attention to stakeholder concerns ▪ Support from NGOs and part of trade and industry ▪ Current visibility in the marketplace of the common trademark ▪ Flexible performance standards 	<ul style="list-style-type: none"> ▪ High level of requirements leading to limited access to the scheme in practice
PEFC	Europe ^a	38%	<ul style="list-style-type: none"> ▪ Comprehensive approach addressing all elements involved in forest management ▪ Established mechanisms for endorsing national schemes ▪ Common trademark 	<ul style="list-style-type: none"> ▪ Regional application ▪ Lack of NGO support ▪ Accreditation arrangements not yet fully completed ▪ Low perceived performance requirements by some stakeholders
SFI	North America	17%	<ul style="list-style-type: none"> ▪ Scheme developed by multiple stakeholders ▪ Clear set of core and optional performance indicators easily applied to local context ▪ Clear assessment process; requires continuous improvement over time ▪ Independent governance 	<ul style="list-style-type: none"> ▪ Regional application ▪ Less comprehensive than FSC

^a PEFC members also include Australia, Brazil, Canada, Chile, Gabon, Malaysia, and the United States. At the time of writing, only the national schemes for Australia and Chile have been endorsed by PEFC (PEFC 2004b).

Sources: Rametsteiner and Simula 2001, Eba'a Atyi and Simula 2002.

Furthermore, ISO 14001 is often used in combination with other regional and national standards. ISO 14001 seeks to ensure that a certified company knows, manages, and limits its effects on the environment. A set of guidelines for applying ISO 14001 to forestry was developed in 1995, and the result, ISO 14061, was approved in 1998. This standard is a process-based certification that lets landowners tailor the system to their objectives and specific situations; it does not demand that any particular set of standards be followed. This feature may constitute a weak point, because sustainability has multiple concepts and definitions.

A by-product of certification programs has been the creation of a new industry of third-party auditing enterprises. Examples include SmartWood and Scientific Certification Systems for FSC and PricewaterhouseCoopers, Bioforest Technologies, Interforest/Arthur Andersen, and the Plum Line for SFI. Société Générale de Surveillance may be the largest player, offering FSC, SFI, and PEFC certification; 57% of all FSC-certified forests are certified by Société Générale de Surveillance (Eba'a Atyi and Simula 2002).

The different programs vary somewhat in their auditing processes. FSC auditors evaluate a wide range of criteria and may give the organization conditions or recommendations. Conditions require that performance criteria be met or changes be made before the company can be certified, after certification is approved, or both. Recommendations are optional. SFI auditors verify that the organization conforms to a set of core indicators. After an audit, a third-party SFI verifier presents a list of major and minor "nonconformances." The former must be corrected before certification is approved; minor nonconformances can be remedied after the firm receives certification but must be corrected before the next audit (Cubbage et al. 2003). Organizations seeking certification often must adapt their administrative and management functions to conform to the certifier's requirements for recordkeeping and forest practices. Consequently, certifying to more than one program can be difficult as well as costly.

Demand for Forest Certification

In the United States and Europe, corporations and NGOs drive the demand for certified forest products. Through the Certified Forest Products Council (CFPC), a membership organization created to encourage the purchase of certified products, companies such as Home Depot, Georgia-Pacific, and B&Q (a U.K. firm) have committed to work toward dealing in certified wood products (Fletcher et al. 2002).

According to the FAO Asia-Pacific Forestry Commission (2000) and Eba'a Atyi and Simula (2002), most corporations that encourage forest certification probably are most interested in the potential marketing benefits and in managing risks that might affect the corporate image. We review some of these practices and the evidence regarding the associated benefits. An important question is not only whether major retailers benefit but also whether they pass along these benefits to certified producers in the form of higher prices.

Corporate Commitment to Purchasing Certified Forest Products

The largest retailers of forest products in the United States and Europe have been key drivers in the global demand for products from sustainable managed forests. Major multinational enterprises have incorporated a preference for certified wood products into their own corporate social responsibility policies.

Home Depot, headquartered in Atlanta, Georgia, is one of the world's largest home improvement retailers. Home Depot procures 94% of its wood from North America and less than 0.15% from the Amazon basin. In its wood-purchasing policy issued in 1999, the company pledged to give preference to wood from responsibly managed forests and to eliminate wood purchases from endangered regions by the end of 2002 (Home Depot 1999).² The company recognizes the FSC certificate, and claims to sell more FSC-certified wood products than any other retailer; it also has partnered with suppliers to promote certified sourcing of wood products (Home Depot 2001). Home Depot also has pledged not to purchase uncertified wood products sourced from the 10 most vulnerable forest ecoregions in the world, as identified by WWF.

Lowe's, based in Wilkesboro, North Carolina, is one of the largest retailers of forest products in the United States. Its wood-purchasing policy states that the company's long-term goal is to ensure that all wood products sold in Lowe's stores originate from well-managed forests that are not endangered. The company has promised to aggressively phase out the purchase of wood products from endangered forests. Lowe's gives preference to the procurement of wood products from independently certified, well-managed forests; it supports the use of the FSC certification standard and favors it over other certification schemes (Lowe's n.d.).

International Paper, a major forest products firm with headquarters in Stamford, Connecticut, reports that all of its forestlands in the United States are certified to SFI and ISO 14001 standards. The operations of Weldwood, International Paper's Canadian subsidiary in Vancouver, British Columbia, have been certified under CAN/CSA Z809, and all of its mills and woodlands operations are certified to the ISO 14001 standard. International Paper's subsidiary operations in Russia and many other countries are in the process of being certified to the ISO 14001 standard (International Paper n.d.).

