

# Latin America and the Caribbean

**L**atin America and the Caribbean, consisting of 47 countries and areas (Figure 26), accounts for 22 percent of the global forest area, 14 percent of the global land area and 7 percent of the world's population (Figure 27). The region contains the world's largest contiguous block of tropical moist forest – the Amazon Basin.

## DRIVERS OF CHANGE

### Demographics

The population in the region is projected to increase from more than 450 million in 2005 to 540 million by 2020 (Figure 28). Population density is low, averaging 25 people per square kilometre in 2006, although this figure is dominated by South America, with 21 people per square kilometre. In Central America and in the Caribbean, there are 79 and 179 people per square kilometre, respectively. Population density in the region is expected to exceed 30 people per square kilometre by 2020 (UN, 2008d). The most populous country in the region, Brazil, which accounts for 41 percent of the region's population, has a density of only 22 people per square kilometre, while at the other extreme Bermuda has 1 280 people per square kilometre.

The urban population makes up 78 percent of the total population and is expected to reach 83 percent by 2020. Fourteen percent of the urban population resides in one of four megacities (of 10 million inhabitants or more). Many South American countries encourage settlement in frontier areas to counter urbanization and attendant social and economic problems (UN, 2008d).

### Economy

Almost all countries in the region are in the middle-income bracket and growing rapidly, although growth is uneven in many countries (Figure 29). While per capita income is high in comparison with other developing regions (with several countries exceeding US\$5 000 per year), income remains unevenly distributed. In some countries, the richest one-tenth of the population receive nearly 50 percent of the total income and the poorest one-tenth less than 2 percent.

Globalization will continue to drive change in the region. Important influences are bilateral and multilateral trade agreements and the growing investment and trade linkages with the emerging Asian economies, particularly China and India. Given the export-driven industrialization policies, continued global demand for agriculture, livestock, forest products and, increasingly, biofuel will intensify the pressure on forests.

Increasing emphasis on export-led growth implies that economic performance will be influenced by changes in global markets and competitiveness. Liberalization policies have led to substantial increases in investments, boosting

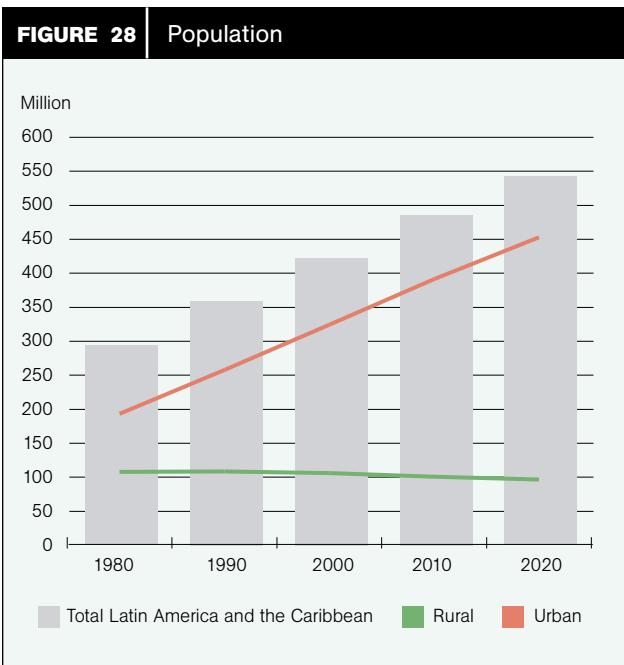
**FIGURE 26** Subregional breakdown used in this report



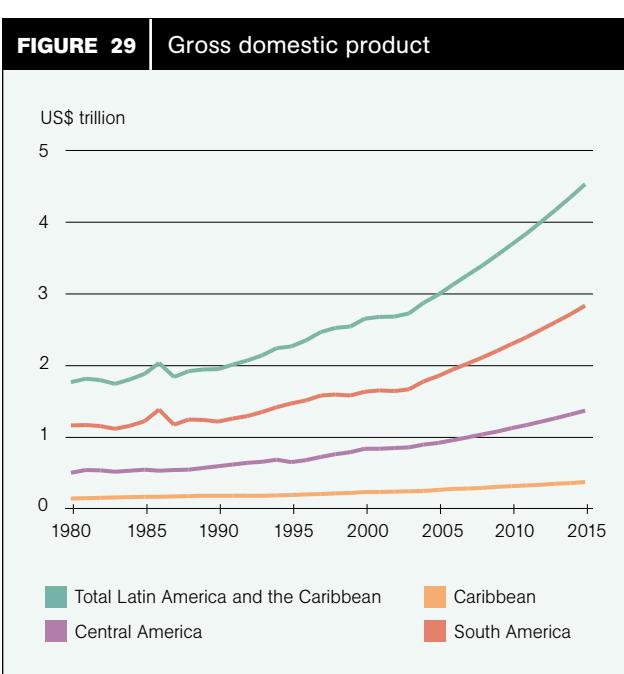
**NOTE:** See Annex Table 1 for list of countries and areas by subregion.

growth rates. Forecasts suggest that economic growth will remain high (World Bank, 2007a; UN, 2008b), but changes in global markets and growing competition from emerging Asian economies could alter the trend.

