



An iguana lies on a forest log, Trinidad and Tobago.  
Photo: J. Blaser

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## Survey coverage

The present survey covers the same 33 ITTO producer member countries (referred to as ITTO producers in the figures and tables below) as were covered in the 2005 survey. The full report is divided into two main parts: an overview (which, with minor editing, constitutes this summary), and detailed profiles of all ITTO producer member countries, arranged according to region as follows:

**Africa**—Cameroon, Central African Republic (CAR), Democratic Republic of the Congo (DRC), Republic of the Congo (abbreviated to Congo), Côte d’Ivoire, Gabon, Ghana, Liberia, Nigeria and Togo.

**Asia and the Pacific**—Cambodia, Fiji, India, Indonesia, Malaysia, Myanmar, Philippines, Papua New Guinea (PNG), Thailand and Vanuatu.

**Latin America and the Caribbean**—Bolivia (Plurinational State of, abbreviated to Bolivia), Brazil, Colombia, Ecuador, Guatemala, Guyana, Honduras, Mexico, Panama, Peru, Suriname, Trinidad and Tobago, and Venezuela.

The year of reporting for all data is nominally 2010—that is, five years after the nominal reporting year, 2005, used in ITTO (2006)—but the actual year to which data refer varies according to availability. Appendices to the full report contain data on tropical forest area, summary tables on a range of parameters for ITTO producer member countries, notes on methodology, a list of tropical timber species and their common names by country, and a tabulation of industrial roundwood production versus area of production forest for ITTO producer member countries.

## ITTO forests in a global setting

Almost all of the world’s closed tropical forests are found in 65 tropical countries, of which 33 are members of ITTO. The forests of these 65 countries cover about 1.66 billion hectares, and ITTO member countries account for 1.42 billion hectares (85%) of this (Table 1; Figure 1). Of the 65 countries, the top seven in terms of total forest area are

ITTO producer member countries—Brazil (520 million hectares), DRC (154 million hectares), Indonesia (94 million hectares), India and Peru (68 million hectares), Mexico (65 million hectares) and Colombia (60 million hectares). The reported area of forest categorized by the Food and Agriculture Organization of the United Nations (FAO 2010) as ‘primary forest’ amounts to about 887 million hectares, of which ITTO producer member countries contain 96%. Brazil has an estimated primary forest area of 477 million hectares, which is more than 50% of primary tropical forests worldwide.

## Definitions

In a survey of this scope, which relies on such a wide range of sources (see below), clear definitions are essential. The following are definitions of the most important terms used in this survey.

### Forest

The definition of forest used by FAO is applied here. The definition is:

Land spanning more than 0.5 hectares with trees higher than five metres and a canopy cover of more than 10%, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use (FAO 2010).

### Tropical forest

Consistent with the International Tropical Timber Agreement, 1994, ITTO (2011) defines tropical forest as forest lying between the tropics of Cancer and Capricorn (so forests at higher altitudes within the tropics that effectively are temperate forest types are still ‘tropical’). Several producer countries—Brazil, India, Mexico and Myanmar—have significant areas of forest outside the tropics. In ITTO (2006) an attempt was made to distinguish tropical from non-tropical forests but it was not possible to do so from the available data for India. In the present survey, however, an attempt has been made to do so. This posed certain difficulties in comparing the results of the two surveys for India because in many cases the parameters being measured were different.