Georgia-Pacific is a multinational forest products company based in Atlanta, Georgia, with facilities in Canada and 11 other countries. The company's corporate social responsibility

² As of this writing, we could find no information as to whether this goal had been met.

policy includes a commitment to support sustainable and responsible forest practices (Georgia-Pacific n.d.). As part of the company's participation in the SFI program, the Georgia-Pacific wood and fiber procurement system has undergone a third-party audit conducted by PricewaterhouseCoopers.

B&Q, based in Eastleigh, Hampshire, England, is considered the largest do-it-yourself retailer in Europe and the third largest in the world. Along with Home Depot and Greenpeace, B&Q collaborated with WWF in creating FSC, and approximately 80% of B&Q's wood products are FSC-certified. The company recognizes other certification schemes, including the U.K. Woodland Assurance Scheme and the Indonesian Lembaga Ekolabel Institute. B&Q is working the Malaysian government on the Malaysian Timber Certification Council (B&Q 2003).

As part of its Global Corporate Investment Policy, the Bank of America (n.d.), headquartered in Charlotte, North Carolina, promotes sustainable practices by managing the effects of financing activities on the environment, society, and the company's reputation. The policy includes the use of due diligence measures to ensure that lending proceeds are not used to finance commercial operations that cut or clear primary (mature) forests or forests of high conservation value, except under certain conditions (for full details, see Bank of America n.d.).

Price Impacts

Consumer willingness to pay a price premium for certified forest products is a function of many factors that must all align to translate into higher prices. These factors include the level of environmental awareness among consumers, the perceived importance of certification, the nature of the product and price, the quality and availability of information about the certification label on the product, and the credibility of the issuing organization. Although there is evidence of consumer willingness to pay more for products from environmentally sound sources, little empirical support is found that certified suppliers of forest products reap higher prices.

Ozanne and Vlosky (1997) report that people who are members of an environmental organization are more likely to seek out and buy certified wood products at a price premium. Anderson and Hansen (2004) found that willingness to pay a premium was highest among those who consider environmental certification an important attribute when purchasing wood products. Still, the price premium that informed consumers are willing to pay for certified products is related to the importance that they attach to the certificate as verification of sustainable management. And for many consumers, becoming informed can be difficult. Benefits of forest certification are often not fully understood and are more difficult to market to consumers in as simple and charismatic a message as, say, "dolphin-friendly tuna."

The diversity of labels, which reflect the multitude of forest products certification schemes, can be confusing to consumers and thus weaken the labels' credibility. On the basis of a study with focus groups in three different U.S. locations, Teisl et al. (2002) suggest that consumers are unsure whether to trust the information on an ecolabel. Most consumers are uninformed about the criteria used for certification and question the independence and unbiased nature of the verification process. Teisl et al. also report mixed reactions about the endorsement of labels by government organizations. Different label formats make it difficult to compare product attributes.

Mario F. Teisl found that consumer demand and willingness to pay for certified forest products are contingent on the information displayed on the ecolabel carried by certified wood products (Anderson and Hansen 2004b). Teisl concluded that the slow development of a market for certified products might be caused in part by the current state of ecolabeling. This conclusion is based on findings that consumers are least satisfied with simple labels like the FSC logo; rather, consumers prefer labels that offer detailed information about the specific environmental benefits associated with the product and contact information for the certifying party. According to Teisl et al. (2002), many consumers believe that the inclusion of a toll-free number and website on an ecolabel increases transparency and credibility. These results are still preliminary, and consumers' attitudes toward ecolabels and their issuing organizations merit further analysis. Furthermore, these studies only involved American consumers; similar studies should be conducted in other markets

According to Anderson and Hansen (2004a, 2004b), Teisl et al. (2002), and Ozanne and Vlosky (1997, 2003), the nature and cost of the product itself may influence consumer willingness to pay a price premium. Consumers are less likely to want to pay a higher percentage premium for large and expensive purchases than for less expensive products. For example, Ozanne and Vlosky (1997) report that consumers are willing to pay a maximum 50% price premium for certified forest products ranging from \$100 to \$5,000 (e.g., a ready-to assemble chair or a kitchen remodeling job), whereas they are willing to pay only a 10% premium on goods priced at \$100,000 (e.g., a new home built with certified wood). Teisl et al. (2002) stress that consumers tend to be more concerned about forest sustainability for products that are used often and in large quantities, such as paper, and thus are willing to pay a higher premium.

These studies suggest that the public and certified producers would benefit from better education about forest products certification and labeling to address credibility problems. In practice, the European paper industry has launched Paper Profile, an initiative to improve business-to-business communication and, hence, industry credibility. This voluntary declaration

includes information about the origin of wood and the environmental management systems applied. It also covers several environmental aspects of pulping and papermaking processes, including raw material, emissions, and electricity consumption.³ This example also reflects the stronger focus on large businesses, rather than marketing to environmentally conscious consumers.