With rapid development of the manufacturing and services sectors, agriculture's share in GDP (only 7 percent in 2005) and employment has decreased in most countries. However, while the viability of small-scale agriculture has declined with import liberalization, large-scale export-focused commercial agriculture, including livestock, has expanded impressively (e.g. soybeans, biofuel crops, meat, fruits, vegetables and cut flowers) (World Bank, 2007b)



SOURCE: UN, 2008a.



SOURCES: Based on UN, 2008b; World Bank, 2007a.

and is responsible for most of the region's deforestation (Figure 30).

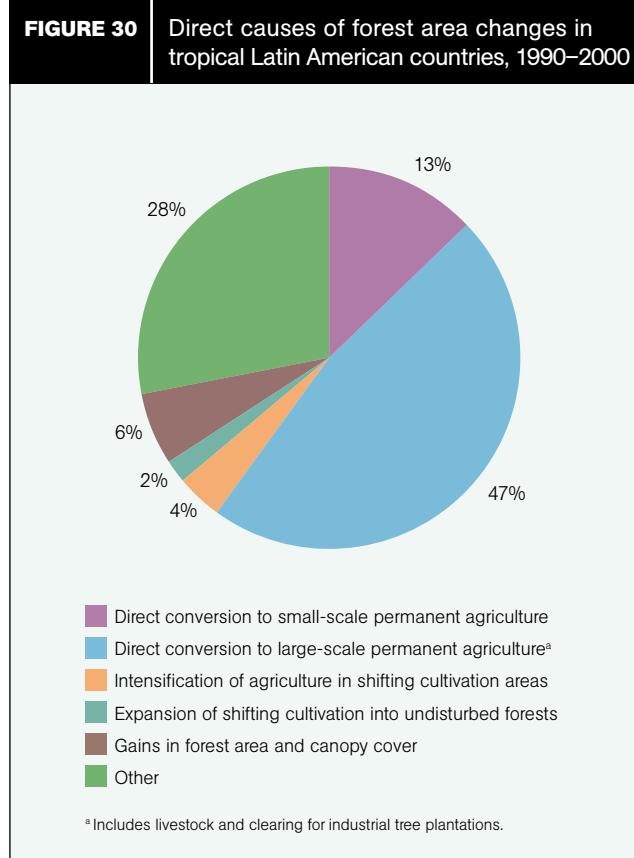
While the region's resource-rich countries are increasingly linked to the rest of the world as producers of industrial goods and primary commodities, others with high population densities and limited resources are witnessing a different kind of globalization, largely linked to the provision of services (e.g. tourism).

### Policies and institutions

In the past two decades, democratically elected governments have largely replaced authoritarian regimes in the region. Political changes have not significantly affected broad policies, which commonly pursue growth with varying emphasis on redistribution.

A pluralistic institutional environment has emerged with government, the private sector and civil-society organizations having an important role in forest resource management. Of particular interest to forestry are:

- decentralization, particularly recognition of the rights of local and indigenous communities to manage natural resources (Box 14);
- greater private investment in managing natural and planted forests;
- substantial incentives contributing to the rapid growth of planted forests, including low-interest loans and tax breaks;



SOURCE: FAO, 2001.

### BOX 14 Indigenous community forest ownership

In the past two decades, some countries have granted legal ownership of forest to indigenous communities: Bolivia, 12 million hectares; Brazil, 103 million hectares; Colombia, 27 million hectares; Ecuador, 4.5 million hectares; and Guyana, 1.4 million hectares of land including forests.

While ownership gives the communities secure rights to sustainable use of forest resources, disputes over ownership (sometimes violent) and lack of enforcement of rules and regulations have allowed illegal occupation and logging in vast areas of these forests.

SOURCE: ITTO, 2006.

- the growing role of local, national and international civil-society organizations in forest issues, including rights for indigenous communities, forest certification and combating illegal logging and forest clearance – with special focus on Amazon forests owing to their global significance for biodiversity conservation and climate change mitigation.

### Science and technology

Although most countries in the region spend less than 0.5 percent of GDP on R&D, investments in R&D are increasing. Brazil, the regional leader, spends 1 percent of its GDP on R&D (still below the international average of 2–3 percent) and has established a legal framework for investing in science and technology (the Innovation Act of 2004). Funding arrangements for science and technology have improved, with particular efforts to link research institutions with industry (de Brito Cruz and de Mello, 2006).

