Forest Market Policy Issues

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Abstract

This chapter discusses environmental and economic policies and developments affecting tropical wood product markets, including those related to trade, climate, and energy.

Keywords

Tropical forest policy; Trade policy; Wood product markets; Trade restrictions; Climate and energy policies; Environmental policies

Forest Products Market Policy Issues

Introduction

The production and trade of tropical wood-based products is increasingly influenced by policy measures introduced at the international level as well as by governments and the private sector. This subchapter explores trade-related issues that have affected tropical wood-based trade, including international and regional trade agreements and trade restrictions imposed by both tropical producer and importing countries. Policies focused on climate, energy, and the environment have become more influential in recent years, and these are discussed in detail. The subchapter also considers economic stimulus policies, particularly the effectiveness of measures introduced during the 2008/2009 global economic crisis.

Market Policy Issues Affecting Tropical Wood Products

Trade-Related Policies

Trade Agreements

Regional economic cooperation, including growth in intraregional wood product trade, was a growing trend in the last decade. The global economic crisis in 2008/2009 played a role in increasing awareness in tropical producing regions (South and Southeast Asia, South America, and Africa) of the benefits of regional cooperation and the opportunities for strengthening regional linkages. These opportunities have included reshaping existing production supply chains and creating more regional demand, policy instruments such as the GSTP1, and more comprehensive and effective regional and trade investment agreements (Maplesden et al. 2013).

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1The Global System of Trade Preferences (GSTP) among developing countries is a preferential trade agreement signed on 13 April 1988 with the aim of increasing trade between developing countries in the framework of the United Nations Conference on Trade and Development. The agreement gives favored nation trading status to signatories.
Regional cooperation and integration has been assisted by bilateral and multilateral trade agreements, which have the aim of lowering trade barriers (including tariffs) between participating countries and, as a consequence, of increasing the economic integration of the participants. Multilateral trade agreements involve three or more countries who wish to regulate trade between the participating countries without discrimination; such agreements are widely considered to be the most effective way of liberalizing trade in an interdependent global economy (OECD 2014).

In the Asia-Pacific region, the Association of South East Asian Nations (ASEAN) has assisted wood industries to collaborate on issues such as illegal harvesting and trade. The ASEAN member countries are: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. ASEAN also has free trade agreements with Australia, India, Japan, New Zealand, and the Republic of Korea. The China–ASEAN free trade agreement became operational in 2010, further assisting the growth of intraregional trade in tropical wood products.

In the African region, the most significant subregion in the tropical wood product trade is the Economic Community of West African States (ECOWAS). Member countries are Benin, Burkina Faso, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Côte d’Ivoire, Liberia, Mali, the Niger, Nigeria, Senegal, Sierra Leone, and Togo. In contrast to the significant tropical wood product trade within Asia, however, intra-African trade in tropical wood products has been minimal and constrained by a number of factors, including weak infrastructure and the existence of a large informal sector, which supplies a large share of the regional market (ITTO 2010).

In South America, the Southern Common Market (MERCOSUR) is a free trade agreement between Argentina, Bolivia, Brazil, Paraguay (currently suspended), Uruguay, and Venezuela. MERCOSUR has five associate members – Chile, Bolivia, Colombia, Ecuador, and Peru – that do not enjoy full voting rights or complete access to the markets of MERCOSUR’s full members. They receive tariff reductions but are not required to impose the common external tariff that applies to full MERCOSUR members.

CITES
The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) entered into force in 1975. It monitors and regulates trade between its 180 Parties (and between Parties and non-Parties) in species listed in its three appendices. Its purpose is to ensure that international trade in specimens of wild animals and plants is legal, sustainable, and traceable. With the recent addition of 111 timber species to Appendix III, currently around 350 tree species are listed in the CITES appendices.

CITES Parties agree to implement international trade controls based on a system of permits and certificates for import, export, re-export, and introduction from the sea for species listed in three appendices.

Appendix I lists species that are currently threatened with extinction and which are, or may be, affected by trade. For these species, international commercial trade is prohibited. Several timber species, including Brazilian rosewood (Dalbergia nigra), are listed in this appendix. Wild-harvested specimens of listed taxa may not be commercially imported by any Party. Plant specimens that are artificially propagated, which could include plantation-grown wood, are treated as listed in Appendix II.

Appendix II includes “species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival.” This includes “look-alike species,” which are species, the specimens of which in trade look like specimens of species listed for conservation reasons. Commercial international trade in species in Appendix II is allowed under certain conditions (i.e., findings of legality and sustainability) and is regulated using permits and certificates. Species listed in Appendix II comprise the majority (96 %) of species listed in the CITES appendices. High-profile tropical
hardwood species listed in Appendix II include afromosia (*Pericopsis elata*), big-leaf mahogany (*Swietenia macrophylla*), and ramin (*Gonystylus* spp.). In 2013, a number of additional tropical hardwood species were included in Appendix II, including Malagasy ebony (*Diospyros* spp.), Thailand rosewood (*Dalbergia cochinchinensis*), Black rosewood (*Dalbergia retusa*), Granadillo rosewood (*Dalbergia granadillo*), Honduras rosewood (*Dalbergia stevensonii*), and Malagasy rosewood (*Dalbergia* spp.).