Still, Sedjo and Swallow (2002) show that a willingness to pay a premium by a portion of consumers does not ensure that a premium will be forthcoming in the market. Recent experience seems to bear this out. Collectively, corporate actions that support forest certification have spurred demand (at least in developed countries) but have not necessarily created more favorable prices for suppliers. The demand for certified products on the part of large corporations may arise primarily from interest group pressure, fear of blacklisting, and desire to protect the value of the corporate image—as opposed to an intent to market premium products. Furthermore, as major clients, they are likely to be able to use their monopsony power to shift more of the compliance cost burden to suppliers. Product manufacturers, for their part, are not willing to pay a price premium for certified raw material or for costs associated with chain-of-custody procedures unless these additional costs can be passed on to consumers (Vlosky and Ozanne 1998). Studies have shown that markets for certified forest products in developed countries are relatively limited, and the prospects for reaping a price premium can be poor (Ozanne and Vlosky 1997, Rickenbach 2002, Teisl et al. 2002, Anderson and Hansen 2004a, 2004b). Consequently, with even less indigenous demand and a larger focus on raw materials, we can only suspect that such prospects are even poorer in developing countries.

Supply of Certified Forest Products

Costs of Certification

Certification costs, which entail both internal and external expenses, can be quite high. The three main categories of costs are described here.

- *Preparation for certification.* The forest landowner must spend time and resources preparing for an audit, particularly if the certification criteria set standards that are higher than local forest legislation.

³ For more information about the Paper Profile Environmental Declaration for Paper, see <http://www.paperprofile.com>.

- *Auditing.* The forest landowner pays auditors' costs—travel, field visits, reports, annual follow-ups, certificates—and the certifying organization's oversight costs.
- *Compliance.* The auditors may mandate changes in management, new systems, and additional employee training—the costs of which must be borne by the forest landowner.

Certification seems to display important scale returns, because per-acre certification costs decrease significantly with the size of the forest. In the United States, certification of 10- to 40-acre parcels may be a few hundred dollars per acre, whereas that of large, nonindustrial, private forests might be less than 10 cents per acre (Fletcher et al. 2002). Owners of smaller forests have greater costs per acre because the fixed costs of auditors and preparation expenditures are spread over a smaller area.

Costs can also vary according to the certification program. In an interesting case in North Carolina, state and university lands underwent dual certification. Costs per acre for FSC certification were \$0.55 for preparation and \$1.44 for inspection, for a total of \$1.99 per acre. Costs per acre for SFI certification were \$1.48 for preparation and \$0.82 for inspection, for a total of \$2.30 per acre. Some of the cost differences were attributed to parcel size (54,500 acres certified by FSC and 44,500 acres by SFI), forest type, the organization being certified, and the firm performing the audit (Sample et al. 2003).

Group certification could reduce transaction costs for small farming units; options include creating cooperatives and obtaining umbrella certification, in which individual forest owners band together to seek certification as one organization. Grants for obtaining certification are another possibility to reduce the cost burden. The certification of community-owned forested areas in developing countries is often financed through subsidies from international bodies, governments, and NGOs.⁴ Additional costs for annual payments and auditing are usually the responsibility of local communities. One example is the Bolivia Sustainable Forest Management Project, a national initiative aimed at reducing the degradation of forest, soil, and water resources and to protect the biological diversity of Bolivia's forests (BOLFOR n.d.). The initiative received support from the Bolivian government and the U.S. Agency for International Development and has successfully certified more than 1 million hectares.

⁴ For example, certification of the Mayan Biosphere Reserve in Petén, Guatemala, was subsidized by an NGO. Total costs were reduced by 50% to \$0.65 per hectare (Soza 2003).

In developed countries, the use of subsidies through severance taxes and taxation per unit of timber volume sold has been discussed as a possibility to support and promote forest certification among owners of small, nonindustrial private forests (Teisl et al. 2001). This tool appears to be less feasible in developing countries, where additional taxes could increase the incentive to conceal the volume of harvested wood recorded in company accounts.

In many developing countries, if forest industries are not prepared for certification or if costs are prohibitive, then making certification a condition for trade in international markets could reduce exports of wood products from these countries—with considerable negative impacts on forest-dependent populations. High certification costs will be compensated with price premiums only if purchasers and buyer groups exhibit sufficient demand for certified suppliers or ecolabeled products.

Barriers to Adoption of Forest Certification in Developing Countries

Forest certification has grown exponentially since the mid-1990s. However, the majority of certified forests are in Europe and North America; developing countries account for only 8% of the total certified area (2% in Asia and the Pacific, 3% in Latin America, and 3% in Africa). Developed countries have regulations in place that support aspects of sustainable management, and owners and managers of forests that are already following sustainable management practices are more likely to opt for certification. Additionally, environmental groups in developed countries demand credible and standardized systems for evaluating claims about the environmental impacts of industry operations.

This situation seems ironic, because certification was initiated to protect the forests of the developing world. One problem is that because the demand for certification comes from developed countries, it offers benefits only for forest products destined for export from developing countries. Consequently, certification will not necessarily slow deforestation, because forests in these countries are generally managed to meet local needs. Most deforestation in developing countries is caused by land conversion to agricultural uses. Furthermore, about 80% of marketed wood and wood products produced in developing countries is also consumed in those countries, where willingness to pay for a price premium for certified environmentally friendly forest products is partially constrained to ability to pay (Whiteman et al. 1999).

In addition to these fundamental market realities, the adoption of forest certification in developing countries has been slow for several reasons.