Figure 1 Tropical forested countries and ITTO members

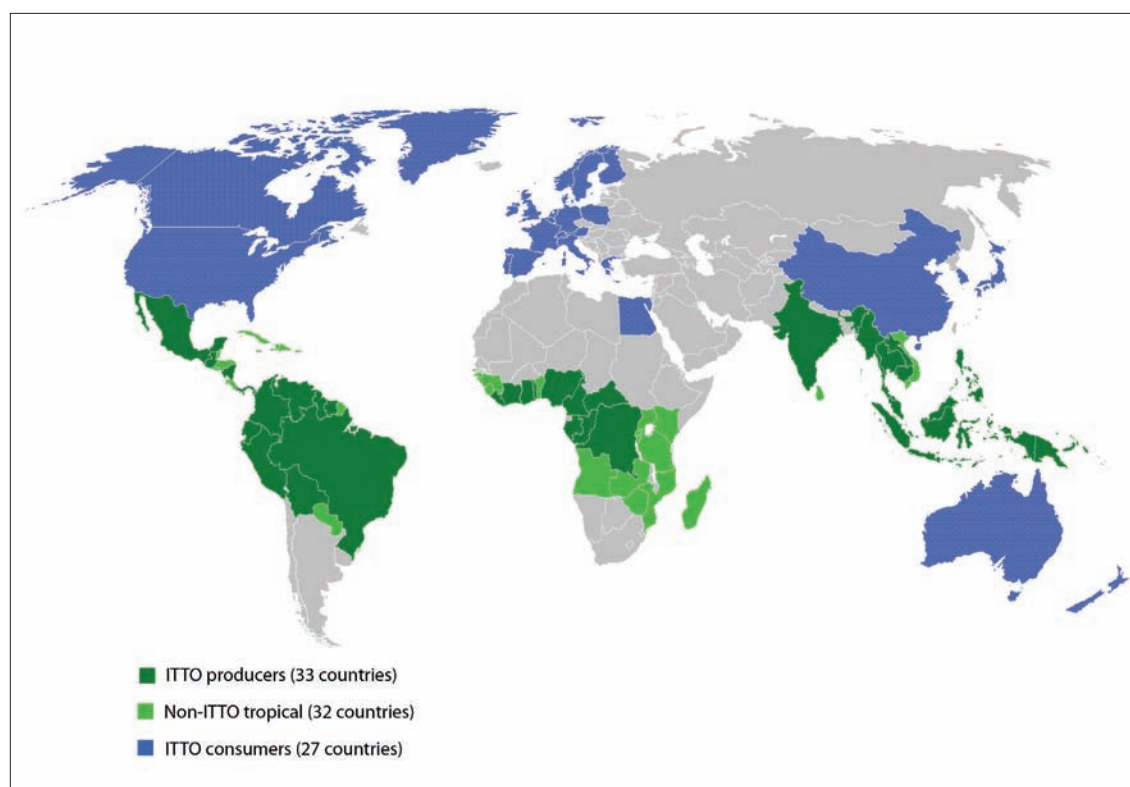


Table 1 Global tropical forest area, by region

Region (number of countries)	Total forest area (million ha)	% of forests in ITTO producer countries	Primary forest (million ha)	% of primary forests in ITTO producer countries
<b>Tropical Africa (26)</b>	<b>440</b>	<b>61</b>	<b>102</b>	<b>98</b>
ITTO (10)	270		100	
Other (16)	170		2	
<b>Tropical Asia and the Pacific (16)</b>	<b>317</b>	<b>89</b>	<b>108</b>	<b>97</b>
ITTO (10)	282		104	
Other (6)	35		3	
<b>Tropical Latin America and the Caribbean (23)</b>	<b>907</b>	<b>96</b>	<b>678</b>	<b>96</b>
ITTO (13)	868		647	
Other (10)	38		30	
<b>Global total (65)</b>	<b>1664</b>	<b>85</b>	<b>887</b>	<b>96</b>
Total ITTO producers (33)	1421		851	
Total non-ITTO (32)	243		35	

Note: Totals might not tally due to rounding. 'Other' refers to non-ITTO member countries with significant closed forests in the tropics. A few countries in Africa with at least part of their territories in the tropics – i.e. Sudan, Ethiopia, Namibia and the countries of the Sahel belt – are not counted here. While the open savannas of these countries are of significant value for many ecological, economic and social reasons, their low productivity means that they are not major contributors to the tropical forest products and services that are ITTO's main interest (see also definition of permanent forest estate below).

Source: FAO (2010). Note, however, that FAO (2010) does not provide estimates of primary forests for several countries, including the large forest area of DRC, in which cases ITTO estimates are used.

### **Primary forest**

The term primary forest is used in some country profiles and also in this overview. Much of the data on primary forest has been obtained from FAO (2010), which defines it as:

naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.