Appendix III contains species that are legislatively protected in at least one country that has asked other CITES Parties for assistance in controlling the trade. Species listed in this appendix represent about 1% of species listed in the three appendices. Decisions on the listing of species in appendices I and II are taken by the Conference of the Parties, which meets every 2–3 years. Any Party may unilaterally request the inclusion in Appendix III of a species for which it is a range country. CITES also allows Parties to take “stricter domestic measures” to control wildlife trade. All trade in listed species by all Parties must be recorded and reported annually to the CITES Secretariat, and this information is made available publicly in the CITES trade database. Specimens of listed species that do not enter international trade are generally not subject to CITES.

A complete list of CITES-listed tropical tree species in all appendices is available at [www.cites.org/eng/app/appendices.php](http://www.cites.org/eng/app/appendices.php). Cooney et al. (2012) provide a useful comparison of import requirements under CITES and Forest Law Enforcement, Governance and Trade (FLEGT) and related European Union (EU) legislation for timber species in trade (Fig. 1).

**Trade Restrictions Imposed by Producer Countries**

The most significant producer-country trade policies influencing the tropical wood products trade are quantitative restrictions on the export of unprocessed material and quotas on the export of specified products and wood species. Most tropical supplying countries have some type of log export ban or
<table>
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<th>Region/country</th>
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<td><strong>Asia–Pacific</strong></td>
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<td>Cambodia</td>
<td>Log export ban since 1992</td>
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<td>Indonesia</td>
<td>Log export ban. Local logging bans, particularly in East Kalimantan. Exports of plantation logs from community forests permitted. Restrictions on export of logs from plantations</td>
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| Malaysia          | Quota on the export of logs from Sarawak  
Quota on the export of logs from Sabah (only 40% of the total volume of harvested logs is permitted to be exported)  
Ban on exports logs from Peninsular Malaysia (since 1972) |
| India             | Logging ban in natural forests                                                                                                                             |
| Myanmar           | Log export ban (to be introduced 1 April 2014)                                                                                                           |
| Papua New Guinea  | Log export ban for certain species. Quotas on logs allowed to be exported, now replaced by log export duties                                           |
| Philippines       | Export bans on all native wood products with the exception of value-added products  
Log export ban on logs from natural forests, but the export of logs from plantation forests is allowed |
| Vietnam           | Ban on the export of logs and sawnwood for wood harvested in natural forests                                                                         |
| **Africa**        |                                                                                                                                                          |
| Cameroon          | Log export restrictions in the form of progressive increase in the share of annual cutting going to local processing. The export ban applies to some hardwood species (e.g., iroko, moabi, bibolo, wenge, and bubinga). Restrictions were extended to sawn boules and “clean sawn” logs in 2014 |
| Côte d’Ivoire     | Log export ban on unprocessed logs                                                                                                                       |
| Gabon             | Export ban on logs, boules, and through cut logs                                                                                                        |
| Ghana             | Log export ban. Levies imposed on export of air-dried timber for nine important species. Ban on harvesting and export of rosewood                           |
| Republic of Congo | Ban on export of logs from 13 specified companies                                                                                                       |
| **Latin America and the Caribbean** |                                                                                                                                                      |
| Brazil            | Log export ban (since 1969). Moratorium on big-leaf mahogany (*Swietenia macrophylla*) exports. Certain wood exports are subject to specific rules and require prior authorization from IBAMAA |
| Colombia          | Regulations on log exports from natural forests since 1968. Roundwood exports permitted from planted forests                                              |
| Costa Rica        | Log export ban. Export ban on roughly squared wood for certain species                                                                                 |
| Ecuador           | Log export ban, except in limited quantities for scientific and experimental purposes. Semifinished forest products exports are allowed only when domestic needs and the minimum levels of industrialization have been met. Export ban on mahogany and cedar logs |
| Guyana            | Log exports permitted only for companies holding forest concessions. A log export ban applies to andiroba (*Carapa megistocarpa*) and jatoba (*Hymenaea courbaril*). Export taxes for logs and squares revised in 2013 for specific species and products |
| Nicaragua         | In 1997, the country instituted a ban on the export of the nation most lucrative timber species – the precious hardwoods mahogany, royal cedar, and pochote. Mahogany exports are permitted for sawnwood, plywood, and veneer. Sawnwood exports require a license |
| Peru              | Total ban on the export of logs from natural forests since 1972. The export of processed big leaf mahogany (*Swietenia macrophylla*) is permitted but regulated under CITES Appendix II |

Sources: Forest Legality Alliance (2014), ITTO MIS (various issues), GFC (2012)

A Brazilian Institute of Environment and Renewable Natural Resources (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis)
restriction in place (Table 1). The motivations for introducing quantitative restrictions and controls vary from environmental (e.g., to curb deforestation and illegal logging) to social/political/economic (e.g., to encourage domestic processing and boost the development of local economies).