- *Diverse ecological and socioeconomic conditions.* Uncertain or disputed land tenure, social and political conflicts involving the use of forest resources, lack of financial and human resources, and diversity of forest management practices make uniform standards difficult to apply. Often only general guidelines can be agreed upon at the international level.
- *Insufficient information.* The implementation of certification norms is often regarded as cumbersome. A thorough understanding of the certification process and the potential costs and benefits could encourage adoption.
- *Lack of government support.* Developing countries often lack the trained personnel and financial resources necessary to promote stakeholder participation, auditing systems, and a better understanding of the certification process. Insufficient government support limits the participation of producers, particularly smaller units whose landowners cannot afford the costs of certification.
- *Inflexible standards.* Some certification schemes are based on performance standards, meaning that a forest cannot be certified until it meets all such requirements. Such systems do not recognize and reward continual progress toward achieving target standards.
- *Incompatibility of laws, traditional rights, and certification standards.* National laws and forest certification standards may be in conflict because of different ownership and usufruct rights of the forest products. What may be considered illegal according to public law or incompatible with certification standards may be part of the customary law and traditional rights of local people.
- *Small forest management units.* The high costs of obtaining certification often make its adoption financially unfeasible for small forestland owners. Current standards tend to favor economies of scale.

- *Perceived discrimination.* There is a concern in developing countries that forest certification, rather than improved forest management, may act as a nontariff barrier to trade by discriminating against wood suppliers that are not certified.⁵

Nevertheless, forest certification can offer opportunities for communities in developing countries to have more control over the marketing and use of their forest resources. Forest certification can provide access to markets outside local communities, and potential higher prices and revenues may create incentives to manage natural resources sustainably (Naka et al. 2000). However, cost and credibility barriers can be substantial.

An alliance between the World Bank Group and WWF set a target of certifying 200 million hectares of forest by 2005, evenly shared between developed and developing countries. Although developed countries met the target in January 2002, developing countries had achieved only 6.4% of their proposed share: 0.5% of the total forested area in the Asia-Pacific region was certified, 0.4% in Latin America, and 0.45% in Africa—compared with 8.7% of total forest in North America and 5.7% in Europe (Eba'a Atyi and Simula 2002). However, even if the goal is reached, 200 million hectares represent only 6% of the world's forest area.

Toward a Common Standard

Issues for Harmonization

The Confederation of European Paper Industries has identified 21 national and international certification schemes worldwide (Rupert 2001). The diversity of national, regional, and global schemes can create confusion among consumers and hinder competition among suppliers, who may not be able to afford multiple certifications for multiple clients. Today, the market seems to be moving toward mutual recognition and harmonization of the major international standards, if not a common global certification standard. The Food and Agriculture Organization of the United Nations, the German Agency for Technical Cooperation, and the International Tropical Timber Organization called for a seminar in 2002 to compare international schemes and develop common definitions and indicators. These organizations have served as

⁵ In 1992, the Austrian parliament voted to ban the import of tropical timber unless the wood was labeled as coming from sustainable sources. According to Bartley (2003), Indonesia and Malaysia considered this measure a nontariff barrier to trade and threatened to challenge it under the General Agreement on Tariffs and Trade. Austria revised the law in 1993. Because of the threat of such challenges, governmental action in regulating the market for tropical timber is limited, opening the door to private initiatives and the creation of multiple certification schemes.

facilitators in the process of adopting common guidelines for national and international standards.

In considering a convergence to a common international forest standard, it is valid to ask whether harmonization or diversity is better for overall welfare. There may be trade-offs between the benefits of differentiation and the costs of overlapping verification requirements. Several complications related to forest products pose challenges for the development of common standards.

Nature of Forestry

Standards for forest management (certification) must be differentiated from standards for forest products manufacture (ecolabeling). Forest management involves all aspects relating to forests, including social, economic, and environmental conditions; compared with product manufacturing, it is more complex to assess and monitor. Components of forest management may include the following.

- *Nonpoint-source pollution.* Standards that require minimum environmental impact are difficult to set given the nature of forestry. Erosion and runoff vary according to soil type, land slope, and rainfall among other conditions. Runoff can be caused by rainfall or snowmelt, for example, and thus its environmental impact is difficult to predict and monitor (U.S. EPA 1994). Sustainability indicators are correspondingly difficult to identify.
- *Extreme weather.* Timber management must account for the variability of natural conditions. Extreme weather can result in significant environmental impacts, such as soil erosion, that are difficult to capture in a certification scheme and even more complex to associate with particular forest management practices.
- *Socioeconomic variables.* In developing countries, land tenure affects the adoption of codes of conduct and liability. Property rights over land and forest resources vary between countries and can limit liability over their use (Eba'a Atyi and Simula 2002).

Outsourcing and Commingling

Commingling of certified and noncertified wood is a major challenge toward the development of common certification standards. Because of increased globalization and outsourcing in the forest products industry, particularly manufacturing, end products often mix wood and fiber inputs from certified and uncertified sources. Given manufacturers' large product volumes and many lumber suppliers, it is difficult to track wood products from manufacturers back to their original sources. Hence, standards for procurement allow these products to enter the certified stream. To address labeling concerns, the PEFC, FSC and SFI have set a minimum content of certified wood or fiber that solid wood products, chip and fiber products, and assembled products must contain. FSC minimum threshold varies with product but is 70% for solid wood; PEFC minimum content is 70%, and SFI minimum requirement is 66% (Forest Certification Resource Center n.d.).

Third-Party Auditing

Environmental organizations allege that third-party assessments often suffer from lax standards, interpretative leniency, and deficient auditing (Gulbrandsen 2004). Variations in the level of scrutiny of audits under different certification schemes and in certifiers' audits within the same scheme have been reported, particularly for system-based standards. Independent certification organizations may interpret and verify the same certification criteria very differently, and some critics believe that independent bodies can have an interest in ensuring successful audit outcomes. A uniform certification standard has the potential to dilute overall credibility by not allowing for differentiation among the more rigorous programs.

