Cover photos:
Seven themes of sustainable forest management
Left, top to bottom: Forest biological diversity (M.P. Wilkie); Forest health and vitality (FAO/FO-0506/C. Palmberg Lerche); Productive functions of forest resources (FAO/FO-6960/J. Carle)
Centre: Extent of forest resources (M.P. Wilkie)
Right, top to bottom: Protective functions of forest resources (M.L. Wilkie); Socio-economic functions of forests (FAO/FO-5154/Veracel); Legal, policy and institutional framework (FAO/24683_1206/G. Napolitano)

Global Forest Resources Assessment 2010

Main report

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FORESTRY
PAPER

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Acknowledgements

The FRA 2010 main report represents a major effort of FAO's Forestry Department, FAO member countries, donors, partners and individual experts. More than 900 people have been directly involved in this mammoth task. National correspondents and their teams provided detailed country reports containing the basic data for the assessment. More than 70 FAO staff members at headquarters and at our regional and subregional offices, as well as consultants and volunteers, contributed to the review of reports, preparation of desk studies for countries and areas that did not have a national correspondent, and analysis and presentation of the results. Several countries and organizations contributed extra budgetary financial resources or secondments to the country reporting process for FRA 2010, including Denmark, Finland, the International Tropical Timber Organization, Japan and the United States of America. The UNECE/FAO Forestry and Timber Section in Geneva assisted with the assessment process for several European and Central Asian countries. Participants in the expert consultation held in Kotka, Finland, in 2006 provided initial guidance on FRA 2010, while the FRA advisory group provided continuous support and advice throughout the process.

FAO is grateful for the support of all countries, organizations and experts inside and outside the organization that have made FRA 2010 possible.

Individual contributors to the country reporting process of FRA 2010 are listed in Annex 1. Green Ink (www.greenink.co.uk) conducted the language editing, translation and layout of the report.

Foreword

Interest in the world's forests has grown to unprecedented heights, especially with growing awareness of their role in the global carbon cycle. The possibility of mitigating climate change by reducing carbon emissions caused by deforestation and forest degradation, and by increasing carbon uptake through afforestation and sustainable forest management, highlights the essential role of forests in supporting life on Earth.

But forests are more than just carbon. In 2010 we celebrate the International Year of Biodiversity, and we are reminded that forests represent some of the most diverse ecosystems on Earth. In a time of economic crisis, we are also reminded that forests provide employment and livelihoods for a large proportion of the population – especially in developing countries – and often act as an economic safety net in times of need.

FAO's Global Forest Resources Assessment (FRA), carried out at five-year intervals, provides the data and information needed to support policies, decisions and negotiations in all matters where forests and forestry play a part.

Each successive assessment is more comprehensive than the last. Organized according to the seven thematic elements of sustainable forest management, FRA 2010 contains information to monitor progress towards international goals and targets – among others the Millennium Development Goals, the 2010 Biodiversity Target of the Convention on Biological Diversity and the four Global Objectives on Forests of the Non-Legally Binding Instrument on All Types of Forests adopted by the United Nations General Assembly in January 2008. In addition, the statistics on trends in forest carbon stocks will support predictions of climate change and development of appropriate mitigation and adaptation measures.

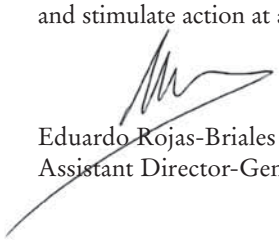
FRA 2010 also includes information on variables such as forest health, the contribution of forests to national economies and the legal and institutional framework governing the management and use of the world's forests.

Behind the data in this report lies a well-established process of data collection, processing, validation, compilation and analysis. The participation of national experts from virtually all countries and all key international forest-related organizations ensures that the best and most recent knowledge is shared and applied, and that feedback reaches national policy processes. FAO thanks all participants for their vital collaboration.

Documentation for FRA 2010 includes 233 country reports, available online (www.fao.org/forestry/fra). Complementing the main report will be a series of special studies on topical issues as well as a global remote sensing survey of changes on forest biomes between 1990 and 2005, scheduled for completion in 2011.

The results of the present assessment are encouraging in some respects. They show that the rate of deforestation, while still alarming in many countries, is slowing down at the global level, and that afforestation and natural expansion in some countries and regions have further reduced the net loss of forests. However, most of the losses of forest happen in countries in the tropical region, while most of the gains take place in temperate and boreal zones. Furthermore, many emerging economies have moved from net loss to net gain of forest area. These results highlight the key role of economic development in reversing global deforestation.

FAO hopes that the information in this report will help broaden discussions on forests and stimulate action at all levels in the International Year of Forests (2011) and beyond.



Eduardo Rojas-Briales
Assistant Director-General, Forestry Department, FAO

Acronyms and abbreviations

CBD	Convention on Biological Diversity
COFO	Committee on Forestry (FAO)
CPF	Collaborative Partnership on Forests
FORIS	Forestry Information System (FAO)
FRA	Global Forest Resources Assessment
FTE	full time equivalent
IFF	Intergovernmental Forum on Forests
IPCC	Intergovernmental Panel on Climate Change
IPF	Ad Hoc Intergovernmental Panel on Forests
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
LFCC	low forest cover countries
MCPFE	Ministerial Conference on the Protection of Forests in Europe (now known as Forest Europe)
NFP	national forest programme
n.s.	not significant, indicating a very small value
NWFP	non-wood forest product
REDD	reduction in emissions from deforestation and forest degradation
SIDS	small island developing states
UNCED	United Nations Conference on Environment and Development
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNEP-WCMC	UNEP World Conservation Monitoring Centre
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UNSD	United Nations Statistics Division
WRI	World Resources Institute

Executive Summary

FAO, in cooperation with its member countries, has monitored the world's forests at five to ten year intervals since 1946. These global assessments provide valuable information to policy-makers, to international negotiations, arrangements and organizations related to forests and to the general public.

The Global Forest Resources Assessment 2010 (FRA 2010) is the most comprehensive assessment to date. It examines the current status and recent trends for more than 90 variables and all types of forests in 233 countries and areas for four points in time: 1990, 2000, 2005 and 2010.

FAO worked closely with countries and forest assessment specialists in the design and implementation of FRA 2010. More than 900 contributors were involved, including 178 officially nominated national correspondents and their teams.

In the main section of this report, results are presented according to the seven thematic elements of sustainable forest management:

- extent of forest resources;
- forest biological diversity;
- forest health and vitality;
- productive functions of forest resources;
- protective functions of forest resources;
- socio-economic functions of forests;
- legal, policy and institutional framework.

A summary of key findings is presented below, followed by a section that attempts to answer the question: What does FRA 2010 tell us about progress towards sustainable forest management since 1990 at global and regional scales?

KEY FINDINGS

Forests cover 31 percent of total land area

The world's total forest area is just over 4 billion hectares, which corresponds to an average of 0.6 ha per capita (Figure 1). The five most forest-rich countries (the Russian Federation, Brazil, Canada, the United States of America and China) account for more than half of the total forest area. Ten countries or areas have no forest at all and an additional 54 have forest on less than 10 percent of their total land area (Figure 2).