### **Closed forest**

The definition of closed forest used in this survey is forest whose tree canopy covers 60% or more of the ground surface, when viewed from above. In the case of India the percentage cover used was 40%, since data for 60% canopy cover was unavailable for India's tropical forests.

### **Sustainable forest management**

ITTO (2005) defined sustainable forest management (SFM) as:

the process of managing permanent forest land to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction in its inherent values and future productivity and without undue undesirable effects on the physical and social environment.

To elaborate the definition and assist the monitoring, assessment and reporting of SFM, ITTO has developed a set of key criteria and indicators (C&I) for the sustainable management of tropical forests. These comprise the essential elements of SFM and are consistent with the seven thematic elements of SFM specified in the Non-Legally Binding Instrument on All Types of Forest (United Nations General Assembly 2007). Along with the definition of SFM given above, they constitute the basis for the assessment of SFM presented in this summary and in the full report.

The definition of SFM given here was not formulated for application in forests in totally protected areas, where forest goods are usually not extracted. Nevertheless, it can still be applied in such forests with the understanding that the extraction of 'desired goods' (both timber and non-timber forest products—NTFPs) should be zero, or close to zero, for SFM to be achieved.

### **Permanent forest estate**

ITTO policies stress the need for countries to establish a permanent forest estate (PFE), which is defined in ITTO (2005) as:

Land, whether public or private, secured by law and kept under permanent forest cover. This includes land for the production of timber and other forest products, for the protection of soil and water, and for the conservation of biological diversity, as well as land intended to fulfil a combination of these functions.

In ITTO (2011) and this summary, two types of PFE are distinguished: production and protection. The production PFE includes both natural forest and planted forest, quantified separately. Figures given for production PFE are usually relatively dense forest and therefore large areas of savanna (even though they are counted as forest under FAO's definition of forest if canopy cover is 10% or greater) are often not included in the production PFE. In general, then, production PFE comprises those tropical forests and planted forests (except those established solely for protective purposes) deemed to be accorded 'permanent' status. In general, protection PFE is considered to be the area of forest inside designated protected areas, where timber production and other forms of resource exploitation such as mining and commercial hunting are not legal land uses.

### **Planted forest**

The term 'planted forest' is preferred to 'plantations', but the two are used interchangeably here. ITTO (2005) defined planted forest as:

A forest stand that has been established by planting or seeding.

FAO (2010) used the following definition:

Forest predominantly composed of trees established through planting and/or deliberate seeding.

These two definitions are essentially complementary and constitute the definition of planted forests used here.

In some countries the distinction between planted forest and natural forest is blurred, especially where indigenous species have been planted. In some cases, such forests are regarded as 'semi-natural' forests; some of these are treated as natural forests, as indicated in the individual country profiles presented in the full report.

### **Sources of data**

The country profiles (ITTO 2011) were compiled from many sources. The most important sources, however, were reports of the ITTO producer member countries as requested by the International Tropical Timber Council in the format devised for the ITTO C&I. The ITTO C&I have been revised periodically in the light of experience and developments in international forest policy. The previous survey (ITTO 2006) used as a source of information questionnaires submitted by ITTO producer member governments based on a set of C&I published in 1998. ITTO (2005) presented a revision of the C&I, reducing the number of indicators and simplifying the reporting format. ITTO producer member countries were requested to use this revised set of C&I as a basis for submitting information to ITTO for the present survey.

Other datasets were also used. These included FAO's Global Forest Resources Assessment 2010, country reports submitted to the World Bank's Forest Carbon Partnership Facility, and others such as web-based datasets maintained by the International Union for Conservation of Nature



(IUCN), the United Nations Environment Programme-World Conservation Monitoring Centre (UNEP-WCMC) and ITTO member countries. Other useful sources included diagnostic missions conducted by ITTO at the request of members, ITTO field projects, national-level training workshops on the application of the ITTO C&I, field visits, investigative reports published by non-governmental organizations (NGOs), and personal communications with organizations and individuals with specialist knowledge. Sources varied by country, and are identified in each country profile. Some countries provided maps of ecological zones, forest types or other relevant parameters. Where they were of sufficient resolution, these maps are presented in the country profiles in their original languages.