Criteria

A degree of harmonization might be achieved among international, national, and private forest certification programs if a set of minimum requirements for sustainable forest management were developed (Whiteman et al. 1999, Eba'a Atyi and Simula 2002). A common standard would have to choose common criteria and commit to system- or performance-based standards. By compressing standards, the strongest and weakest programs are naturally eliminated, even though each might have its place given different consumer preferences and compliance costs.

To comply with a system-based certification scheme, a company must demonstrate that it has a management system in place to identify, measure, and monitor its impact on the

environment and to improve environmental performance. However, the company is not required to meet any particular standard. Rather, collection of the monitoring information itself is seen as a desirable first step toward improving performance. A performance-based scheme goes further and requires the company to meet certain standards or report achievement in a quantitative way (Costa and Ibanez 2000).

Experience in the timber and forest products industry seems to indicate that a performance-based scheme is better suited for manufacturing but a system-based approach is more appropriate to the certification of forest management practices. Nevertheless, a combination of both is probably necessary.

Ecolabeling and Credibility

The diversity of ecolabels (which reflect the multitude of certification schemes) can be confusing to consumers and weaken the credibility of all labels. Consumers prefer detailed information that labels often do not provide. In addition, current label formats make it difficult to compare product attributes because they do not differentiate between plantations and natural forests or among the environmental services provided by the forests.

Information about the endorsing entities and the evaluation procedure could help bolster consumer confidence and influence consumers' selection of ecolabeled products (Rickenbach 2002, Teisl et al. 2002, Anderson and Hansen 2004a, 2004b). On the one hand, a certain level of coherency among current standards could help avoid confusion among consumers. On the other hand, consumers in different markets may hold diverse views about which environmental information is important when they make purchasing decisions. In that case, standardization could inhibit differentiation among attributes and the detailed information that consumers desire.

Certification Costs

The primary benefit to forestry companies of a common standard would be relief from overlapping compliance and certification costs. A single certification could then foster more competition, as suppliers would be free to sell to any client demanding certified products, not only the subset requiring a particular label out of many. It also could foster competition among certifying organizations, further reducing costs. However, if the common standard ends up being more rigorous than the label a forest manager would otherwise have chosen, then compliance costs could rise, meaning some forests might forgo certification.

Mutual Recognition in Practice

In the long run, market forces are likely to foster harmonization among the multiple systems. Trends include mutual recognition (a forest certified through one system could carry the product label of another), a common chain-of-custody standard, and the creation of a common certification framework that would apply to all systems (Gulbrandsen 2004).

Mutual recognition is a reciprocal agreement under which one forest certification program or body recognizes and accepts all critical components of another program as being substantially equivalent to its own scope, design, process, and output. The intent of mutual recognition is to provide a critical mass of credibly certified wood products by recognizing that different certification systems can provide substantially equivalent standards of sustainable forest management (Griffiths 2001).

A mutual recognition framework would set a high threshold for entry for participating systems while enabling the use of standards that accommodate local and regional conditions. By providing a rigorous process to differentiate credible from noncredible certification systems, mutual recognition would use market forces to provide a range of certification systems that will assure customers that their wood product purchases contribute to sustainable forest management (Griffiths 2001). Furthermore, such a framework could help prevent discrimination against any particular scheme, forest, forest owners, region, or country by providing an open market for all wood products sourced from sustainably managed forests (Kanowski et al. 2000, Griffiths 2001).

The International Forest Industry Roundtable suggested the adoption of a set of different criteria to support the adoption of an international mutual recognition framework for forest certification schemes. Table 3 below presents the themes and criteria that should be included in the proposed framework.

National governments also play an important role in the effective development and adoption of an international mutual recognition framework. Governments need to create a consistent forest and environmental policy. Any privately developed program for forest certification must be compatible with macro-level and forest-sector national policies. Governments may also regulate independent third-party certifiers by establishing minimum accreditation or licensing standards for auditors (Kanowski et al. 2000).

Table 3. Components of an International Mutual Recognition Framework as Suggested by the International Forest Industry Roundtable

<i>Theme</i>	<i>Criteria</i>
Conformity with sustainable forest management (SFM) standards and legislation	The certification system shall require conformance with a nationally (or regionally or subnationally) accepted standard for SFM that is consistent with internationally agreed sets of SFM criteria and indicators and which complies with applicable legislation, including ratified international agreements (e.g., Convention on Biodiversity).
Participation	The certification system shall be open and accessible to all interested stakeholders. The influence of all stakeholders shall be balanced, and consensus outcomes shall be sought.
Scientifically supported	The SFM standard shall be scientifically supported. Views shall be supported by knowledge or the weight of current scientific opinion.
Continual improvement	The certification system shall be responsive to new knowledge, be amenable to changed public values, and contribute to continual improvement in SFM.
Nondiscriminatory	The certification system shall be nondiscriminatory among all forest types, sizes, and ownership structures.
Repeatability, reliability, and consistency	The certification system shall ensure that the results of independent audits are repeatable and consistent.
Independence and competence	Audits and certifications shall be carried out by competent, independent third-party certification bodies and auditors who are accredited through internationally accepted procedures. All certification institutions (including those involved in forest assessment, accreditation, standards setting, and dispute resolution) shall be free from conflicts of interest.
Transparency	The certification system shall be transparent. All interests can identify and comprehend standards and institutional frameworks. Procedures and documentation shall be clear, concise, and readily available.
SFM claims	Certification procedures shall include guidelines designed to ensure all SFM claims are clear, unambiguous, substantiated, and consistent with relevant national and international laws, standards, and guidelines.

Source: Griffiths 2001.