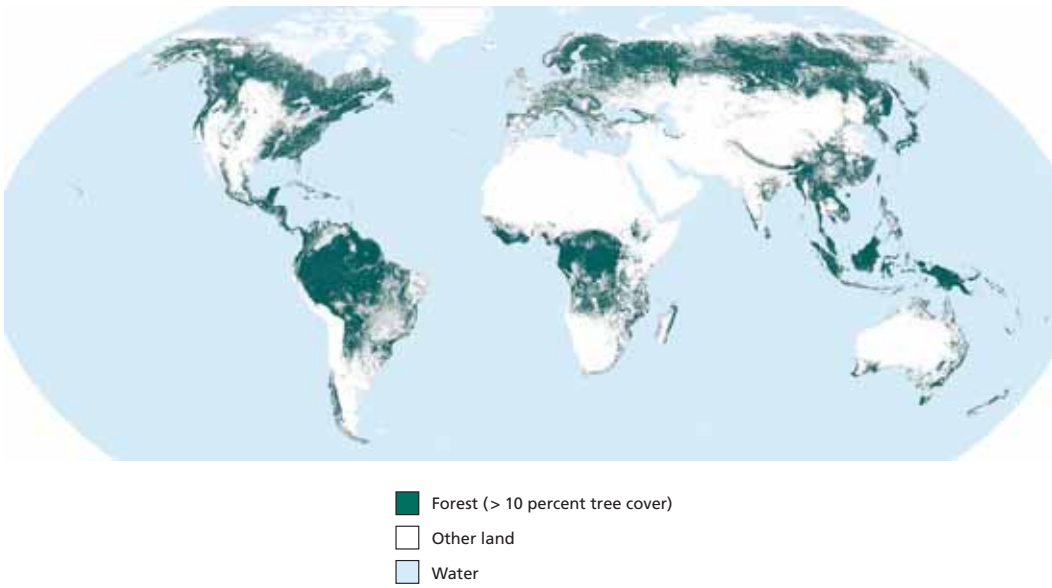
The rate of deforestation shows signs of decreasing, but is still alarmingly high

Deforestation – mainly the conversion of tropical forest to agricultural land – shows signs of decreasing in several countries but continues at a high rate in others (Boxes 1–3). Around 13 million hectares of forest were converted to other uses or lost through natural causes each year in the last decade compared with 16 million hectares per year in the 1990s. Both Brazil and Indonesia, which had the highest net loss of forest in the 1990s, have significantly reduced their rate of loss, while in Australia, severe drought and forest fires have exacerbated the loss of forest since 2000.

Large-scale planting of trees is significantly reducing the net loss of forest area globally

Afforestation and natural expansion of forests in some countries and regions have reduced the net loss of forest area significantly at the global level (Figure 4). The net change in forest area in the period 2000–2010 is estimated at -5.2 million hectares per year (an area about the size of Costa Rica), down from -8.3 million hectares per year in the period 1990–2000.

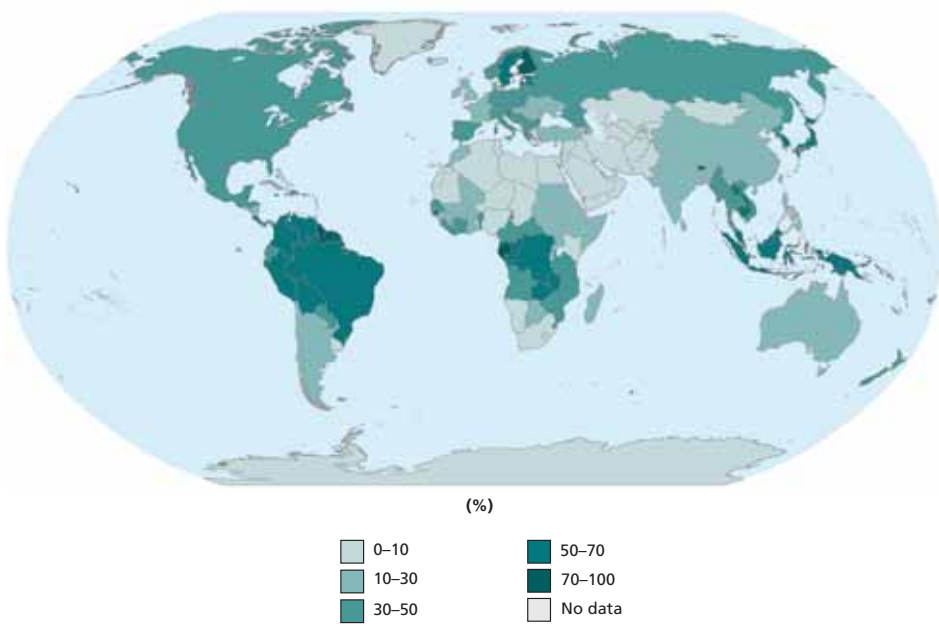
FIGURE 1
The world's forests



Note: Tree cover derived from MODIS VCF* 250 meter pixels for year 2005.

* Moderate-resolution Imaging Spectroradiometer Vegetation Continous Fields (Hansen *et al*. 2010).

FIGURE 2
Forest area as a percentage of total land area by country, 2010



BOX 1

Deforestation and net change in forest area

Figure 3 is a simplified model illustrating forest change dynamics. It has only two classes: forests and all other land. A reduction in forest area can happen through either of two processes: deforestation and natural disasters. Deforestation, which is by far the most important, implies that forests are cleared by people and the land converted to another use, such as agriculture or infrastructure. Natural disasters may also destroy forests, and when the area is incapable of regenerating naturally and no efforts are made to replant, it too converts to other land.

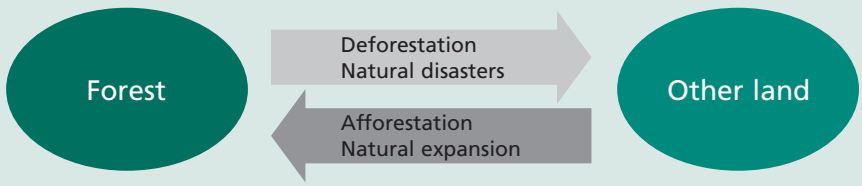
An increase in forest area can also happen in two ways: either through afforestation (i.e. planting of trees on land that was not previously forested) or through natural expansion of forests (e.g. on abandoned agricultural land, a process which is quite common in some European countries).

Where part of a forest is cut down but replanted (reforestation) or grows back on its own within a relatively short period (natural regeneration), there is no change in forest area.

For FRA 2010, countries were asked to provide information on their forest area for four points in time. This enables the calculation of the net change in forest area over time. This net change is the sum of all negative changes due to deforestation and natural disasters and all positive changes due to afforestation and natural expansion of forests.

FIGURE 3

Forest change dynamics



BOX 2

Previous figures underestimated the global deforestation rate for the 1990s

FRA 2010, like FRA 2005, did not directly compile data on deforestation rates because few countries have this information. In FRA 2005 the global deforestation rate was estimated from net changes in forest area. Additional information on afforestation and on natural expansion of forest for the past 20 years has now made it possible to also take into account deforestation within those countries that have had an overall net gain in forest area. As a result, the revised estimate of the global rate of deforestation and loss from natural causes for 1990–2000 (close to 16 million hectares per year) is higher, but more accurate, than was estimated in FRA 2005 (13 million hectares per year).