Export restrictions on tropical wood products have also been imposed via export taxes (also called export duties, export charges, export tariffs, fees, and export levies). There are two types of export taxes: ad valorem taxes, which tax a percentage of the value of the exports, and specific taxes, which levy a given monetary amount per unit or weight of the exported product. Export taxes can be progressive, implying a higher tax when the price of the good exported is high and a lower tax when the price is low. Export taxes can also be differential; for example, a higher tax might be charged on unprocessed exports compared with the processed version of the export, with the aim of encouraging domestic processing.

Other export restrictions in accordance with international arrangements are those associated with phytosanitary standards and quality control (see Standards and Transport in Forest Product Markets) and those imposed to counteract the “unfair” duties of an importing country (known as “countervailing measures”).

Tropical log export restrictions in many African supplying countries (particularly Gabon, Cameroon, and the Republic of the Congo) were relaxed during the 2008/2009 global economic crisis to assist domestic forest industries to improve their profitability, but sawmills closed and there was a cessation of the construction of new mills. In 2010, many of the log export restrictions were re-imposed to assist the recovery of the sawmilling and other wood-processing industries, aided by improvements in prices and demand in EU markets and by the diversion of some sawnwood exports to growing markets in India and China (Maplesden et al. 2013).

In 2011, Indonesia established a two-year moratorium on new logging and plantation concessions in 14.5 million hectares of primary forest and peat lands as part of its Reducing Emissions from Deforestation and Degradation (REDD+) program. The government of Norway jump-started the program with a billion-dollar pledge in 2010.

Log export restrictions may foster the development of downstream wood-processing industries in countries. USITC (2010) noted, however, that, in the ASEAN region, log export restrictions have tended to act as a barrier to the development of an integrated and efficient regional industry that would otherwise draw on wood at various stages of processing obtained from throughout the region.

Trade Restrictions Imposed by Consumer Countries

Trade Sanctions

At various times, consumer regions and countries have, for political reasons, imposed trade sanctions on certain tropical producer countries that have had impacts on the tropical wood product trade. The UN Security Council, for example, imposed a ban on log imports from Liberia in mid-2003, with the intention of halting the use of wood export revenues to fund illegal arms transactions. The embargo resulted in a drastic decline in tropical log exports from Liberia and forced major importers such as China and France to seek alternative supplies. Initially imposed for 10 months, the embargo was renewed for another year in 2004, despite the pleas of the Liberian transitional government. The ban was lifted in 2006 after the government of Liberia instituted a series of regulatory reforms (ITTO 2008).

Myanmar’s tropical log exports were affected by economic sanctions imposed by the EU in 2008. The sanctions were imposed in response to human rights violations in the country and affected teak logs, lumber, and other finished products originating from Myanmar, in addition to other sanctions, although the EU was not a major destination for Myanmar’s exports. The sanctions affected products imported both directly from Myanmar and indirectly from other countries (e.g., China). NGOs claimed that the sanctions stimulated illegal cross-border trade to importers such as China and India, with a high percentage of
Myanmar wood being re-exported in the global market (Forest Trends 2011). The sanctions were lifted in 2012.

**Antidumping and Countervailing Duties**

Antidumping investigations and the imposition of antidumping (also known as antisubsidy) duties, instigated by importing countries, have affected trade in tropical wood products. According to World Trade Organization rules, antidumping duties may be imposed after an investigation finds that a foreign country subsidizes its exports, injuring domestic producers in the importing country. A country may launch its own investigation and decide to charge extra duties, provided such additional duties are in accordance with GATT Article VI and the GATT Agreement on Subsidies and Countervailing Measures.

Because countries can rule domestically on whether domestic industries are in danger and whether foreign countries subsidize export products, the institutional process surrounding the investigation and determinations has significant impacts beyond the countervailing measures. Antidumping duties target goods that are being sold below fair value, while countervailing measures retaliate for unfair government subsidies.

In recent years, a number of high-profile antidumping investigations have been carried out on tropical wood products of Chinese origin. China is now the most important country importer of tropical raw material and a major re-exporter of secondary manufactured wood products of tropical origin (see Forest Product Market Trends). In 2003, for example, the EU found that China had dumped okoumé (an African species) plywood in the period 1999–2003 and imposed antidumping duties on okoumé plywood of Chinese origin. In 2007, the European Federation of the Plywood Industry (FEIC) requested the European Commission (EC) to extend the existing antidumping duties on okoumé plywood to include plywood with other red-faced tropical surface veneers – including the Asian species bintangor, red canarium, and kedondong – originating from China. Although the FEIC withdrew its request in December 2007 and the EC subsequently dropped its review of tariffs on Chinese plywood, the 1-year delay in implementing a decision caused uncertainty and a slackening of demand for Chinese plywood (ITTO 2008).

The price competitiveness of a number of tropical wood products from China (and other countries) has also been a major concern for the US hardwood industry. The US Department of Commerce and the US International Trade Commission (USITC) have conducted a number of formal investigations of the legality of wood product supplies from China.

China’s exports of wooden furniture (a proportion of which contains tropical wood products) have been affected by antidumping duties imposed on wooden bedroom furniture from China in 2004. These duties were extended in December 2010 after pressure from US manufacturers who had been affected by a constrained market. In response to the duties, China’s furniture industry diverted some of its production to items not subject to antidumping measures, such as seats with wooden frames, which now account for about 37% of wooden furniture exports.