Research areas of particular interest to forestry in the region include information and communication technologies, remote-sensing technology to monitor forest area changes, productivity-enhancing technologies for planted forests, precision logging systems and biofuel technologies (especially cellulosic biofuel). Brazil is already a global leader in sugar-based ethanol production.

### OVERALL SCENARIO

Countries in the region are likely to follow two broad patterns of development:

- Natural-resource-dependent economic development: Countries with low population densities and substantial forest resources will take advantage of the increasing global demand for food, fuel and fibre. The main challenge will be determining the trade-offs between the different options. While there

will be significant efforts to conserve resources, the emphasis on immediate economic gains through large-scale expansion of production of food, fuel and fibre is likely to dominate in the short term.

- Shift from dependence on natural resources: More densely populated and relatively resource-poor countries will emphasize human-resource-based development. Urbanization and emerging alternative sources of income (including remittances from workers abroad) could help to reduce land pressures. The economic viability of small farms will continue to decline, resulting in less-intensive cultivation or even abandonment. Increasing income will also result in greater willingness to improve the environment.

## OUTLOOK

### Forest area

In countries with relatively high forest cover and in the early stages of industrialization, forests are highly vulnerable. Between 1990 and 2005, the region lost almost 64 million hectares, or 7 percent, of its forest area (Table 14). The region accounted for more than one-third of annual global forest area loss from 2000 to 2005.

All South American countries registered a net forest loss between 2000 and 2005 except Chile and Uruguay, which had positive trends because of large-scale industrial plantation programmes. With the increasing global demand for food, fuel and fibre, those forest-rich countries in South America that remain dependent on natural resources will continue to lose forests to large-scale industrial agriculture and cattle ranching as long as these remain competitive. New planted forests for industrial uses, especially in Argentina, Uruguay and potentially Colombia, may partially offset the loss of natural forests, although not in ecological terms.

In most Central American countries, net forest loss declined from 2000 to 2005 in comparison with the previous decade, with Costa Rica achieving a net increase in forest area. However, in percentage terms, Central

America has had one of the highest rates of forest loss of any subregion in the world, exceeding 1 percent per year from 2000 to 2005. This rate is expected to decline as small-scale agriculture becomes uneconomic, with abandonment of marginal farmlands, increasing opportunities for alternative sources of income and growing urbanization. Several countries in the subregion will witness stabilization and recovery in their forest area.

The Caribbean registered a small increase in forest area between 2000 and 2005, mainly in Cuba. Trade liberalization, which has made traditional agricultural exports such as sugar and bananas uncompetitive, is resulting in abandonment of agricultural land and reversion to secondary forest (Eckelmann, 2005). Furthermore, greater emphasis is being given to protecting the natural environment in support of the growing tourism industry (Box 15). Thus, forest area is expected to remain stable or to expand in most Caribbean countries.

### Forest management

Although the role of natural forests in wood production is declining with the rise of plantation forestry, they remain an important source of timber in some countries. Natural production forests are largely managed through long-term

BOX 15	Tourism in the Caribbean
<p>The Caribbean accounts for 5.1 percent of total global demand for tourism. Tourism contributes 16.5 percent to the subregion's gross domestic product and its contribution is predicted to remain stable until at least 2014. Tourism directly employs 15 percent of the total population and indirectly supports close to half of the population. Given the dependence on coastal zones for attracting visitors, global warming and natural disasters such as hurricanes are increasingly drawing attention to environmental conservation issues.</p> <p><b>SOURCE:</b> Griffin, 2007.</p>	

TABLE 14

### Forest area: extent and change

Subregion	Area (1 000 ha)			Annual change (1 000 ha)		Annual change rate (%)	
	1990	2000	2005	1990–2000	2000–2005	1990–2000	2000–2005
Caribbean	5 350	5 706	5 974	36	54	0.65	0.92
Central America	27 639	23 837	22 411	-380	-285	-1.47	-1.23
South America	890 818	852 796	831 540	-3 802	-4 251	-0.44	-0.50
<b>Total Latin America and the Caribbean</b>	<b>923 807</b>	<b>882 339</b>	<b>859 925</b>	<b>-4 147</b>	<b>-4 483</b>	<b>-0.46</b>	<b>-0.51</b>
<b>World</b>	<b>4 077 291</b>	<b>3 988 610</b>	<b>3 952 025</b>	<b>-8 868</b>	<b>-7 317</b>	<b>-0.22</b>	<b>-0.18</b>

**NOTE:** Data presented are subject to rounding.

**SOURCE:** FAO, 2006a.

private concessions of up to 200 000 ha in Bolivia, Guyana and Suriname; medium-sized concessions in Guatemala, Peru and the Bolivarian Republic of Venezuela; and small-scale concessions in Colombia, Ecuador, Honduras and Trinidad and Tobago (ITTO, 2006). In Brazil, nearly all production has been in private forests, but the Law on the Management of Public Forests for Sustainable Production approved in 2005, and now beginning to be put into practice, opens up national forests in the Amazon for logging concessions; the intention is to encourage sustainable management and help to avoid illegal occupation and logging (Box 16).