PEFC is one of the leaders in the development and adoption of mutual recognition for various national certification programs. In an effort to establish a common certification framework, the PEFC Council has endorsed 17 national schemes to fully comply with all their standard requirements. Table 4 lists these schemes by country. Canada's CAN/CSA Z809 is now

undergoing the PEFC endorsement process. Other public and private certification schemes are also seeking PEFC recognition.⁶

Table 4. National Schemes Endorsed by PEFC

<i>Country</i>	<i>Scheme</i>	<i>Organization</i>
Australia	Australian Forest Certification Scheme	Australian Forestry Standard Limited
Austria	Austrian Forest Certification Scheme	PEFC Austria
Belgium	Belgian Forest Certification Scheme	WoodNet–Commission PEFC Belgique
Chile	CertforChile Forest Certification Corporation	CertforChile
Czech Republic	Czech Forest Certification Scheme	PEFC Czech Republic
Denmark	Danish Forest Certification Scheme	PEFC Denmark
Finland	Finnish Forest Certification Scheme	Finnish Forest Certification Council
France	French Forest Certification Scheme	PEFC France
Germany	German Forest Certification Scheme	PEFC Germany eV
Italy	Italian Forest Certification Scheme	PEFC Italy
Latvia	Latvian Forest Certification Scheme	PEFC Latvia Council
Norway	Norwegian Forest Certification Scheme and Living Forest Standard	PEFC-Norway
Portugal	Portuguese Forest Certification Scheme	Portuguese Forestry Sector Council
Spain	Spanish Forest Certification Scheme	PEFC España
Sweden	Swedish Forest Certification Scheme	Swedish PEFC Co-operative
Switzerland	Swiss “Q-Label Holz” Scheme	PEFC Switzerland and HWK-Zertifizierungsstelle
United Kingdom	U.K. Scheme for Sustainable Forest Management	PEFC U.K. Ltd.

Source: PEFC 2004b.

The PEFC Council also is working on a comprehensive International Chain of Custody Standard with requirements for verification throughout the supply chain. This new international standard would offer a common framework to allow mutual recognition among forest certification schemes operating with or without PEFC endorsement (PEFC 2004a).

The FSC criteria for recognizing equivalence of other standards are more stringent. Only standards developed by an FSC working group that follow FSC’s requirements for structure and content can be accredited by FSC (FSC 2003). By March 2004, FSC had accredited 18 national and subnational standards that comply with all FSC requirements. In an unusual case, the U.K. Woodland Assurance Standard (UKWAS) was developed by multiple stakeholders to gain public support for certified forest products in the United Kingdom. UKWAS has been recognized by the

⁶ For a full list of PEFC members and the schemes PEFC endorses, see PEFC 2004b.

two major international bodies that set certification standards, FSC and PEFC. According to Eba'a Atyi and Simula (2002), forest owners of UKWAS-certified forest can choose which certificate they prefer (FSC or PEFC).

The Sustainable Forestry Board is currently adjusting its own SFI scheme to meet PEFC criteria. This decision has been made given that the benefits of an independent SFI mutual recognition program would be limited in the long term and eventually would have to be consistent with PEFC to expand into new markets (particularly in Europe). SFI considers that the PEFC scheme has reached a dominant position internationally. Hence, it will not develop its own independent criteria and procedures for mutual recognition but leave such process to PEFC. SFI is currently pursuing endorsement by PEFC (Banzhaf 2005).

Conclusions

Several national and international forest certification schemes have been developed over the past 15 years in response to public outcry over deforestation and environmentally detrimental harvesting practices. In that time, forest certification has been widely adopted in developed countries; however, contrary to earlier goals, it has been slow to gain acceptance in developing countries. Demand for certified products in those countries is low, and costs related to certification and auditing may be prohibitive. In developed countries, despite greater market penetration of certification, there is little evidence that producers of forest products have been rewarded with higher prices. Rather, major retailers and corporate purchasers have made certification a cost of doing business.

In retrospect, these results should not be surprising. By succeeding in certifying the mass market of forest products, the industry has surpassed the creation of a niche market, in which exclusivity breeds premium prices by targeting the most environmentally conscious consumers. Thus, in the developed world, the systems have arguably achieved improved environmental management without additional government regulation at little or no apparent cost to consumers while producers have taken on the additional costs to secure markets for their products.

However, the impact of international certification programs is more ambiguous for developing-country producers, who are less able to pay for the costs of certification, face little demand at home for certified products, and see little in the way of premium prices even in export markets. The fact that some major corporate purchasers require certification may even imply fewer markets for developing-country wood and wood products. Reduced demand for exports may relieve some pressure for logging but does not improve producer practices or living standards.

The question arises as to what extent common, clearer standards could improve incentives for producers, particularly in developing countries, and what other policies might be needed. The sheer variety of certification programs has resulted in segmented markets, difficulties in maintaining credible chains of conduct, and considerable confusion to consumers. On these points, then, the harmonization of forest standards can offer benefits to both suppliers and consumers.

However, any harmonization requires some participants to make their standards more stringent and others to water theirs down. Although the easiest basis for developing a framework for a common forest certification scheme probably would be management systems, performance standards would likely have to be incorporated as well. The success of the FSC label indicates that many of those stakeholders will have expectations of performance criteria.

Harmonization could be complemented by a public awareness campaign to educate consumers and increase demand for certified forest products. Still, a tension remains between mass-marketing certification and targeting the segments in society that are willing to pay more for the claimed environmental benefits of ecolabeled products. An important research question is whether viable market demand exists to justify creating niche markets for premium certification (i.e., wood products harvested under more stringent sets of requirements) and whether the benefits of such certification could reach developing-country producers.