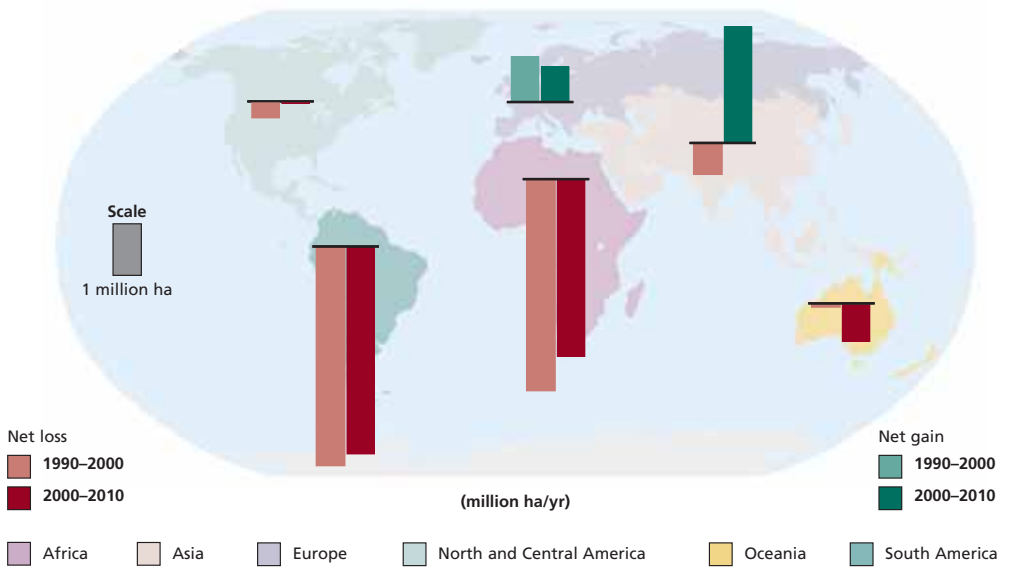
BOX 3

A global remote sensing survey of forests will yield improved information on changes in the area of major forest types over time

Countries use differing frequencies, classification systems and assessment methods when monitoring their forests, making it difficult to obtain consistent data on major forest types that span national borders. FAO, in collaboration with countries and key partner organizations, is currently undertaking a global remote sensing survey – based on a systematic sampling of some 13 500 sites around the globe – to provide additional and more consistent information on deforestation, afforestation and natural expansion of forests at regional and biome levels for the period 1990–2005. Results are expected at the end of 2011.

FIGURE 4

Annual change in forest area by region, 1990–2010



South America and Africa continue to have the largest net loss of forest

At a regional level, South America suffered the largest net loss of forests between 2000 and 2010 – about 4.0 million hectares per year – followed by Africa, which lost 3.4 million hectares annually (Figure 5). Oceania also reported a net loss of forest (about 700 000 ha per year over the period 2000–2010), mainly due to large losses of forests in Australia, where severe drought and forest fires have exacerbated the loss of forest since 2000. The area of forest in North and Central America was estimated as almost the same in 2010 as in 2000. The forest area in Europe continued to expand, although at a slower rate (700 000 ha per year) than in the 1990s (900 000 ha per year). Asia, which had a net loss of forest of some 600 000 ha annually in the 1990s, reported a net gain of forest of more than 2.2 million hectares per year in the period 2000–2010, primarily due to the large-scale afforestation reported by China and despite continued high rates of net loss in many countries in South and Southeast Asia.

FIGURE 5
Annual change in forest area by country, 2005–2010

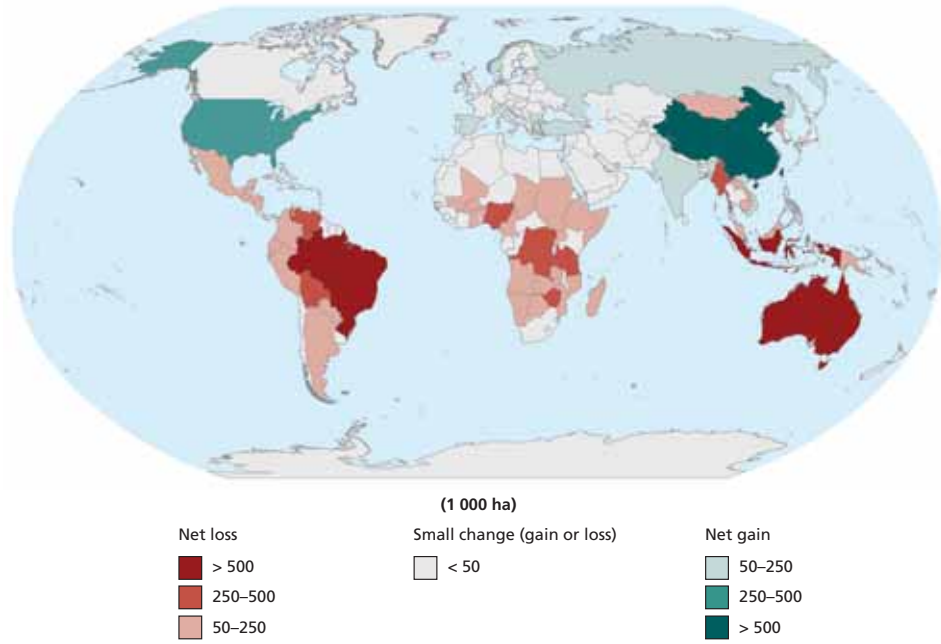
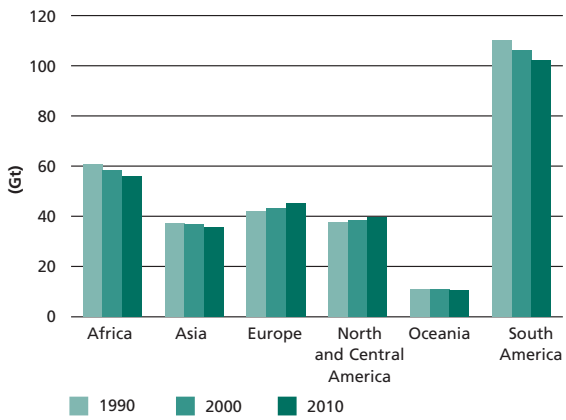


FIGURE 6
Trends in carbon stocks in forest biomass, 1990–2010



Forests store a vast amount of carbon

Estimates made for FRA 2010 show that the world's forests store 289 gigatonnes (Gt) of carbon in their biomass alone. While sustainable management, planting and rehabilitation of forests can conserve or increase forest carbon stocks, deforestation, degradation and poor forest management reduce them. For the world as a whole, carbon stocks in forest biomass decreased by an estimated 0.5 Gt annually during the period 2005–2010, mainly because of a reduction in the global forest area (Figure 6).

Primary forests account for 36 percent of forest area – but have decreased by more than 40 million hectares since 2000

On a global average, more than one-third of all forest is primary forest, i.e. forest of native species where there are no clearly visible indications of human activities and the ecological processes have not been significantly disturbed (Figure 7). Primary forests, in particular tropical moist forests, include the most species-rich, diverse terrestrial ecosystems. The decrease of primary forest area, 0.4 percent annually over a ten-year period, is largely due to reclassification of primary forest to 'other naturally regenerated forest' because of selective logging and other human interventions.