More recent antidumping and antisubsidy investigations include determinations in 2011 on 169 Chinese multilayer wood-flooring companies. The US Department of Commerce imposed antidumping duties of up to 58.84%, and countervailing duties of up to 26.73% on all but one of the supplying companies. The investigations are continuing.

US tropical hardwood plywood imports from China have been subject to on-going antidumping and countervailing duty investigations conducted by the US Department of Commerce. A coalition of US plywood manufacturers initiated an antidumping and countervailing duty investigation in 2012, alleging that Chinese imports are sold in the US at below cost and are subsidized by the Government of China. The case was dismissed in 2013, with the USITC determining negative injury to the US plywood industry.
At various times, Malaysian plywood exports have also been subject to antidumping investigations, and currently there are preliminary antidumping duties on Malaysian plywood which have been imposed by the Republic of Korea.

Legislation to Remove Illegal Wood from Trade
Recognizing the potential environmental, economic, and social consequences of illegal logging and associated trade, laws have been enacted in consumer countries with the aim of eliminating, from supply chains, illegally harvested wood and products derived from such wood. These trade-based measures have escalated the requirement for certified legal and sustainable wood products and are already having significant impacts on tropical wood product suppliers, particularly in areas and regions where the risk of illegal logging is judged to be high.

Numerous policy measures have been implemented to improve forest law enforcement and governance and counter the trade in illegally harvested wood, the most important of which are summarized here (Fig. 2).

In 2003, the EU adopted the FLEGT Action Plan with the objectives of increasing the capacity of producer countries to control illegal logging and reducing the trade in illegal wood products between these countries and the EU. The FLEGT Action Plan provides a number of measures to exclude illegal wood from EU markets, improve the supply of legal wood, and increase the demand for responsible wood products. Sustainable consumption and green consumerism have become dominant market drivers in EU markets, with emphasis on ensuring supplies of legal and/or sustainable wood products.

Voluntary Partnership Agreements (VPAs) with wood-exporting countries have been important elements in the EU’s strategy to combat illegal logging. VPAs include the design of legality assurance systems to identify, monitor, and license legally produced wood and ensure that only legal wood is exported to the EU. So far, six countries have concluded VPAs with the EU: Cameroon, the Central African Republic, the Republic of the Congo, Gabon and Liberia in Africa, and Indonesia in Asia. Nine other VPAs are being negotiated – with Côte d’Ivoire, the Democratic Republic of the Congo, Gabon, Guyana, Honduras, Lao PDR, Malaysia, Thailand, and Vietnam.

The EU Timber Regulation, legislation arising from the EU FLEGT Action Plan, is a response to demands from a number of EU member states and various stakeholder groups to prohibit the sale of illegal wood in the EU and to the desire of FLEGT partner countries for a “level playing field” for wood trade.
with the EU. The EU Timber Regulation came into force in March 2013. It puts a traceability obligation on traders throughout the supply chain to identify the operators or traders who have supplied the wood and wood products and, where applicable, the traders to whom they have supplied wood and wood products and requires companies to implement a “due diligence” system to minimize the risk that the wood they sell was harvested illegally. The regulation covers a broad range of wood products, including solid wood products, flooring, plywood, and pulp and paper. The regulation applies to both imported and domestically produced wood and wood products. It is legally binding on all 27 EU member states, which are responsible for laying down effective, proportionate, and dissuasive penalties and for enforcing the regulation (EC 2014).

The EU Timber Regulation is causing concern among EU stakeholders about how the law will be applied and the associated administrative and bureaucratic burdens it may impose. The regulation is also worrying tropical exporters, who perceive that it will impose an additional cost burden that will reduce their competitiveness. Another important issue concerns the ability to enforce the regulation in relation to the complexities of the composite wood products trade, particularly identifying the precise origin of the components of composite wood materials (Oliver 2013). However, proponents of the EU Timber Regulation suggest that it will increase demand for wood products, set a level playing field, increase awareness of legal and sustainable wood, and lead to responsible purchasing by stakeholders. The EU Timber Regulation is expanding the demand for certified legal and sustainable wood products and VPA-licensed wood products, with certification becoming a central issue in the marketing of tropical wood products in EU markets.

Amendments to the US Lacey Act in 2008 extended its application to include illegally harvested wood. The amendment makes it illegal to import, export, transport, sell, receive, acquire, or purchase, in interstate or foreign commerce, any plants or products made from plants – with limited exceptions – that were harvested or taken in violation of a domestic or foreign law. The Act gives the government the power to fine and jail individuals and companies that import wood products that have been harvested, transported, or sold in violation of the laws of the country in which the wood was originally harvested (USDA 2013).

An important principle of the Lacey Act is that the burden of proof is on the US government to demonstrate that the violators knew or should have known of the underlying violation. The amended Act includes new import declaration requirements for information on the tree species of imported wood products and the name of the country in which the wood was harvested. It does not, however, require the importer to have all the information needed to be certain of the legal origin of the wood. Instead, the importer must collect information that, depending on what it suggests about the origin of the wood, should prompt further inquiry by the importer to assure its legality.