Meanwhile, mutual recognition is proceeding, led by PEFC. Because major retailers favor the procurement of wood products certified under a single umbrella-certification program, such as FSC, mutual recognition can broaden markets for finding suppliers and prevent discrimination against any certification program—or region. However, mutual recognition does not necessarily assure retailers and consumers that all participant forest managers meet equivalent standards. Rather, as SFI seeks endorsement by PEFC, those consumers will be assured that all participants meet criteria for management systems. FSC still requires more stringent performance measures.

The opportunity for competition among certifiers risks leading to a “race to the bottom,” because certifying to the easiest system allows access to all with mutual recognition. However, the programs as a whole have an incentive to maintain credibility, so as long as the minimum standards are appropriate and recognized by all stakeholders, competition may instead primarily help reduce certification costs to landowners. Because cost is a major barrier in developing countries, this effect could contribute to expanding the area currently certified. However, it is unlikely to be enough. To make forest certification more attractive in developing countries,

lower costs are needed; group certification and financial support from governments and international sources are possible means of reducing landowner burdens.

On the whole, it is by no means clear whether greater standardization will offer significant help developing-country producers and forests. The benefits of common standards—improved consumer credibility and prices, or lower costs—must be passed on to them. Unfortunately, it is likely that developed-country stakeholders will reap most of the benefits, as they do now. In the meantime, partial standardization may be more disadvantageous. Notably, the program that is most prevalent in developing countries is more reticent to allow mutual recognition, whereas the systems well seated in developed countries are moving toward consolidation. This trend may exacerbate issues of market access. Ultimately, however, the biggest challenges for forest management in developing countries lie beyond the scope of mass certification: poverty and insecure land tenure. Certification can make a difference in some areas, such as those offering particular products slated for export. But because the vast majority of wood is harvested for local consumers, they cannot afford to pay extra for an ecolabel, and because producers are not sufficiently secure to take a long-term land management view, large-scale impacts still seem remote.

References

- Anderson, R.C., and E.N. Hansen. 2004a. The Impact of Environmental Certification on Preferences for Wood Furniture: A Conjoint Analysis Approach. *Forest Products Journal* 54(3): 42–50.
- . 2004b. Determining Consumer Preferences for Ecolabeled Forest Products: An Experimental Approach. *Journal of Forestry* 102(4): 28–32.
- Bank of America. n.d. *Bank of America Forests Practices—Global Corporate Investment Bank Policy*. <http://www.bankofamerica.com/newsroom/presskits/view.cfm?page=climateandforests>. Accessed June 14, 2004.
- Banzhaf, William H. 2005. Personal communication. March 14, 2005.
- Bartley, T. 2003. Certifying Forests and Factories: States, Social Movements, and the Rise of Private Regulation in the Apparel and Forest Products Fields. *Politics & Society* 31(3): 433–463.
- B&Q. 2003. *Product Integrity: Timber*. Environment Fact Sheet 1. http://www.diy.com/diy/jsp/aboutbandq/social_responsibility/TIMBER.PDF. Accessed June 8, 2004.
- BOLFOR Proyecto de Manejo Forestal Sostenible. n.d. *Overview*. <http://bolfor.chemonics.net/overview.htm>. Accessed June 8, 2004.
- Costa, S., and L. Ibanez. 2000. *Forest Certification: Performance-Based Approach Versus Process-Based Approach*. Paris, France: Institut National de la Recherche Agronomique. October.
- Cubbage, F., S. Moore, J. Cox, L. Jervis, J. Edeburn, D. Richter, W. Boyette, M. Thompson, and M. Chesnutt. 2003. Forest Certification of State and University Lands in North Carolina: A Comparison. *Journal of Forestry* 101(8): 26–31.
- Eba'a Atyi, R., and M. Simula. 2002. *Forest Certification: Pending Challenges for Tropical Timber*. International Tropical Timber Organization (ITTO) Technical Series No. 19. Yokohama, Japan: ITTO. October.
- FAO (Food and Agriculture Organization of the United Nations) Asia-Pacific Forestry Commission. 2000. Seminar: Certification and Forest Product Labeling: A Review. Noosaville, Queensland, Australia, May 15–19. <http://www.fao.org/docrep/meeting/X5967E.htm>. Accessed June 5, 2004.