The area of planted forest is increasing and now accounts for 7 percent of total forest area

Forests and trees are planted for many purposes and make up an estimated 7 percent of the total forest area, or 264 million hectares. Between 2000 and 2010, the area of planted forest increased by about 5 million hectares per year (Figure 8). Most of this

FIGURE 7
Characteristics of the world's forests, 2010

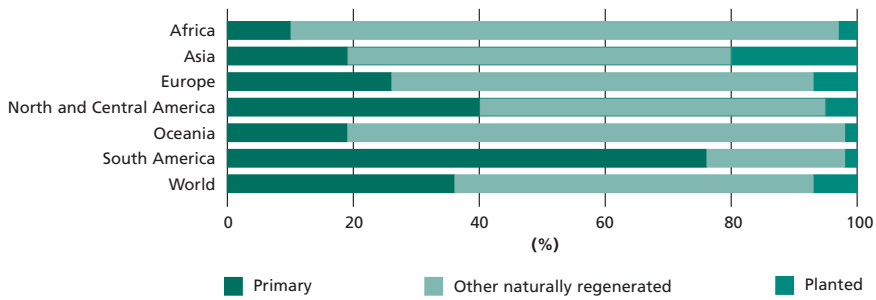
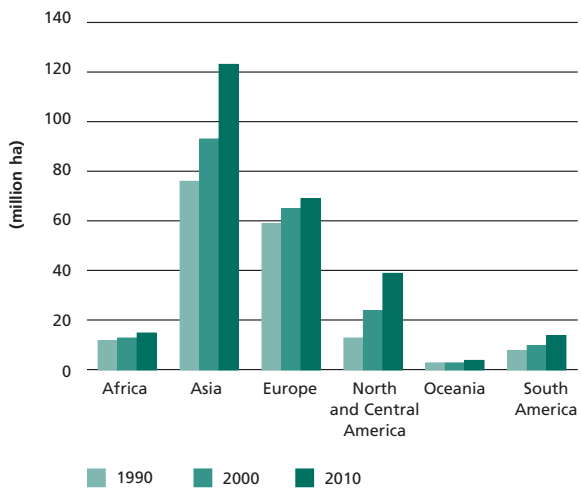


FIGURE 8
Trends in area of planted forests, 1990–2010



was established through afforestation (i.e. planting of areas not forested in recent times) particularly in China. Three-quarters of all planted forests consist of native species while one-quarter comprises introduced species (Figure 9).

Twelve percent of the world's forests are designated for the conservation of biological diversity

The area of forest where conservation of biological diversity is designated as the primary function has increased by more than 95 million hectares since 1990, of which the largest part (46 percent) was designated between 2000 and 2005 (Figure 10). These forests now account for 12 percent of the total forest area or more than 460 million hectares. Most but not all of them are located inside protected areas.

FIGURE 9
Proportion of planted forests consisting of introduced species, 2010

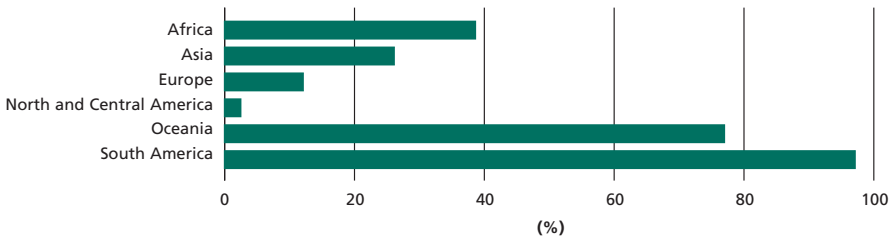
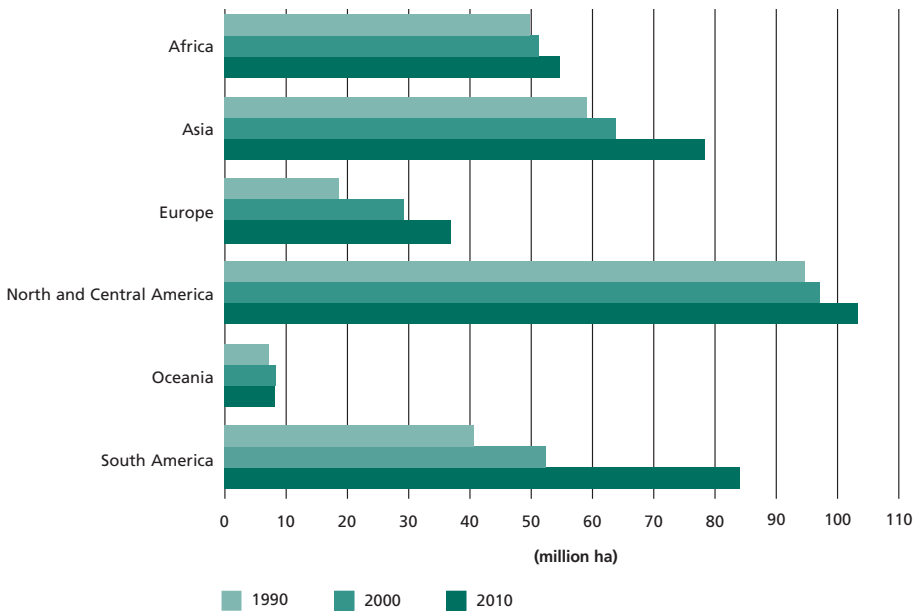


FIGURE 10
Trends in area of forest designated for conservation of biodiversity by region, 1990–2010



Legally established protected areas cover an estimated 13 percent of the world's forests

National parks, game reserves, wilderness areas and other legally established protected areas cover more than 10 percent of the total forest area in most countries and regions (Figure 11). The primary function of these forests may be the conservation of biological diversity, the protection of soil and water resources, or the conservation of cultural heritage. The area of forest within a protected area system has increased by 94 million hectares since 1990. Two-thirds of this increase has been since 2000.

Forest fires are severely underreported at the global level

While some forest ecosystems depend on fire for their regeneration, in others forest fires can be devastating and also frequently cause loss of property and human life. On average, 1 percent of all forests were reported to be significantly affected each year by forest fires. However, the area of forest affected by fires was severely underreported, with information missing from many countries, especially in Africa. Less than 10 percent of all forest fires are prescribed burning; the rest are classified as wildfires.

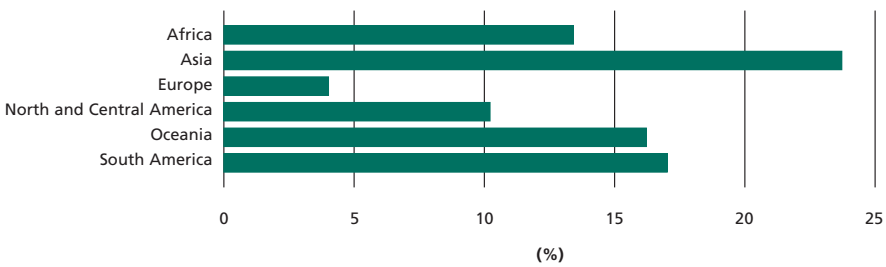
Insect pests and diseases, natural disasters and invasive species are causing severe damage in some countries

Outbreaks of forest insect pests damage some 35 million hectares of forest annually, primarily in the temperate and boreal zone. The mountain pine beetle has devastated more than 11 million hectares of forest in Canada and the western United States of America since the late 1990s – an unprecedented outbreak exacerbated by higher winter temperatures. Severe storms, blizzards and earthquakes have also damaged large areas of forest since 2000. Woody invasive species are of particular concern in small island developing states, where they threaten the habitat of endemic species. Information availability and quality continues to be poor for most of these disturbances.

Thirty percent of the world's forests are primarily used for production of wood and non-wood forest products

Close to 1.2 billion hectares of forest are managed primarily for the production of wood and non-wood forest products. An additional 949 million hectares (24 percent) are designated for multiple use – in most cases including the production of wood and non-wood forest products. The area designated primarily for productive purposes has decreased by more than 50 million hectares since 1990 as forests have been designated for other purposes. The area designated for multiple use has increased by 10 million hectares in the same period.

FIGURE 11
Percentage of forest area in protected areas by region, 2010



Wood removals increased between 2000 and 2005, following a fall in the 1990s

At the global level, reported wood removals amounted to 3.4 billion cubic metres annually in the period 2003–2007, similar to the volume recorded for 1990 and equivalent to 0.7 percent of the total growing stock (Figure 12). Considering that informally and illegally removed wood, especially woodfuel, is not usually recorded, the actual amount of wood removals is undoubtedly higher. At the global level, woodfuel accounted for about half of the removed wood.