The data obtained from such diverse sources are necessarily highly variable, which often posed considerable difficulties in interpretation. These are discussed later.

### **Estimating the area under SFM**

In order to assess progress in the achievement of SFM, ITTO (2011) estimates the area of natural forest in each ITTO producer member country that can reasonably be thought to be under management that is largely consistent with SFM. These estimates have been derived for the natural-forest production PFE by adding the forest management units that have been independently certified or in which progress towards certification is being made; have fully developed, long-term (ten years or more) forest management plans with firm information that these plans are being implemented effectively; are considered as model forest units and information is available on the quality of management; and/or are community-based units with secure tenure for which the quality of management is known to be of a high standard.

Since trends are more useful than one-off measurements in determining progress towards sustainability, the assessment of SFM requires the long-term monitoring of forest values, but there are very few tropical production forests in which this is carried out. For some forests, therefore, information on changes in the quality of management is anecdotal or unpublished.

In most cases the estimates should be considered conservative, since they include only those forest areas where information about the quality of forest management was available. It is possible that other forest areas are also being managed well, but information was not available to identify these. The resulting estimates of SFM presented in ITTO (2011) and summarized here give the area of forests being managed in a way that is unlikely to cause long-term, undue harm to the biological, physical and social environments (as consistent with the definition of SFM).

Where data allowed, estimates were also made of the extent of protection PFE under management considered consistent



Many people living in Amazon have a high dependency on forests for their livelihoods.  
*Photo: J. McAlpine*

with SFM. These estimates were derived from information provided by countries and from other (mostly unpublished) sources. Areas included are those with secure boundaries and a management plan (usually fully in place, but in some instances still being developed), that are generally considered in the country and by other observers to be well managed, and that are not under significant threat from destructive agents.

### **Recent developments**

There has been considerable change in the global policy environment in the five years since the preparation of ITTO's report on the status of tropical forest management in 2005 (ITTO 2006). Some of these changes have had, or are likely to have, a significant effect on efforts to promote SFM in the tropics.

#### **REDD+**

A concept that was only nascent in debates on tropical forests in 2005 is that of REDD (reduced emissions from deforestation and forest degradation) and its more evolved form, REDD+. REDD+ is part of a broader development agenda that particularly addresses the role of tropical forests in climate-change mitigation and adaptation. The term has been defined in the framework of the climate-change negotiations of the United Nations Framework Convention on Climate Change (UNFCCC) as "policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" (UNFCCC 2010). REDD+ has developed since 2008 as a major new policy tool in tropical forests and has the potential to provide substantial new and additional funding for the sustainable management of tropical forests.

REDD+ focuses on the capacity of forests, especially in the tropics, to capture and store carbon. Forest carbon occurs in living and dead above-ground biomass, litter, below-ground biomass (roots) and the organic soil (collectively, 'carbon pools'). In most closed tropical forests, living biomass is by far the most important component of the carbon stock (although there are exceptions, such as heath forests on poor podsol soils and, in particular, peat swamp forests). Carbon may accumulate rapidly in young planted forests or in recently harvested forest stands but is mostly lost on harvesting, unless retained in the form of wood products. Primary forests often have the largest accumulation of carbon in their biomass but they tend to sequester little new carbon. A sustainably managed production forest is carbon-neutral in the long term—that is, there is no long-term net emission or sequestration of carbon.

Forests sequester and store more carbon than most other terrestrial ecosystems and could play an important role in mitigating climate change. When forests are cleared or degraded, however, their stored carbon is released into the atmosphere as carbon dioxide (CO<sub>2</sub>) and other greenhouse gases (GHGs; such as methane). Tropical deforestation is estimated to have released in the order of 1–2 billion tonnes of carbon per year over the past 20 years, with estimates of the contribution to global GHG emissions ranging up to 20% (e.g. Houghton 2005). There are no estimates of counteracting sequestration. The largest source of GHG emissions in most tropical countries is deforestation and forest degradation. In Africa, for example, deforestation accounts for nearly 70% of total emissions (FAO 2005). Moreover, clearing tropical forests further destroys globally important carbon sinks that are currently sequestering CO<sub>2</sub> from the atmosphere and are critical to future climate stabilization.