Selective logging is the primary focus of most concession management in the region, with little attention to postharvest silviculture and unregulated harvesting leading to degradation. Obstacles to sustainable management of the region's natural forests for wood production include:

- scarce adoption of reduced-impact logging because of weak incentives;
- limited area of forests certified (Box 17) because of the high costs and absence of a price premium, especially with the availability of low-priced illegally procured timber;

BOX 17	Forest certification
In 2007, Latin America and the Caribbean had about 12 million hectares of certified forests, or about 4 percent of all certified forests in the world. Although the certified area represented only 1.2 percent of the region's forests, this was a significant increase from 0.4 percent in 2002. Almost 80 percent was certified by the Forest Stewardship Council, and the rest under national systems: CERFLOR (Brazil) and CERTFOR (Chile), which is affiliated with the Programme for the Endorsement of Forest Certification. Brazil's CERFLOR has separate standards for natural and planted forests.	

**SOURCE:** ITTO, 2008.

- ownership disputes from overlapping land tenure and illegitimate titles encouraging illegal logging and land conversion, especially in the Amazon;
- diseconomies of scale for small community-managed concessions, especially those remote from markets;
- preponderance of the informal sector (especially illegal logging and wood-processing units).

Considering the conflicting demands, multiple-use management of natural forests continues to be a complex challenge. The difficulties will discourage long-term private investments, and most logging will continue to be done by short-term investors.

Latin America and the Caribbean has about 12.5 million hectares of planted forests. This is only 5 percent of the global planted forest area (FAO, 2006b), but the region is emerging as a leader in high-productivity plantation forestry. Argentina, Brazil, Chile and Uruguay account for about 78 percent of the planted forests in the region. Plantation development, driven by the private sector, is supported by favourable government policies and financial incentives. These include partial reimbursement of costs, tax breaks and low-interest loans for small owners (Box 18). These factors have made South America a destination for investments by both regional and global pulp and paper producers and recently by North American investors, including timber investment management organizations (TIMOs).

Key features of plantation forestry in the region include:

- investment in productivity-enhancing technologies, especially clonal propagation, achieving productivity of more than 50 m<sup>3</sup> per hectare per year in some cases;
- use of intensively managed short-rotation species such as *Eucalyptus* spp., radiata pine (*Pinus radiata*), loblolly pine (*Pinus taeda*) and southern yellow pine (*Pinus elliottii*);
- integration of plantation management with wood processing, especially pulp and paper and panel production.

BOX 16	Brazilian forest concessions
<p>The Law on the Management of Public Forests for Sustainable Production outlines the allocation of timber concessions in Brazil's federal forests. Salient features of the law include:</p> <ul style="list-style-type: none"> <li>• creation of the Brazilian Forest Service;</li> <li>• establishment of the National Forest Development Fund;</li> <li>• allocation of forest concessions through a transparent and open bidding process;</li> <li>• preference given to non-profit organizations, communities and non-governmental organizations;</li> <li>• allocation of 20 percent of concession revenues to the Brazilian Forest Service and the Brazilian Institute of Environment and Renewable Natural Resources.</li> </ul> <p>The emphasis is on safeguarding environmental, social and economic values. Bids are judged on price only after demonstration that operations will cause the least environmental impact, generate the largest direct social benefits and add the most value to products and services in the concession area.</p> <p>Private logging concessions are expected to cover 13 million hectares within the next decade, eventually expanding to about 50 million hectares.</p> <p><b>SOURCES:</b> Schulze, Grogan and Vidal, 2007; Tomaselli and Sarre, 2005.</p>	

Current projections suggest an increase in the area of planted forests in the region from 12.5 million hectares in 2006 to 17.3 million hectares in 2020 (see Box 31 on page 63).

Availability of suitable land and a favourable investment climate will enable the region (primarily South America) to maintain its competitive advantage in plantation forestry. As a high proportion of production is geared to global markets, the future of plantation forestry will depend on global demand, especially for pulp and paper, panel products and biofuel feedstock. A possible increase in transportation costs could be a major concern, especially if wood products are destined to meet the demand from the emerging Asian economies.