Although, to date, the US government has prosecuted only a small number of importers, the high-profile case involving the Gibson Guitar Corporation of Nashville, Tennessee, demonstrated that demand-side forest legality policies can be enforced by national governments. Proponents of the legislation suggest that the Lacey Act and other demand-side policies have already changed practices in the tropics, putting political and financial pressures on producer countries to enact their own strict laws against illegal logging (Elias 2012). It has also been suggested that the Lacey Act has the potential to change ongoing investment choices and that the expectation of investors that illegally logged products will not be saleable in the US will encourage appropriate practices (Elias 2012).

In 2012, Australia introduced legislation to promote the trade in legally harvested wood by restricting imports of illegally logged wood into Australia. The Australian Illegal Logging Act 2012 came into effect on 28 November 2012: within two years of that date, regulations will outline the due-diligence process for importers and processors of domestic wood regarding certain wood products. In 2013, an amendment was
introduced to the law which specifies due-diligence requirements for furniture and pulp and paper products (Australian Government 2014).

Climate and Energy Policies

**REDD+**

Deforestation and forest degradation are the largest sources of greenhouse gas (GHG) emissions in most tropical wood-producing countries. Clearing tropical forests also destroys globally important carbon sinks that are currently sequestering CO₂ from the atmosphere and are critical for future climate stabilization (Fig. 3).

REDD+ is an international mechanism framed by international negotiations on climate change to provide economic assistance to developing countries to reduce GHG emissions by protecting and restoring their forest carbon stocks. The concept of REDD+ is that developed countries will provide financial incentives to developing countries to reduce their deforestation, conserve and sustainably manage their permanent forest estates, and increase forest cover through reforestation and afforestation. Thus, REDD+ has the potential to simultaneously mitigate climate change (through carbon capture and storage), conserve biodiversity, protect other ecosystem goods and services, increase income for forest owners and managers, and help address issues of forest governance.

REDD+ has evolved from an earlier formulation known simply as “REDD.” REDD+ includes, as eligible activities, the sustainable management of forests and the enhancement of forest stocks, in addition to reducing deforestation and forest degradation, which were the activities originally covered by REDD. The evolution arose in response to early criticisms that REDD excluded countries with low deforestation rates and did not recognize the positive contributions of sustainable forest management. Thus, REDD would have been limited to compensating countries according to their reduction of emissions against a baseline, and those with projected higher future deforestation or forest degradation rates would have qualified for higher compensation for preventing such deforestation or forest degradation. REDD+ acknowledges that climate benefits can arise not only from avoiding negative changes (i.e., deforestation and degradation) but also from enhancing positive changes in the form of forest conservation, sustainable forest management, and the enhancement of forest carbon stocks, although the issue of whether forest plantations should be part of REDD+ has been contentious.
The potential effects of REDD+ on wood products markets and trade are difficult to assess because REDD+ is still under negotiation within the official process of the United Nations Framework Convention on Climate Change (UNFCCC). The REDD+ mechanism remains unclear; for example, it has been proposed that market-based funding mechanisms such as carbon trading, and private-sector involvement, could be introduced. A market-based approach would entail converting the emission reductions (or maintained/enhanced carbon stocks) achieved in REDD+ projects into credits, which would then be traded in a carbon market to generate funds. The alternative fund-based approach would involve providing funds directly to developing countries, without carbon market transactions. Currently, most payments are being provided directly to countries for readiness and policy reforms, rather than for proven emission reductions (Angelsen et al. 2012).

Management strategies and policies such as REDD+ may have unintentional consequences for forest sectors in countries that are not REDD+ targets, most notably through market linkages. By definition, the success of a policy effort like REDD+ would lead to significant reductions in deforestation and forest degradation in participating developing countries and may also result in the reclassification of some forest areas from production to conservation and a consequent reduction in the area of forest subject to wood-harvesting, with the net result of reducing the overall wood supply. This, in turn, may result in increased pressure to further exploit other forests. This would be an example of leakage – the displacement of deforestation or forest degradation from protected sites to other locations (Jonsson et al. 2012).

Environment-Related Policies

**Green Building Initiatives and Life Cycle Assessment**

Initiatives to reduce the energy footprint of the construction sector and its CO₂ emissions have escalated, particularly in consumer countries. These initiatives have been driven by mounting concerns about energy security, global warming, and the risk of climate change. Compared with many other industry sectors, opportunities to reduce energy consumption and emissions in the construction sector tend to be regarded as easier to achieve and more substantial.

Energy efficiency standards in construction are often linked to green building programs that attempt to provide broader measures of the environmental performance of whole buildings. These include Leadership in Energy and Environmental Design (LEED), Green Globes, IgCC, and CalGreen in North America, BREEM in the United Kingdom (UK), CASBEE in Japan, HQE in France, and DGNB in Germany. The International Green Construction Code (IgCC) was issued in 2012 and addresses commercial construction and requirements for various building materials. LEED is the best known and most significant green building rating and certification program in North America, although a major criticism of it is that it currently only rewards wood certified by the Forest Stewardship Council (FSC). Other programs, such as IgCC and CalGreen, recognize all the major third-party certification schemes.