The aim of REDD+ is to provide financial incentives to help tropical countries voluntarily reduce national deforestation, conserve and sustainably manage their permanent forest estates, and increase forest cover through reforestation and afforestation. Thus, REDD+ could 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.

The operationalization of REDD+ will require accurate monitoring and reporting; forest management activities included in REDD+ schemes are likely to be subject to high levels of scrutiny and accountability at the international level. Concepts such as PFE and SFM are likely to be adapted for use in REDD+ schemes. In the full report, each country profile includes information on forest vulnerability to climate change and the country's potential to address the challenges and opportunities for tropical forests stemming from an international climate-change regime.

### **Vulnerability of forests to climate change**

Climate change and climate variability<sup>1</sup> could be among the most serious threats to sustainable development, with potential adverse impacts on natural resources, physical infrastructure, human health, food security and economic activity. Forests and rural landscapes in the tropics may be particularly vulnerable to the effects of climate variability, for example extreme weather events such as droughts (and associated wildfires), flooding

and storms. At the same time, forests have the capability to reduce both environmental and social vulnerability.

In many tropical countries the climate appears to be changing. Recent data (as presented in ITTO 2011) provide evidence of, for example, increasing temperatures and prolonged dry periods in some regions, and increased rainfall and more frequent tropical storms in others. In Mexico, there has been an increase in mean annual temperature of 0.6 °C in the past four decades. In Peru, average annual temperature has increased by 0.3 °C in the last 50 years. In Ghana, average annual temperature has increased by 1.0 °C since 1960, thus damaging the integrity of forest ecosystems. Adaptive approaches to forest management will become increasingly important in the face of climate change. Regardless of the pace of such change, healthy forests maintained under SFM will be better able to cope than those weakened and/or degraded by over-exploitation.

### **Rise of local stakeholders**

In many countries, not only in the tropics, forest management has often taken a 'top-down' approach, whereby a central forest administration has supervised the harvesting and management of large areas of forest. In recent years, however, people living closer to the forest, including Indigenous communities, have begun to express, at the national and international levels, their strong desire for more control over local resources. This trend has been strengthened in the United Nations with the adoption, in 2007, of the Declaration on Rights of Indigenous Peoples. Among other things, this declaration:

- States that Indigenous peoples have the right "to the recognition, observance and enforcement of treaties" concluded with states or their successors.
- Prohibits discrimination against Indigenous peoples.
- Promotes the full and effective participation of Indigenous peoples in all matters that concern them.
- Declares that states should consult and cooperate in good faith with Indigenous peoples in order to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them.

The effects of this rise of local stakeholders vary. At the international level, the increased influence of Indigenous peoples is having an effect in shaping policies, especially in climate-change related bodies such as the UNFCCC, the Forest Carbon Partnership Facility and the REDD+ Partnership. In Latin America, there has been a significant transfer of forest ownership from the state to Indigenous and local communities. In Asia a similar if less significant trend has been observed, but there has been less change in Africa (ITTO & RRI 2009). In some instances there has been increased tension at the local and national levels over rights to land and resources.

1 Climate change refers to long-term changes of climatic parameters, such as temperature, while climate variability refers to short-term changes and extreme weather conditions, such as droughts and increased frequency or intensity of storms.



The rise of local stakeholders has highlighted the limitations of what has been termed the ‘big-conservation’ model, whereby biodiversity conservation is achieved through the creation of large protected areas, often without accommodating the traditional ownership attached to, or the use made of, those areas by Indigenous and local people. In recent years there has been a strengthening of the view that a big-conservation approach to forest protection can be counterproductive where Indigenous people and local communities have customary land-rights claims over those forests. At the international level and in many countries, including some in the tropics, efforts are being made to strengthen the participation of Indigenous and local people in policy debates and decisions and to reform land tenure, including forest tenure.