### Wood products: production, consumption and trade

Industrial wood production, while not significant in Central America or the Caribbean, is increasing rapidly in South America, especially because of plantation

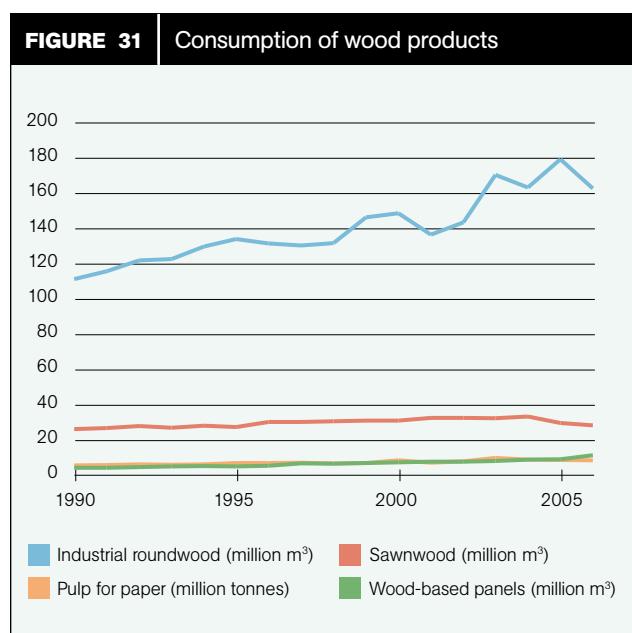
investment in the Southern Cone. The region's share of global industrial roundwood production rose from 7 percent in 1990 to 10 percent in 2006. Production of key products, in particular pulp and paper, has grown since 1990 and the trend is likely to continue considering the high investments in plantations and processing (Table 15).

Domestic consumption of wood products is essentially stable (Figure 31). Increasing income could boost consumption in some countries, and housing programmes will boost domestic timber consumption despite competition from substitutes used in construction. However, the domestic market for most products is expected to remain small except in Brazil.

Most production is exported. The net export value of all products exceeded US\$7 billion in 2005. However, the net export value has declined recently (Figure 32) as a result of the appreciation of South American currencies against the United States dollar and because of increasing competition from China, especially in furniture and panel products.

Export promotion programmes will continue to encourage the production of paper and packaging. The region's share of the global market in pulp and paper products will increase, especially with continuing disinvestments in Europe and North America and the relocation of wood products industries to regions that

BOX 18	Incentives for forest plantations in Chile and Uruguay
<p>In Chile, government policies in place for some decades to promote planted forests and private investments have resulted in a strong diversified forest industry and a plantation area of more than 2 million hectares. The national development strategy promotes financial incentives for industrial forest plantations. Legal instruments define subsidies and regulate logging, favouring small and medium-sized landholdings and plantations in degraded areas. The forestry sector now accounts for about 20 percent of Chile's exports and 4 percent of its gross domestic product.</p> <p>In Uruguay, the government has supported planted forests since 1987 by granting tax benefits when they are established in Forestry Priority Areas (extending over 2.5 million to 3 million hectares). Inexpensive flat terrain and favourable climate and soil provide ideal conditions. In 2005, Uruguay had 0.8 million hectares of planted forests and an annual planting rate of 50 000 ha.</p> <p><b>SOURCE:</b> PwC, 2007a.</p>	



**SOURCE:** FAO, 2008a.

TABLE 15  
Production and consumption of wood products

Year	Industrial roundwood (million m <sup>3</sup> )		Sawnwood (million m <sup>3</sup> )		Wood-based panels (million m <sup>3</sup> )		Paper and paperboard (million tonnes)	
	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption
2005	168	166	39	32	13	9	14	16
2020	184	181	50	42	21	12	21	24
2030	192	189	60	50	29	15	27	31

**SOURCE:** FAO, 2008c.

have competitive advantages. South America's advantages include a stable investment climate, low population density, favourable conditions for tree growth and significant technical capacity. Consequently, South America has some of the lowest wood fibre costs in the world (PwC, 2007b).