A number of other countries have set new policies to promote green building and are reviewing their building regulations in order to remove barriers to the use of renewable building materials. Many of these new policies reference the use of certified wood and life cycle assessments (LCAs) in building design and materials selection. A considerable amount of work is required, however, to ensure that energy efficiency standards give appropriate credit to the environmental attributes of wood products, including tropical wood products, and that the industry fully understands and has access to reliable objective research on the LCAs of tropical wood products.

**Public-Sector Procurement Policies**

Public-sector procurement of wood-based products from sustainable sources grew substantially in the period 1999–2005. It has subsided more recently, however, due in part to a change in focus on the
inclusion of forests and sustainable forest management in international efforts to address climate change and a corresponding diminished emphasis on public policies and initiatives related to procurement (Martin and Ghazali 2013).

Notwithstanding this trend, a number of national governments worldwide have introduced some form of wood procurement policy, including Australia, Belgium, Brazil, China, Denmark, the EU, France, Germany, Ghana, Japan, Mexico, the Netherlands, New Zealand, Norway, the UK, and Vietnam. In most developed countries, governments account for a significant proportion (an estimated 15–20%) of wood purchases and can therefore exert substantial influence on markets. Concerned consumers, retailers, investors, communities, governments, and other groups increasingly want assurances that by buying and consuming wood products they are making positive social and environmental contributions. Rather than merely seeking to avoid wood from illegal sources, several government authorities have moved rapidly to require that wood is certified as sustainably produced. There are significant differences in the detailed legality and sustainability requirements of government procurement policies, however, and this is a concern for wood producers that supply several markets (Simula 2010).

Martin and Ghazali (2013) noted recent moves to include paper in broader purchasing policies on wood products, giving emphasis to recycling and waste reduction. In implementation, many public wood procurement policies have been folded into a broader set of “green” or environmental guidelines or requirements addressing, for example, energy efficiency, waste reduction and recovery, and water conservation. Similarly, policies on wood procurement by most private-sector firms have been integrated into broader codes of ethics on the environment and forests. Many procurement policies accept third-party systems of verification as sufficient for assurance of legality or forest sustainability. There continues to be significant divergence in policy implementation—in both the public and private sectors—on which forest certification systems should be accepted as sufficient.

Environmental Product Declarations
Tropical wood product exports to the EU and US markets will also need to comply with market requirements for information on the environmental credentials of products. Until recently, the development of environmental product declarations (EPDs) was limited to organizations associated with the 14,000 series of standards of the International Organization for Standardization (ISO) and the government agencies of several EU countries. Now, however, the EPD concept is moving into the mainstream. EPDs are standard reports of environmental impacts linked to product or services; they are based on LCAs and enable the comparison of environmental performance. In the USA, the American Wood Council has made EPDs available for specific North American wood product categories (American Wood Council 2014). The EU Construction Product Regulation (CPR) and European standard (EN 15804) set mandatory information and indicators for EPDs in the European construction industry.

Economic Stimulus-Related Policies
Demand for primary and secondary wood-based products, including those of tropical origin, is a derived demand arising from residential, nonresidential, and public construction activity and consumer wealth and spending. Government policies aimed at stimulating general economic growth usually have positive effects on housing and construction activity, which are significant end-use sectors for wood products, including those of tropical origin.

The global economic crisis, which had its most severe effects in 2009, resulted in declining economic growth in many countries that consume tropical wood products, with marked impacts on disposable incomes, consumer demand, and housing starts. In tropical producer countries, small- and medium-sized enterprises (SMEs), which dominate tropical wood-processing industries, were exposed by the crisis because of limited access to finance, weak negotiating power, and a limited ability to respond quickly
when markets recovered. Many tropical producer countries were cushioned from the full economic shock of the global economic crisis, however, because they had adopted stronger economic frameworks in the past. This was particularly true of Asian countries that had regulated their financial sectors in the aftermath of the Asian economic crisis at the end of the 1990s. A large proportion of Asia’s fiscal stimulus packages during the global economic crisis were directed at public infrastructure projects, which helped offset declines in residential and nonresidential building activity. A detailed account of the impacts on the tropical forest sector of economic stimulus policies introduced during the global economic crisis is given in Maplesden et al. (2013).

Although China’s wood-processing sector was negatively affected by a decline in demand for its value-added wood product exports in 2008 and 2009, aggressive economic stimulus measures targeting both the general economy and the forest and wood-based industries contributed to a recovery in wood product exports and to significant growth in the domestic market for wood-based products. The economy was boosted by domestic fiscal stimulus packages to encourage residential purchases of single-family homes and apartments. Export tariff rebates were adjusted to support export-oriented businesses, including secondary processed wood products of tropical origin. As a result of these measures, China’s exports were able to quickly capitalize on a recovery in export markets in 2010, and the stimulus to domestic consumption resulted in a rise in domestic demand, which acted as a buffer to commodity exporters in Asia, including tropical wood exporters.