### Ecosystem services

The role of tropical forests in the provision of ecosystem services, such as catchment protection, biodiversity conservation and carbon sequestration, is increasingly being recognized. Markets to facilitate payments for such services have been created in a number of countries and also internationally. At the international level, the volume and value of payments is still low, but, as discussed above in the context of REDD+, there is substantial potential for an increase, especially for carbon sequestration.

### Tropical timber trade

The tropical timber trade faces increasing competition from non-tropical timber and a range of substitute products such as aluminium, plastics and steel. Moreover, some export markets are increasingly requiring evidence that imported timber is legal and, in some cases, that it has been produced in well-managed forests or is certified as sustainably produced. In some countries, especially in Africa, these demands appear to be having an effect on forest management.

Figure 2 shows that official timber (industrial roundwood or log) production was more-or-less stable in the 16 years from 1995 to 2010 in each of the three tropical regions, with declines in production in natural forests in some countries offset by increases in production from planted forests. Figure 3 shows charts of regional price indices derived by combining data for species tracked in ITTO’s *Annual Review and Assessment of the World Timber Situation* (ITTO 2010). The charts show that despite the cyclical nature of tropical timber commodity markets, most products have experienced modest price increases over the past decade. African and Asian logs (both up by over 60% in real terms since January 2000, an average increase of about 5% per year) were the best performers, due to continuing demand from countries such as China and India and supply restrictions (including export bans) in several exporting countries. African and Latin American sawnwood prices have risen by over 40% during the period (averaging about 3.5% per year), while Asian prices remained at 2000 levels at

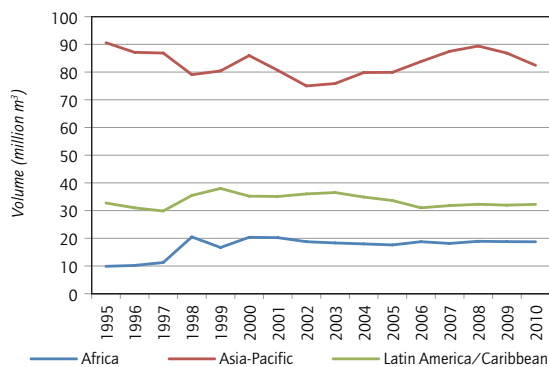


A woman collects seeds from *Madhuca* trees in an Indian dry teak forest. Photo: J. Blaser

the end of 2010. Asian plywood prices were up by around 20% from 2000 levels at the end of 2010 (an annual increase of less than 2%), while Latin American plywood prices rose by around 15%. Even the average annual increase in log prices identified above barely kept pace with inflation in most exporting countries. The global financial crisis led to significantly lower prices for most tropical timber products in the second half of 2008 (although it had little apparent impact on overall timber production), and pre-crisis prices had generally not been attained by December 2010.

Tropical plywood exports, once a mainstay of the sector in several countries, have declined dramatically since the 1990s (Figure 4). Overall, many tropical countries are concerned that their natural-forest-based timber sectors are in decline, with key export markets turning away from natural tropical timber, supply dwindling, and prices stagnant or rising only slowly.

Figure 2 Tropical timber production, by region, 1995–2010



Note: Data reflect official production statistics from most countries.

Source: ITTO (2010).