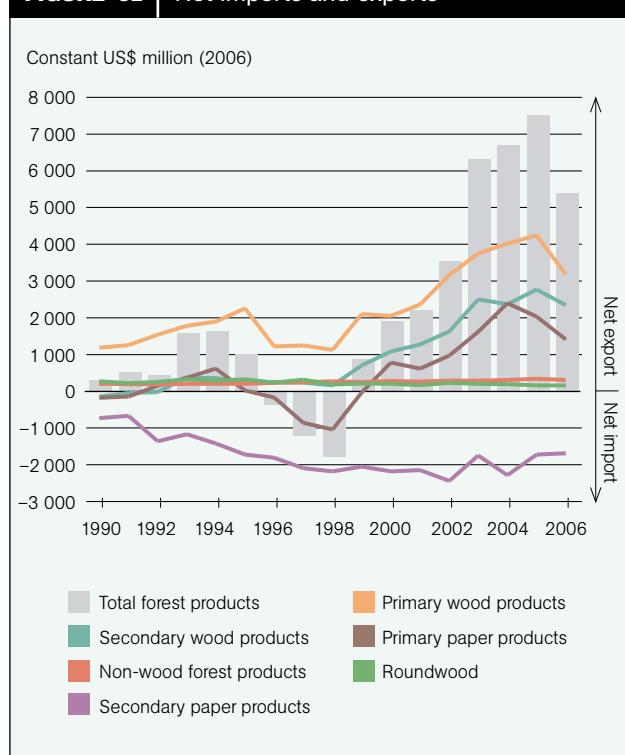
### Woodfuel

Household woodfuel use is declining in South America (mainly because of urbanization and increased use of fossil fuel and biofuels), steady in the Caribbean and rising in Central America. Overall, woodfuel production in the region has been growing gradually over the past ten years. This trend is expected to continue (Figure 33), mainly owing to industrial charcoal use in Brazil (Box 19). Future demand will also depend on the supply of fossil fuels and developments in renewable energy technologies.

### Non-wood forest products

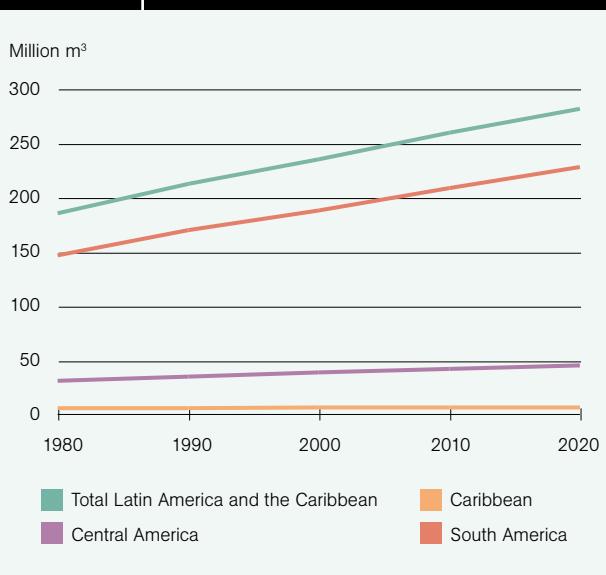
Most NWFPs in the region are for local subsistence use, although some are sold in national and international markets as ingredients for health and beauty care products and medicines. Brazil nuts (*Bertholletia excelsa*) are an important source of income for indigenous groups in Bolivia, Brazil and Peru and are also the most important commercial NWFP; the supply chain provides direct employment for 15 000 people. Brazil nuts constitute 45 percent of Bolivia's forest-related exports (more than that of all wood products) and contribute more than

**FIGURE 32** | Net imports and exports



SOURCES: FAO, 2008a; UN, 2008e.

**FIGURE 33** | Woodfuel consumption



SOURCE: FAO, 2003b.

**BOX 19**

### Charcoal for iron and steel

Aside from spearheading the most extensive global programme to introduce biofuels (ethanol) into its energy matrix, Brazil also consumes large quantities of charcoal in its iron and steel industry – an estimated 8.3 million tonnes in 2006. Iron and steel companies and others involved in supplying charcoal to the industry own about 1.2 million hectares of forest plantations, which produced almost 10 million tonnes of charcoal in 2005.

SOURCE: UN, 2008f.

US\$70 million per year to the national economy (CIFOR, 2008a).

To reduce conflicts between NWFP-dependent indigenous communities and loggers and ranchers in the Amazon, Brazil has established extractive reserves exclusively for the collection of NWFPs. This model, which grants long-term rights in public forests to groups engaged in sustainable activities, is spreading through the region. Initiatives supported by civil-society organizations and governments have improved NWFP collection, value addition and marketing, with the support of certification and fair trade organizations.

As economies grow and urbanize and more lucrative income-earning opportunities become available, dependence on NWFPs for subsistence is expected to decline. Processing and marketing of products that are already well known will improve. Local value chains will largely be replaced by national and global chains, often assisted through fair trade initiatives and organic labelling.