- Fletcher, R., M. Rickenbach, and E. Hansen. 2002. *Forest Certification in North America*. EC 1518. Corvallis, OR: Oregon State University Extension Service.
- Forest Certification Resource Center. n.d. *Comparison of Forest Certification Systems Operating in North America*. <http://www.certifiedwood.org>. Accessed July 22, 2004.
- FSC (Forest Stewardship Council). 2003. *Recognition and Collaboration*. http://www.fsc.org/keepout/en/content_areas/45/8/files/Recognition_and_Collaboration_in_the_FSC_system.pdf. Accessed March 13, 2005.
- FSC (Forest Stewardship Council)–United States. 2000. *Principles and Criteria for Forest Management*. Document 1.2. Washington, DC: FSC–United States. Revised February 2000. <http://www.certifiedwood.org/documents/FSCPrinciplesCriteria.pdf>. Accessed Nov. 3, 2004.
- Georgia-Pacific. n.d. Sustainable Forestry. In *Where We Stand*. <http://www.gp.com/enviro/strategy/stand.html>. Accessed June 7, 2004.
- Griffiths, J. (ed.). 2001. *Proposing an International Mutual Recognition Framework*. Report of the Working Group on Mutual Recognition between Credible Sustainable Forest Management Certification Systems and Standards. International Forest Industry Roundtable. http://research.yale.edu/gisf/assets/pdf/tfd/IFIR_report.pdf. Accessed March 13, 2005.
- Gulbrandsen, L.H. 2004. Overlapping Public and Private Governance: Can Forest Certification Fill the Gaps in the Global Forest Regime? *Global Environmental Politics* 4(2): 75–99.
- Home Depot. 1999. *Wood Purchasing Policy*. http://www.homedepot.com/HDUS/EN_US/corporate/corp_respon/wood_purchasing_policy.shtml. Accessed June 8, 2004.
- . 2001. *2001 Social Responsibility Report*. http://www.homedepot.com/HDUS/EN_US/corporate/corp_respon/docs/2001_report.pdf. Accessed March 20, 2005.
- International Paper. n.d. *Environmental Certification of Our Forests*. http://www.internationalpaper.com/our_world/forest_mgmt/envirocerts.asp. Accessed June 8, 2004.
- Kanowski, P., D. Sinclair, and B. Freeman. 2000. Issues in Certification. *ITTO Tropical Forest Update* 10(1): 1–5. [http://www.itto.or.jp/live/Live_Server/75/tfu.2000.01\(02-06\).e.pdf](http://www.itto.or.jp/live/Live_Server/75/tfu.2000.01(02-06).e.pdf). Accessed April 13, 2005.
- Lowe's. n.d. *Lowe's Wood Policy*. http://www.lowes.com/lkn?action=pg&p=PressReleases/wood_policy.html. Accessed Nov. 2, 2004.

- Naka, K., A.L. Hammet, and W.B. Stuart. 2000. Forest Certification: Stakeholders, Constraints and Effects. *Local Environment* 5(4): 475–481.
- Ozanne, L.K., and R.P. Vlosky. 1997. Willingness To Pay for Environmentally Certified Wood Products: A Consumer Perspective. *Forest Products Journal* 47(6): 39–48.
- . 2003. Certification from the U.S. Consumer Perspective: A Comparison from 1995 and 2000. *Forest Products Journal* 53(3): 13–21.
- PEFC (Program for the Endorsement of Forest Certification). 2004a. *New International PEFC Chain-of-Custody Standard for All Certification Systems*. http://www.pefc.org/internet/html/news/4_1154_65/5_1105_1074.htm . Accessed March 24, 2005.
- . 2004b. *PEFC Members and Schemes*. http://www.pefc.org/internet/html/members_schemes/4_1120_59.htm. Accessed June 24, 2004.
- Rametsteiner, E., and M. Simula. 2001. *Forest Certification: Forging Novel Incentives for Environment and Sustainable Forest Management*. http://www.efi.fi/attachment/f5d80ba3c1b89242106f2f97ae8e3894/8c281349464a154eea8e8433f06f9630/Proc_43.pdf. Accessed July 15, 2004.
- Rickenbach, M.G. 2002. Forest Certification of Small Ownerships: Some Practical Challenges. *Journal of Forestry* 100(9): 43–46.
- Rupert, O. 2001. *Comparative Matrix of Forest Certification Schemes*. Brussels, Belgium: Confederation of European Paper Industries. November.
- Sample, V.A., W. Price, and C.M. Mater. 2003. Certification on Public and University Lands: Evaluations of FSC and SFI by the Forest Managers. *Journal of Forestry* 101(8): 21–24.
- Sedjo, R.A., and S.K. Swallow. 2002. Voluntary Eco-Labeling and the Price Premium. *Land Economics* 87(2): 272–284.
- Soza, C. 2003. The Process of Forest Certification in the Mayan Biosphere Reserve in Petén, Guatemala. Annex 2: Forest Certification in Guatemala. In *Forest Certification and Communities: Looking Forward to the Next Decade*, edited by A. Molnar. Washington, DC: Forest Trends. http://www.forest-trends.org/documents/publications/Forest_communities_Annex2.pdf. Accessed June 15, 2004.
- Stevens, J., M. Ahmad, and S. Ruddell. 1998. Forest Products Certification: A Survey of Manufacturers. *Forest Products Journal* 48(6): 43–49.

- Teisl, M.F., A.J. Plantinga, T.G. Allen, and D. Field. 2001. Funding Forest Certification. *Choices* 7(4): 1–8. http://www.philpoirier.com/pdf/forestry_certification.pdf. Accessed June 15, 2004.
- Teisl, M.F., S. Peavey, F. Newman, J. Buono, and M. Hermann. 2002. Consumer Reactions to Environmental Labels for Forest Products: A Preliminary Look. *Forest Products Journal* 52(1): 44–50.
- U.S. EPA (Environmental Protection Agency). 1994. *Polluted Runoff (Nonpoint Source Pollution)*. EPA-841-F-94-005. Washington, DC: U.S. EPA.
- Vlosky, R.P., and L.K. Ozanne. 1998. Environmental Certification of Wood Products: The U.S. Manufacturers' Perspective. *Forest Products Journal* 48(9): 21–26.
- Wallinger, R.S. 2003. Sustainable Forestry Initiative Program. *Journal of Forestry* 101(8): 9–18.
- Whiteman, A., C. Brown, and G. Bull. 1999. Forest Product Market Developments: The Outlook for Forest Product Markets to 2010 and the Implications for Improving Management of the Global Forest Estate. Working Paper prepared for the World Bank Group Forest Policy Implementation Review and Strategy. Rome, Italy: Forestry Policy and Planning Division. July.