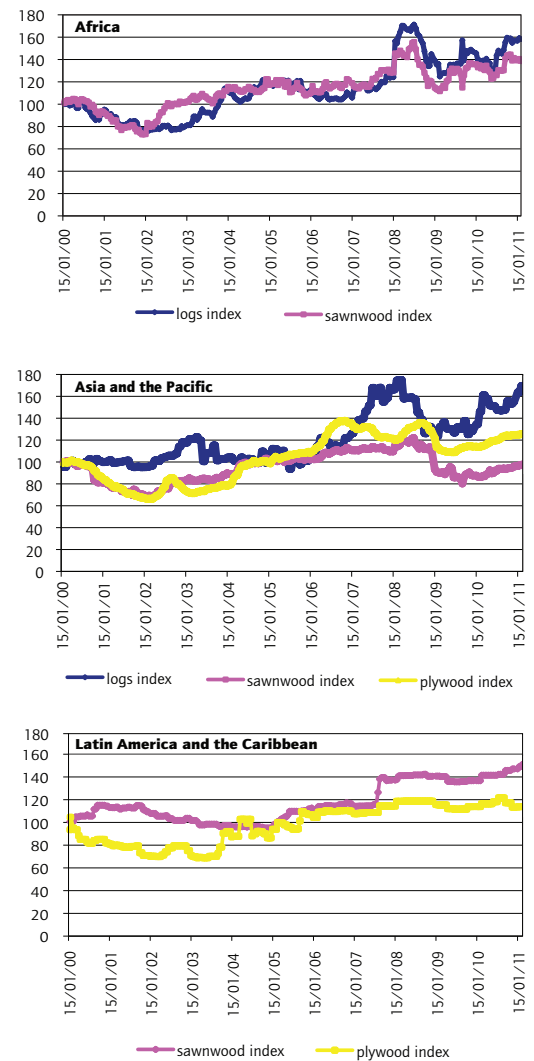
Nevertheless, the tropical timber sector also has opportunities to consolidate its position by moving towards SFM and by improving marketing and the use of innovative wood technologies. Some governments and industry segments believe that a move towards the production of certified, higher-value products would capitalize on an emerging 'green economy' and help to secure a viable future for the natural-forest-based tropical timber sector.

### Measures to combat illegal timber trade

A number of consumer markets are becoming increasingly sensitive about the environmental credentials of timber products. New trade legislation, procurement policies and buyer preferences for legality-verified wood (as a minimum) are being developed and enforced. In 2008, the United States passed legislation (the Lacey Act) that makes it a criminal offence to import or trade in timber products that have been harvested illegally. The Government of Japan has adopted a public purchasing policy whereby only legally produced timber products may be procured for government projects. The European Union has passed legislation that requires all entities placing timber products on the European Union market to implement management systems that provide assurance that such products have been produced legally. In addition, several European Union member states have adopted public procurement policies that demand legally or sustainably produced timber, and the European Commission has issued guidelines for green public procurement that recommend legally produced timber as a minimum requirement.

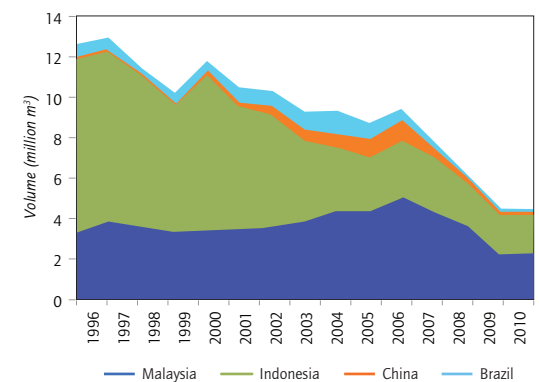
Such measures could have a dramatic impact on the tropical timber trade, and many export-oriented companies and countries are moving to adapt their management systems to meet these market demands. To assist such moves, the European Union is providing, through its Forest Law Enforcement, Governance and Trade Action Plan, technical assistance to governments, industry and NGOs to improve forest governance and the production and trade of legal timber products. In some cases this assistance is being provided on the basis of 'voluntary partnership agreements' (VPAs) between the European Union and timber-exporting countries, which, once entered into, become legally binding on both parties, committing them to trading only legal timber. Under VPAs, exporting countries develop systems to verify the legality of their timber exports to the European Union. The European Union and its member states provide support to help implement those systems. Other organizations are also helping tropical countries to address forest governance and timber legality through a range of measures. ITTO, for example, is assisting its member countries through several national-level projects and through its Tropical Forest Law Enforcement and Trade thematic program.

Figure 3 Tropical timber price indices, 2000–2010 (Jan 2000 = 100)



Source: ITTO (2010).

Figure 4 Aggregate tropical plywood exports, major countries, 1996-2010



Source: ITTO (2010).