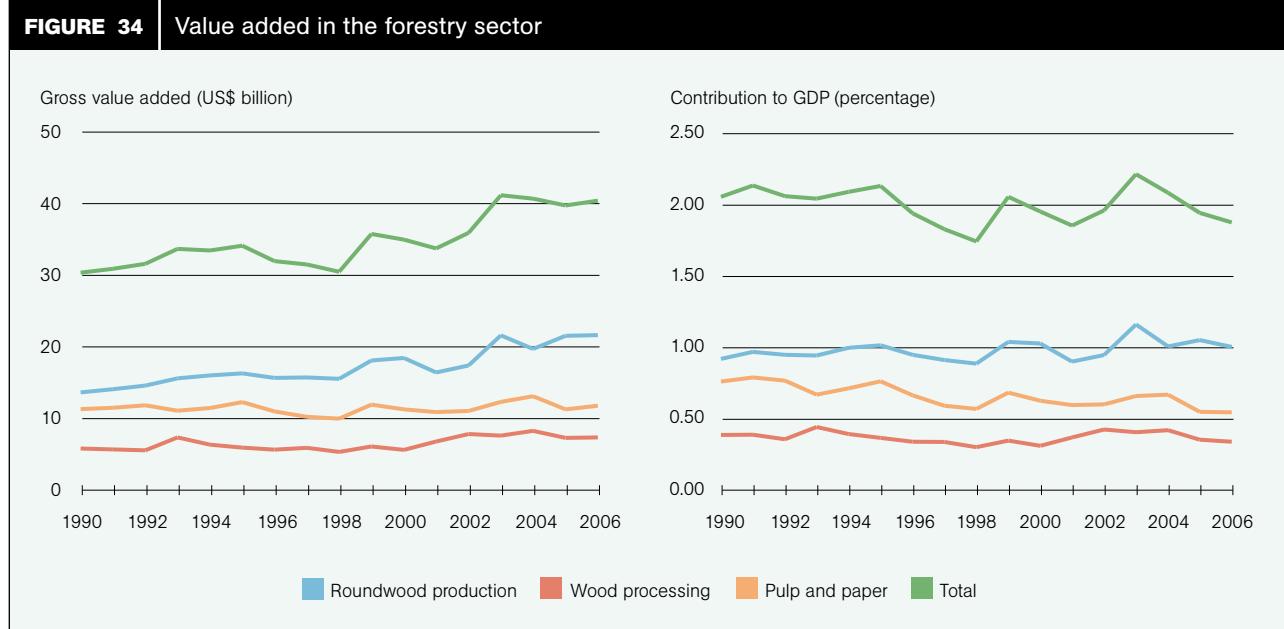
## Contribution of forestry to income and employment

Since 1990, the contribution of forestry to GDP has increased from US\$30 billion to \$40 billion (Figure 34). Most of the increase in gross value added is from roundwood production. Value added in wood processing and pulp and paper production has remained stable, but the latter is expected to change with the increasing investments in pulp and paper capacity. Employment in the forestry sector has also increased (Figure 35). In comparison with other regions, the share of forestry in total value added and employment has remained relatively stable.

## Environmental services of forests

The impact of deforestation on the region's provision of global and regional environmental services (biodiversity, water regulation, climate change mitigation and nature-based tourism) is drawing particular attention. While non-market interventions (through policies and legislation) have been the primary means for environmental conservation, the region is a leader in adopting market-driven approaches, especially PES schemes. In most cases, these are not strictly market-driven approaches, but primarily government-managed schemes using tax revenues to pay landowners, with no direct linkage

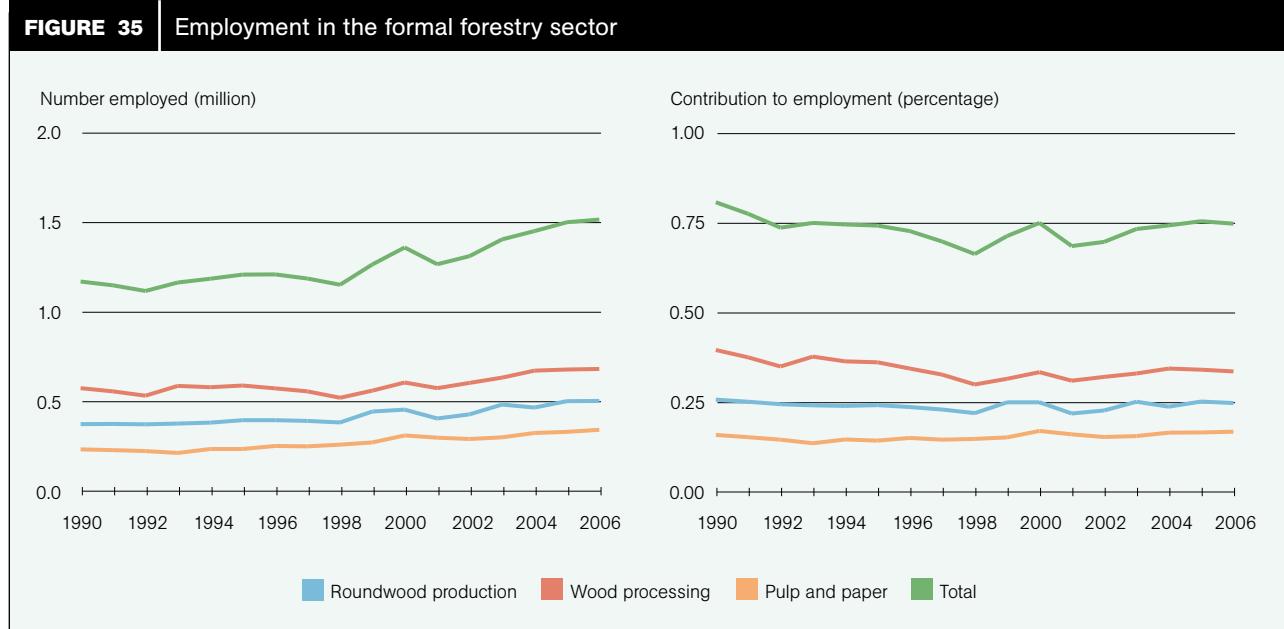
**FIGURE 34** | Value added in the forestry sector