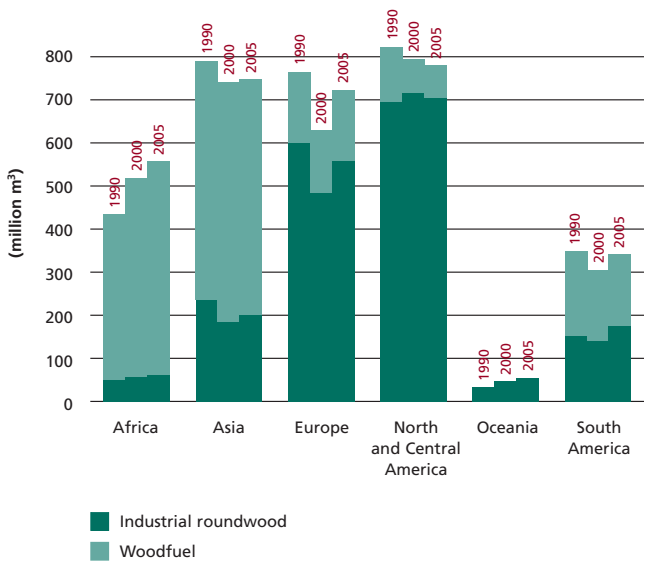
Eight percent of the world's forests have protection of soil and water resources as their primary objective

Around 330 million hectares of forest are designated for soil and water conservation, avalanche control, sand dune stabilization, desertification control or coastal protection. The area of forest designated for protective functions increased by 59 million hectares between 1990 and 2010, primarily because of large-scale planting in China aimed at desertification control, conservation of soil and water resources and other protective purposes.

The management of forests for social and cultural functions is increasing, but the area is difficult to quantify

The only subregions and regions with fairly good data on the designation of forests for recreation, tourism, education or conservation of cultural and spiritual heritage are East Asia and Europe, where provision of such social services was reported as the primary management objective for 3 and 2 percent of the total forest area, respectively. Brazil has designated more than one-fifth of its forest area for the protection of the culture and way of life of forest-dependent people. Globally, 4 percent of the world's forests are designated for the provision of social services.

FIGURE 12
Trends in wood removals, 1990–2005



The value of wood removals is high, but fluctuating

Wood removals valued just over US$100 billion annually in the period 2003–2007, mainly accounted for by industrial roundwood. At the global level the reported values show no change between 1990 and 2000, but an increase of about 5 percent annually over the period 2000–2005, suggesting that roundwood prices recovered somewhat since their decline (in real terms) in the decade 1990–2000 (Figure 13). However, they have since fallen sharply.

The value of non-wood forest products remains underestimated

The reported value of non-wood forest product removals amounted to about US$18.5 billion in 2005. Food products accounted for the greatest share. However, information is still missing from many countries in which non-wood forest products are highly important, and the true value of subsistence use is rarely captured. As a result, the reported statistics probably cover only a fraction of the true total value of harvested non-wood forest products.

Around 10 million people are employed in forest management and conservation – but many more are directly dependent on forests for their livelihoods

Reported employment in forest establishment, management and use declined by about 10 percent between 1990 and 2005, probably because of gains in labour productivity. Europe, East Asia and North America saw steep declines (15 to 40 percent between 1990 and 2005), while in other regions, employment increased somewhat – probably because roundwood production has increased faster than gains in labour productivity. Most countries reported increased employment in management of protected areas. Given that much forestry employment is outside the formal sector, forest work is surely much more important for rural livelihoods and national economies than the reported figures suggest.

Governments generally spend more on forestry than they collect in revenue

On average, total forest revenue collection was about US$4.5 per hectare, ranging from under US$1 per hectare in Africa to just over US$6 per hectare in Europe (Figure 14).

FIGURE 13
Trends in value of wood removals, 1990–2005

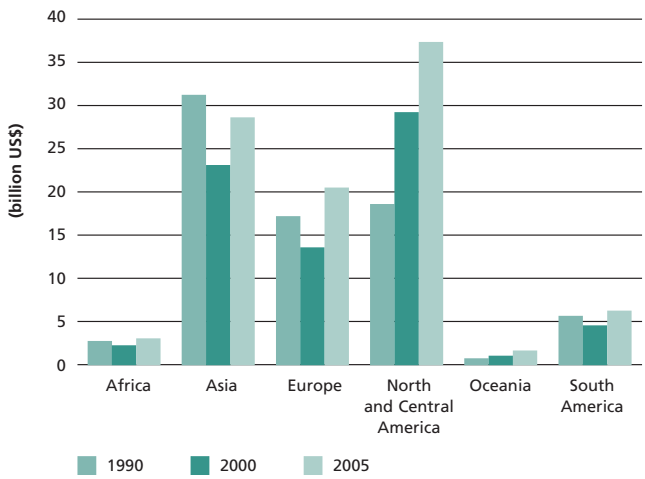
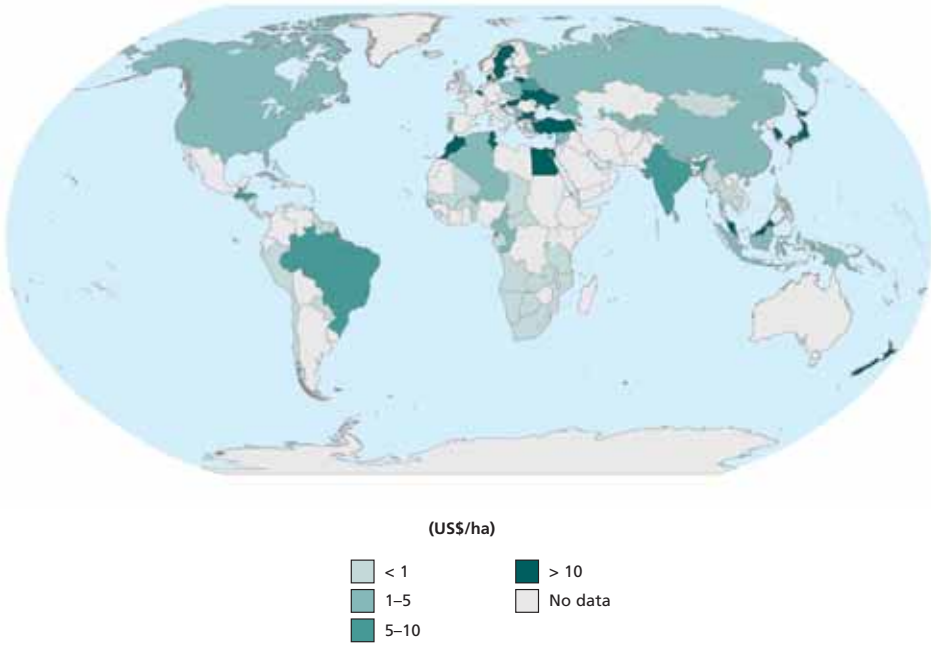


FIGURE 14
Forest revenue collection by country, 2005



Public expenditure on forestry was about US$7.5 per hectare on average. Average expenditure was highest in Asia (over US$20 per hectare). In contrast, the average expenditure per hectare was less than US$1 in South America and Oceania (Figure 15).

Significant progress has been made in developing forest policies, laws and national forest programmes

Of the 143 countries that have a forest policy statement, 76 countries have issued or updated their statements since 2000. Of the 156 countries that have a specific forest law, 69 countries – primarily in Europe and Africa – reported that their current forest law has been enacted or amended since 2005. Close to 75 percent of the world's forests are covered by a national forest programme, i.e. a participatory process for the development and implementation of forest-related policies and international commitments at the national level (Figure 16).