The Chinese government provided value-added-tax rebates for forest industry enterprises, including rebates for products produced with wood residues and small-diameter logs, and reduced-interest-rate lending to forest industries, with the costs met by the government budget. Assistance measures were also aimed at moving up the value chain, product, and market restructuring and encouraging external capital flows via venture capital, private equity, and initial public offerings. The restructuring and upgrading of China’s wood products manufacturing industry in response to the crisis improved the sector’s competitiveness, giving Chinese manufacturers a comparative advantage over many other producing countries that were unable to provide significant, targeted manufacturing and export assistance measures. This generated opportunities for Chinese exporters when export markets began to recover in 2010.

**Wood Energy**

Increased fossil fuel prices and concern over energy security and climate change have been the main drivers in the development of alternative and renewable energy sources. Seventy percent of all biomass energy is consumed in developing countries, mainly for cooking and heating, with a smaller share going to power generation. Traditional biomass for energy includes fuelwood, charcoal, manure, and crop residues. These are important sources of energy in many developing countries and provide the bulk of energy supply for many dispersed and poor rural populations in tropical producer countries. However, wood energy is also becoming increasingly important in many developed countries, especially in Europe.

Wood is the predominant biomass type, with more than half of global roundwood removals being used for energy. From the perspective of climate-change mitigation, the best sources of wood-based bioenergy are coproducts from the manufacturing of solid wood products.

**Wood Pellets**

Wood pellets are the predominant product in the international wood-energy trade, with the EU dominating both production and import demand (UNECE 2013). Demand for wood pellets and other biomass energy in consumer markets is determined by national energy policies, especially targets for renewables, and the cost-competitiveness of alternative energy sources, particularly oil, coal, and natural gas. Cocchi et al. (2011) noted that the rapid growth of the wood-energy market has been driven by various factors related to different market segments (e.g., pellets for co-firing, combined heat and power and district
heating, and residential heating). However, markets are still dependent (albeit to differing extents) on the availability of direct and indirect support measures, with wood-energy consumption still dominated by regulatory policies, fiscal incentives, and public financing.

EU bioenergy and wood-pellet demand has been driven by EU targets to meet at least 20 % of its total primary energy supply from renewable energy by 2020. Beyond 2020, the EC Energy Roadmap 2050 suggests a share of around 30 % by 2030 (EC 2013). This target “aims to provide certainty and reduce regulatory risk in order to spur investment and create more demand for efficient low-carbon technologies while promoting research, development and innovation.” The main exporters of wood pellets are Canada, the US, the Russian Federation, and the Baltic states, although some pellet producers in the tropics – such as several South American producers – have the potential to become pellet exporters.

Demand for wood pellets has also grown in Asia, primarily in China, Japan, and the Republic of Korea. Japan is the largest importer of wood pellets in Asia, mostly for use in co-firing electricity generation plants. Although biomass plays a relatively small role in China’s energy generation, it is important in some niches. China has an established wood-pellet market, but most wood pellets are supplied domestically. Through its Renewable Energy Law, China has established a legal framework for promoting renewable energy – a combination of mandated targets, market-based incentives, and direct subsidies. Renewable biomass energy-generating capacity is targeted to reach 13GW by 2015 and 30GW by 2030 (up from 4GW in 2012). These ambitious targets are expected to increase demand, and they may create opportunities for wood-pellet exporters in Asia. The Republic of Korea’s policy is to generate 6.1 % of its energy from renewables by 2020 and 11.5 % by 2030 (with strict penalties for a lack of compliance); this is also expected to boost Asian demand for wood pellets, projected to be in the range of 5–10 million tonnes per year by 2020 (Cocchi et al. 2011).

A key issue in the future trading of wood pellets, particularly for tropical wood producers, will be developments in requirements for the certification of forests and wood used to produce the pellets.

Certified Forest Products
Consumer markets are becoming increasingly sensitive about the environmental credentials of wood products. Markets for certified wood products have been driven by government, and private-sector policies aimed at providing market-driven incentives for forest retention and the responsible harvesting of forest resources. Market drivers include private-sector environmental purchasing goals, public-sector procurement policies, and, importantly, the development of government trade legislation designed to remove illegal wood from trade, including the Lacey Act and the EU Timber Regulation. The EU Timber Regulation’s due-diligence system recognizes the Programme for the Endorsement of Forest Certification (PEFC) and FSC schemes. The Lacey Act also recognizes the PEFC and the FSC, in addition to an alternative approach developed by the American Hardwood Export Council for its members (Fig. 4).

The number of forest and chain-of-custody2 certification schemes has surged in recent years, but demand is strong in only a limited number of markets, mostly the EU and, to a lesser extent, the USA. Certification and eco-labeling have benefited from the development of green building standards such as LEED. Green building initiatives continue to move from voluntary programs towards integration into formal building codes. The IgCC, for example, encourages the use of certified wood products and recognizes all the major certification schemes.