**NOTE:** The changes in value added are the changes in real value (i.e. adjusted for inflation).

**SOURCE:** FAO, 2008b.

**FIGURE 35** | Employment in the formal forestry sector



**SOURCE:** FAO, 2008b.

between providers and buyers of environmental services (Kaimowitz, 2007).

Brazil, Colombia, Ecuador and Peru rank among the world's ten most biodiverse countries, while the eastern slope of the Andes is the most biologically diverse area in the world. Ten countries each have more than 1 000 different tree species. However, the region also leads the world in the number of tree species considered endangered or vulnerable to extinction (FAO, 2006a). Forty percent of the plant life in the Caribbean is found nowhere else (USAID, 2006).

Establishment of protected areas has been core to environmental conservation in the region. Between 1990 and 2007, the extent of protected areas increased from 213 million to 451 million hectares (24 percent of the world's protected areas) (UN, 2008c). However, many governments have limited human and financial capacity to enforce conservation measures. Conservation often comes into conflict with mining, oil extraction, agriculture and logging, particularly where property rights are ill-defined.

The outlook for maintaining and improving watershed services also depends on land-use changes. It looks bleak considering the high rate of deforestation. Water scarcity is particularly acute in the Andes and in some of the Caribbean islands. The region has been a pioneer in implementing payment for watershed services. In most cases, the schemes are managed by intermediary organizations, often government agencies responsible for managing irrigation and domestic water supply facilities, which channel funds from water users to landowners. There is potential to improve and scale up some of the initiatives. However, wider adoption will depend on overcoming some obstacles. These include ill-defined property rights; farmers' fears that their resources will be expropriated; distrust of privatization of water supply; and inadequate information on the technical linkage between upstream land use and downstream benefits (Dillaha *et al.*, 2007).

With its high deforestation rate, the region has great potential for reducing greenhouse gas emissions through slowing deforestation and degradation.

Ecotourism is an important income generator in several countries, especially in the Caribbean. The highly diverse ecosystems make the region one of the most popular ecotourism destinations. For example, Costa Rica has taken advantage of its natural attractions and made ecotourism the backbone of its economy. Ecuador earns more than US\$100 million per year from nature-based tourism in the Galapagos Islands. Easier access and higher incomes could result in continued growth of ecotourism in the region – although concern about carbon footprints and further ecosystem degradation may begin to deter ecotourists. Concern is growing about threats to biodiversity from increased numbers of visitors. Managing tourism sustainably and enhancing its benefits to the poor will remain the major challenges.

PES systems, including those proposed under the REDD initiative, will surely gain momentum. However, it remains to be seen whether they can bring about significant changes in the behaviour of those responsible for forest clearance. PES appears to be particularly effective where the opportunity cost of land use is low.

## SUMMARY

The outlook for forests and forestry in Latin America and the Caribbean will be influenced by the pace of diversification of the economies and changes in land dependence (FAO, 2006c).

In most Central American and Caribbean countries, population densities are high; as urbanization increases, there is a significant shift away from agriculture and related activities, especially as smallholder agriculture becomes less remunerative. Tourism and remittances from migrant workers are becoming important sources of income. Agriculture-related forest clearance is declining and some cleared areas will revert to forest, as is already evident.

Although population density is low in South America, high food and fuel prices will favour continued forest clearance for increased production of livestock and agricultural crops for food, feed and biofuel to meet global demand – especially as South American economies increase linkages with emerging Asian economies.

Planted forests will spread, promoted by private investments and continuing global demand for wood products, especially from the emerging Asian economies. However, the accelerated plantation rate will not offset continuing deforestation.

In short, the pace of deforestation in South America is unlikely to decline in the near future. Heavily forested countries that are taking advantage of the expanding global demand for primary products and are pursuing a path of rapid economic development will find it extremely difficult to slow the rate of forest conversion. Provision of global public goods – for example carbon credits – may help to some extent. However, an effective mechanism for providing adequate incentives to refrain from forest clearance has yet to be developed.