Staff numbers in public forest institutions are decreasing

Around 1.3 million people were reported to work in public forest institutions in 2008, 22 percent of whom were female. At the global level, the number of staff has declined by 1.2 percent annually since 2000. More than 20 000 professionals work in public forest research institutions.

The number of university students graduating in forestry is increasing

More than 60 000 university students graduate in forestry annually. This equates to about 1 per 86 000 inhabitants, or around 200 per 10 million hectares of forests. One-third of graduating students are female, and this proportion is increasing.

FIGURE 15
Public expenditure on forestry by country, 2005

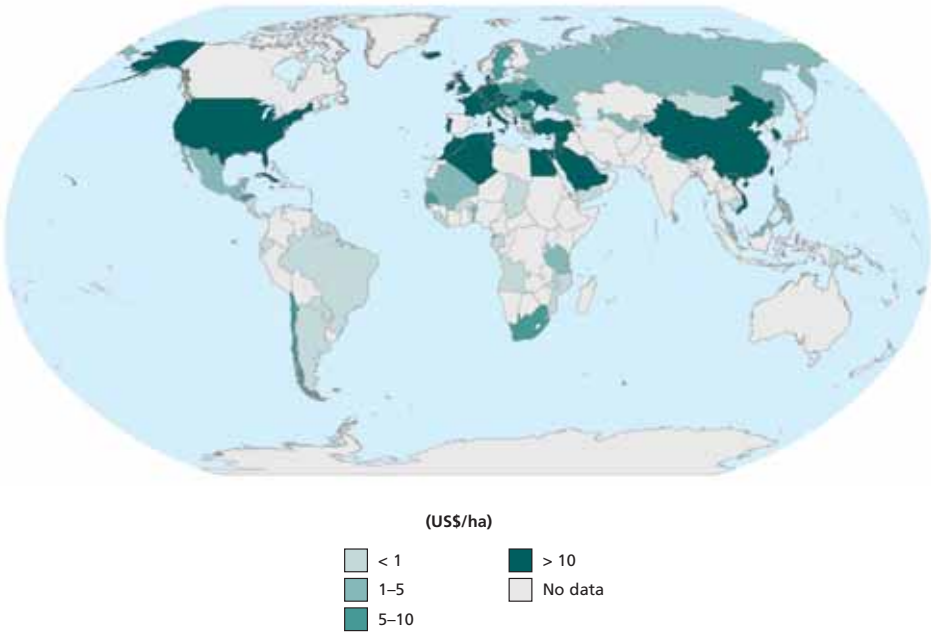
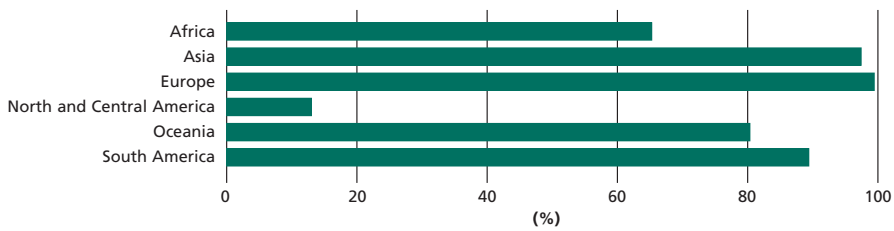


FIGURE 16
Forest area covered by a national forest programme by region, 2008



Eighty percent of the world's forests are publicly owned, but ownership and management of forests by communities, individuals and private companies is on the rise

Despite changes in forest ownership and tenure in some regions, most of the world's forests remain under public ownership (Figure 17). Differences among regions are considerable. North and Central America, Europe (other than the Russian Federation), South America and Oceania have a higher proportion of private ownership than other regions. In some regions, there is an increasing trend toward involving communities, individuals and private companies in the management of publicly owned forests (Figure 18).

FIGURE 17
Forest ownership by region, 2005

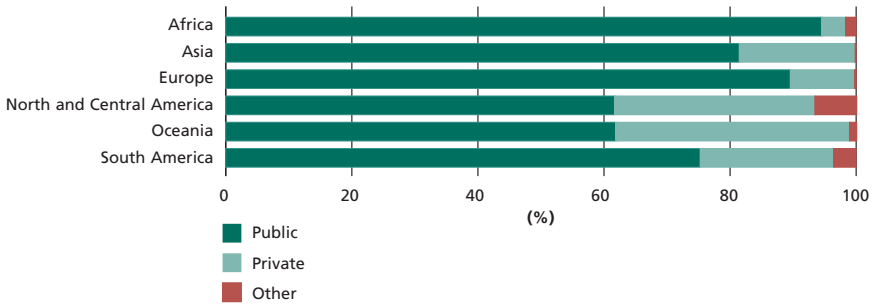
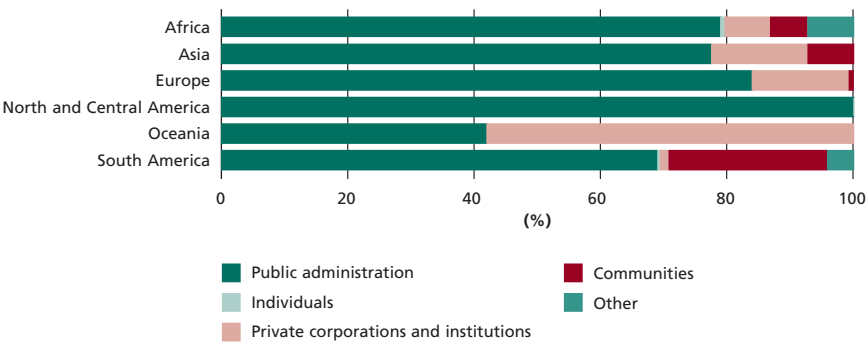


FIGURE 18
Management of public forests by region, 2005



Forests are managed for a multitude of uses and values

Forests are increasingly being conserved and managed for multiple uses and values – often in combination (Figure 19). Around 949 million hectares, or 24 percent of all forests, are designated for multiple use, i.e. managed for any combination of the production of goods, protection of soil and water, conservation of biodiversity and provision of social services – or where none of these alone is considered as the predominant function.

More than 1.6 billion hectares of forest have a management plan

The area of forest covered by a management plan – an important tool for achieving sustainable forest management – is steadily increasing, yet information is only available for 80 percent of the total forest area (Figure 20). For the first time, information was also collected on the area of forest under sustainable forest management (Box 4).