Measures that encourage or require certification are having a dramatic impact on the tropical wood product trade, and many export-oriented countries and companies are moving towards adapting their

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2Chain-of-custody forest certification is a mechanism for tracking certified material from the forest to the final product to ensure that the wood, wood fiber, or non-wood forest product contained in the product or product line can be traced back to certified forests.
forest management systems to meet these market demands. Nevertheless, the proportion of global certified roundwood production derived from the tropics remains small (Table 2). In 2013, over 95% of the certified roundwood supply was from Western Europe and North America, and only 1.5% was from tropical producer regions.

Significant fluctuations in the certified forest area – in which previously certified forests fail certification audits – are relatively common in the tropics. In the Republic of the Congo, for example, the area of FSC-certified forest declined by about 40% in April 2013 (UNECE 2013).

Malaysia is the largest supplier of certified tropical wood products and has its own voluntary national certification scheme operated by the Malaysian Timber Certification Council. In 2009, the Malaysian Timber Certification Standard (MTCS) became the first tropical wood certification scheme in the Asia-Pacific region to be endorsed by the PEFC. The Indonesian Forestry Certification Cooperation (IFCC-KSK) is also seeking PEFC endorsement to improve market access for Indonesian certified wood products.

### Table 2  Supply of roundwood from certified resources in tropical supplying regions and globally, 2011–2013

<table>
<thead>
<tr>
<th></th>
<th>Total forest area (million ha)</th>
<th>Certified forest area (million ha)</th>
<th>Estimated industrial roundwood production from certified forest (million m$^3$)</th>
<th>Estimated share of total roundwood production from certified forest (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>674.4</td>
<td>7.6</td>
<td>7.3</td>
<td>7.5</td>
</tr>
<tr>
<td>Latin America</td>
<td>955.6</td>
<td>16.1</td>
<td>14.7</td>
<td>15.7</td>
</tr>
<tr>
<td>Asia</td>
<td>592.5</td>
<td>8.1</td>
<td>9.5</td>
<td>12.5</td>
</tr>
<tr>
<td>World</td>
<td>4033.1</td>
<td>374.9</td>
<td>385.5</td>
<td>417.0</td>
</tr>
</tbody>
</table>

Source: UNECE 2013
Carbon Markets
A survey of the state of forest carbon markets (Forest Trends 2014) estimated the overall market value of forest carbon offset demand at US$216 million in 2012. Almost all offsets (99 %) were sold to buyers in developed regions; EU-based corporations were the largest source of demand for forest carbon offsets in 2012, purchasing over half of all traded offsets. EU buyers transacted the largest proportion of offsets produced by projects in Africa and Asia.

Voluntary Carbon Offsetting
Most forest carbon offset value is derived from voluntary offset markets. The majority (71 %) of forest carbon offsets transacted in 2012 were sold to voluntary buyers, while the remainder was sought by businesses complying with or preparing for regulation. The private sector had the largest pool of buyers and was responsible for about 70 % of offset transactions in 2012. The most common driver of offset purchases in 2012 was resale to voluntary or future compliance end users. Voluntary end users were motivated primarily by corporate social responsibility commitments and a desire to “demonstrate climate leadership” within their industries in the absence of strong national climate policies (Forest Trends 2014).

REDD+ Finance
REDD+ projects were the dominant form of carbon market activity in both Latin America (80 %) and Africa (70 %), as large REDD+ projects came onstream in both regions in recent years. The majority of carbon-managed land area is associated with REDD+ projects, with 17 million ha under management for REDD+ in 2013. The public sector has invested significant sums of money in several countries with potential for REDD+ development, although public-sector finance has so far been limited to preparing for the next phase of REDD+. The first REDD+ credits entered the voluntary carbon market in 2011. REDD+ projects and carbon markets are challenged by complex regulations, a lack of financing, and incompatibility between regional and national markets. At the most recent UNFCCC climate negotiations (in Warsaw, Poland, in November 2013), no agreement was reached on how to achieve the goal of mobilizing US$100 billion for climate-change mitigation measures annually from 2020.

Compliance Forest Carbon Offsets
The Clean Development Mechanism (CDM), which encourages project-based emissions-reduction activities in developing countries, is the world’s largest compliance offset program. It was initiated under the Kyoto Protocol, an international agreement adopted in 1997 with the aim of fighting global warming by reducing greenhouse gas (GHG) concentrations in the atmosphere. The Kyoto Protocol entered into force in 2005 and required 37 industrialized countries – known as Annex I countries – to reduce their GHG emissions to 5 % below 1990 levels between 2008 and 2012. A number of countries have established national ETSs (carbon emissions trading schemes), including China, Japan, and South Korea, and the US State of California also has an ETS. The EU’s ETS has been hampered by the stagnation of the EU economy and concerns about the effectiveness of the ETS. ETS participants can sell international credits through the CDM, but, over time, the development of national-based ETSs may diminish the importance of the CDM.

The voluntary carbon market is not considered sufficient to drive significant growth in carbon markets (Forest Trends 2014). Future growth is expected, therefore, to hinge on regulatory drivers, particularly progress in international climate negotiations towards a legally binding climate treaty, particularly legally binding financial commitments for REDD+ and new market mechanisms for carbon trading. No decisions on establishing a future carbon market was made at the UNFCCC negotiations in Warsaw in November 2013.
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