FIGURE 19
Designated functions of forests, 2010

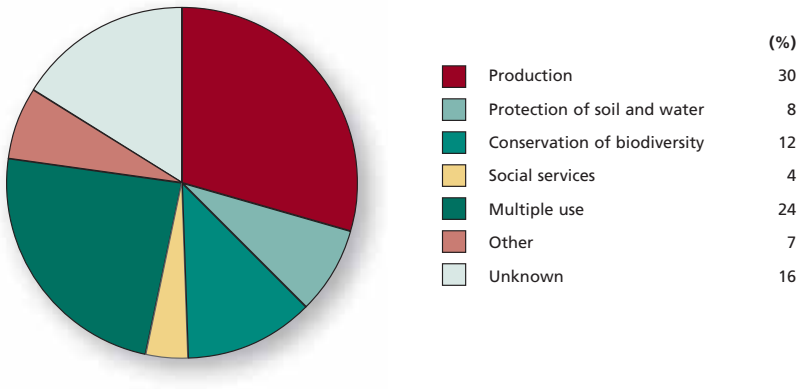
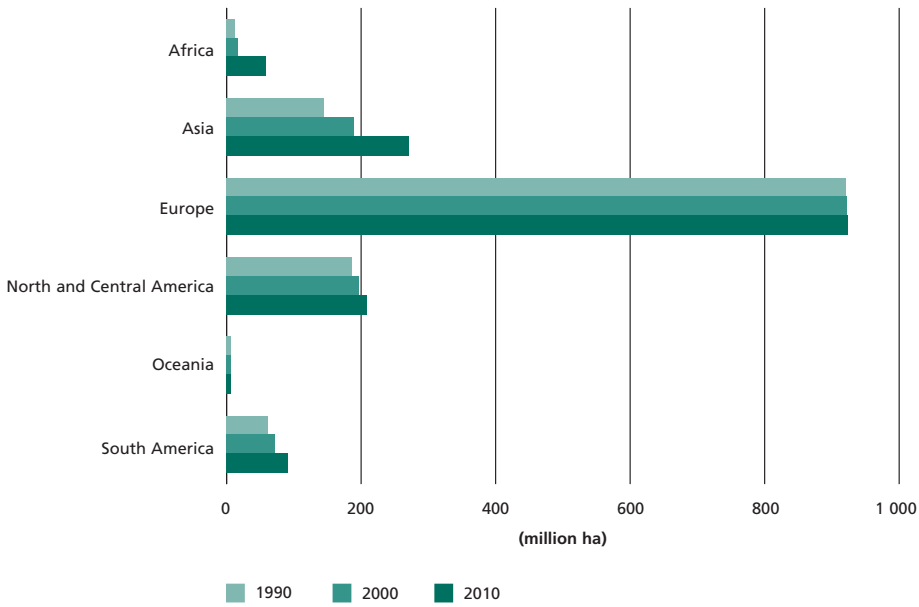


FIGURE 20
Trends in area of forest with a management plan by region, 1990–2010



PROGRESS TOWARDS SUSTAINABLE FOREST MANAGEMENT

To obtain a broad picture of progress towards sustainable forest management, a subset of indicators was selected for each of the seven thematic elements of sustainable forest management and data on trends were compiled and compared at global, regional and subregional levels across the seven themes. The results are summarized below and illustrated in Tables 1 and 2. For more information, refer to Chapter 9.

BOX 4

Information is collected on the area of forest under sustainable forest management

The area of forest with a management plan is not necessarily an adequate indicator of the area of forest under sustainable forest management. For example, plans may not be effective, or forests may be conserved and sustainably used without a plan. Therefore, for FRA 2010, countries were asked to provide information on the area of forest under sustainable management using national definitions, criteria and assessment methods, including expert estimates. More than 100 countries, representing 62 percent of the global forest area, responded. Although data cannot be compared across countries or aggregated at the global scale, the responses indicate that significant progress has been made over the last ten years.

Progress towards sustainable forest management at the global level

Overall, the situation at the global level has remained relatively stable over the last 20 years (Table 1). The change in forest area is well below the threshold of 0.5 percent per year for a significant change. The largest negative rates (in percentage terms) include the decrease in the area of primary forest over the entire 20-year period; in wood removals and employment in the 1990s; and in human resources in public forest institutions during the period 2000–2005. Significant positive trends were reported in the area of forest designated for the conservation of biological diversity and the area of forest in protected areas (particularly in the last decade), the area of planted forest and the number of students graduating in forestry. Forests under private ownership and the value of wood products showed a positive trend for the period 2000–2005.

Progress at regional levels

Africa. On the whole, progress towards sustainable forest management in Africa has improved when comparing the last decade to the 1990s. The net loss of forest area has slowed down, and the areas of forest designated for the conservation of biological diversity and included in protected areas have increased slightly. The sharp increase in the area of forest with a management plan over the last ten years is particularly good news. The continued, rapid loss of forest area (the second largest of any region during this 20-year period) is, however, still a cause for concern as is the loss of primary forests. A summary of information by subregion can be found in Table 2.

Asia. Overall the forest area in Asia is about 16 million hectares larger in 2010 than it was in 1990 as a result of large-scale afforestation efforts during the last 10–15 years, particularly in China. The decrease in area of primary forest is cause for concern, while the increase in the forest area designated for conservation of biological diversity, the area of forest in protected areas and forests designated for protective functions is commendable. The area affected by fire decreased while that affected by insects increased sharply between 1990 and 2000, but then levelled off. Variables representing the legal, policy and institutional framework are largely positive or stable and information availability in the region is generally good. In short, there has been mixed progress over the last 20 years at the regional level with large variations between countries and subregions. A summary of information by subregion can be found in Table 2.

Europe. Data availability was generally high for Europe, although results were strongly influenced by the Russian Federation. The status of forest resources in Europe

TABLE 1
Progress towards sustainable forest management at the global level, 1990–2010

Thematic element	FRA 2010 variables	Data availability	Annual change rate (%)		Annual change		
			1990–2000	2000–2010	1990–2000	2000–2010	Unit
Extent of forest resources	Area of forest	H	-0.20	-0.13	-8 323	-5 211	1 000 ha
	Growing stock of forests	H	0.13	0.14	n.s.	n.s.	m^3/ha
	Forest carbon stock in living biomass	H	-0.18	-0.17	-538	-502	million tonnes
Forest biological diversity	Area of primary forest	M	-0.40	-0.37	-4 666	-4 188	1 000 ha
	Area of forest designated primarily for conservation of biodiversity	H	1.14	1.92	3 250	6 334	1 000 ha
	Area of forest within protected areas	H	1.09	1.97	3 040	6 384	1 000 ha
Forest health and vitality	Area of forest affected by fire	M	-1.89	-2.15	-345	-338	1 000 ha
	Area of forest affected by insects	L	-1.88	-0.70	-699	-231	1 000 ha
Productive functions of forest resources	Area of forest designated primarily for production	H	-0.18	-0.25	-2 125	-2 911	1 000 ha
	Area of planted forest	H	1.90	2.09	3 688	4 925	1 000 ha
	Total wood removals	H	-0.50	1.08	-15 616	33 701	1 000 m^3
Protective functions of forest resources	Area of forest designated primarily for protection of soil and water	H	1.23	0.97	3 127	2 768	1 000 ha
Socio-economic functions of forests	Area of forest under private ownership	H	0.75	2.56	3 958	14 718	1 000 ha
	Value of total wood removals	M	-0.32	5.77	-241	4 713	million US$
	Employment in primary production of goods	M	-1.20	-0.11	-126	-10	1 000 FTE
Legal, policy and institutional framework	Forest area with management plan	M	0.51	1.07	6 964	15 716	1 000 ha
	Human resources in public forest institutions	L	-1.94	0.07	-23 568	830	total staff
	Number of students graduating in forestry	L	15.67	8.83	4 384	4 081	number of students

Notes: No forecasting to 2010 was done for areas affected by fire and by insects or for the amount and value of wood removals. For these variables estimates were provided for 1990 (an average of the period 1988–1992), 2000 (average of 1998–2002) and 2005 (average of 2003–2007). Data on ownership and employment were requested only for 1990, 2000 and 2005. In all these cases change rates were calculated for the periods 1990–2000 and 2000–2005. Data for human resources in public institutions and the number of forestry graduates are from 2000, 2005 and 2008; change rates are calculated for 2000–2005 and 2005–2008.

H = High (reporting countries represent 75–100% of total forest area)
M = Medium (reporting countries represent 50–74% of total forest area)
L = Low (reporting countries represent 25–49% of total forest area)

● = Positive change (greater than 0.50%)
● = No major change (between -0.50 and 0.50%)
● = Negative change (less than -0.50%)
– = Insufficient data to determine trend

has essentially been stable over the last 20 years. While the area of forest is expanding, the focus of forest management in Europe has clearly shifted away from productive functions towards conservation of biological diversity, protection and multiple uses – a shift already evident at the end of the 1990s. The main negative trends are found in employment and – when analysing figures excluding the Russian Federation – in human resources in public forest institutions between 2005 and 2008, as well as in the value of wood removals in the 1990s. Table 2 shows the trends for Europe including and excluding the Russian Federation.

North and Central America. Progress towards sustainable forest management was generally positive in North and Central America as a whole during the period 1990–2010, with the notable exception of the significant negative trends noted for the area of forest affected by fire and by insect pests and the slight decrease in the level of employment. There was, however, considerable variation among subregions, as can be seen in Table 2.

Oceania. Data availability is largely determined by Australia, since it accounts for 78 percent of the forest area in this region. With information missing from Australia for 1990 for many of these variables it is impossible to assess long-term trends in this region for most of the themes. The loss of primary forest and the increase in the net loss of forest area in the region are cause for concern, despite the fact that part of the loss of forest area may be a temporary loss of forest cover due to an extensive drought in Australia.

South America. Overall, progress towards sustainable forest management was mixed in South America. The rate of net forest loss continues to be a cause for concern although significant progress has been made, particularly in the last five years. The rate of loss of primary forest also remains alarmingly high. Nonetheless, there were also positive signs in the increased areas of forest designated for conservation of biological diversity and in protected areas. The decrease in removals of woodfuel may reflect a reduced demand for this product in the region, but this was partly offset by an increase in removals of industrial wood since 2000. The area of planted forests increased and may meet a larger proportion of the demand for wood in the future. The increase in the area of forest with a management plan is also a positive sign.

Is there progress towards sustainable forest management?

There are many good signs and positive trends at the global level, particularly in the last ten years, but many negative trends remain at regional, subregional and national levels. While the area of planted forest and conservation efforts are on the rise, the area of primary forests continues to decline at an alarming rate as these forests come under use or are converted to other uses. As the analyses above illustrate, the answer depends on the suite of indicators selected and the scale at which they are applied. Given this and the complexity of the question, the answer cannot be definitive.

NEXT STEPS

Members of the Collaborative Partnership on Forests (CPF), regional groups, non-governmental organizations and countries worked together in the design and implementation of FRA 2010. Joint planning for the next global assessment (FRA 2015) will commence in 2011 based on an in-depth evaluation of FRA 2010.

TABLE 2
Progress towards sustainable forest management by subregion, 1990–2010

Themes and variables	Africa									Asia		
	Eastern and Southern			Northern			Western and Central			East		
		R1	R2		R1	R2		R1	R2		R1	R2
Extent of forest resources												
Area of forest	H	●	●	H	●	●	H	●	●	H	●	●
Growing stock of forests	H	●	●	H	●	●	H	●	●	H	●	●
Forest carbon stock in living biomass	H	●	●	H	●	●	H	●	●	H	●	●
Forest biological diversity												
Area of primary forest	H	●	●	H	●	●	L	●	●	H	●	●
Area of forest designated primarily for conservation of biodiversity	H	●	●	H	●	●	M	●	●	H	●	●
Area of forest within protected areas	H	●	●	–	–	–	L	●	●	H	●	●
Forest health and vitality												
Area of forest affected by fire	L	●	●	–	–	–	–	–	–	H	●	●
Area of forest affected by insects	–	–	–	–	–	–	–	–	–	H	●	●
Productive functions of forest resources												
Area of forest designated primarily for production	H	●	●	H	●	●	M	●	●	H	●	●
Area of planted forest	H	●	●	H	●	●	H	●	●	H	●	●
Total wood removals	H	●	●	H	●	●	H	●	●	H	●	●
Protective functions of forest resources												
Area of forest designated primarily for protection of soil and water	H	●	●	H	●	●	M	●	●	H	●	●
Socio-economic functions of forests												
Area of forest under private ownership	H	●	●	H	●	●	H	●	●	H	●	●
Value of total wood removals	–	–	–	H	●	●	L	●	●	H	●	●
Employment in primary production of goods	L	●	●	–	–	–	–	–	–	H	●	●
Legal, policy and institutional framework												
Forest area with management plan	M	●	●	–	–	–	L	●	●	H	●	●
Human resources in public forest institutions	H	●	●	H	●	●	L	●	●	H	●	●
Number of students graduating in forestry	M	●	●	H	●	●	L	●	●	H	●	●

Notes:
R1 = Reference period 1: 1990–2000 with a few exceptions, see Notes to Table 1
R2 = Reference period 1: 2000–2010 with a few exceptions, see Notes to Table 1

H = High (reporting countries represent 75–100% of total forest area)
M = Medium (reporting countries represent 50–74% of total forest area)
L = Low (reporting countries represent 25–49% of total forest area)

● = Positive change (greater than 0.50%)
● = No major change (between -0.50 and 0.50%)
● = Negative change (less than -0.50%)
– = Insufficient data to determine trend

Asia						Europe					North and Central America							Oceania			South America		
South and Southeast			Western and Central			Total Europe		Europe excl. Russian Federation			Caribbean			Central America			North America							
	R1	R2		R1	R2		R1	R2		R1	R2		R1	R2		R1	R2		R1	R2		R1	R2
H	●	●	H	●	●	H	●	●	H	●	●	H	●	●	H	●	●	H	●	●	H	●	●	H	●	●
H	●	●	H	●	●	H	●	●	H	●	●	H	●	●	H	●	●	H	●	●	–	–	–	H	●	●
H	●	●	H	●	●	H	●	●	H	●	●	H	●	●	H	●	●	H	●	●	–	–	–	H	●	●
H	●	●	H	●	●	–	–	–	M	●	●	M	●	●	H	●	●	H	●	●	H	●	●	H	●	●
H	●	●	H	●	●	H	●	●	H	●	●	M	●	●	L	●	●	H	●	●	–	–	–	H	●	●
H	●	●	L	●	●	H	●	●	H	●	●	L	●	●	–	–	–	H	●	●	–	–	–	M	●	●
H	●	●	L	●	●	H	●	●	H	●	●	M	●	●	–	–	–	H	●	●	–	–	–	–	–	–
–	–	–	L	●	●	H	●	●	M	●	●	–	–	–	–	–	–	H	●	●	–	–	–	–	–	–
H	●	●	H	●	●	H	●	●	H	●	●	M	●	●	L	●	●	H	●	●	H	●	●	H	●	●
H	●	●	H	●	●	H	●	●	H	●	●	M	●	●	H	●	●	H	●	●	H	●	●	H	●	●
H	●	●	H	●	●	H	●	●	H	●	●	H	●	●	M	●	●	H	●	●	H	●	●	H	●	●
H	●	●	H	●	●	H	●	●	H	●	●	M	●	●	L	●	●	H	●	●	–	–	–	H	●	●
H	●	●	H	●	●	H	●	●	H	●	●	M	●	●	L	●	●	H	●	●	–	–	–	H	●	●
M	●	●	M	●	●	–	–	–	H	●	●	L	●	●	–	–	–	H	●	●	–	–	–	M	●	●
L	●	●	M	●	●	H	●	●	M	●	●	–	–	–	L	●	●	L	●	●	H	●	●	–	–	–
L	●	●	L	●	●	H	●	●	H	●	●	L	●	●	–	–	–	L	●	●	–	–	–	M	●	●
M	●	●	L	●	●	–	–	–	M	●	●	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
L	●	●	L	●	●	–	–	–	M	●	●	L	●	●	L	●	●	M	●	●	–	–	–	H	●	●