



Food and Agriculture  
Organization of the  
United Nations

# Global Forest Resources Assessment 2020 *Main report*



Global  
Forest  
Resources  
Assessment  
2020  
*Main report*

**Required citation:**

FAO. 2020. *Global Forest Resources Assessment 2020: Main report*. Rome.  
<https://doi.org/10.4060/ca9825en>

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ISBN 978-92-5-132974-0

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# Foreword

In September 2015, the world's leaders agreed on the 2030 Agenda for Sustainable Development, including its 17 Sustainable Development Goals. The 2030 Agenda is now guiding the development of policies worldwide aimed at eradicating poverty and hunger, promoting sustained, inclusive and sustainable growth, reducing inequalities, tackling climate change and environmental degradation, and sustainably managing our natural resources.

Forests are at the heart of the 2030 Agenda. They are a source of food, medicines and biofuel for more than 1 billion people. They protect soils and water, host more than three-quarters of the world's terrestrial biodiversity, and help tackle climate change. Forests provide many products and services that contribute to socio-economic development and create work and income for tens of millions of people.

Forests have immense potential to support sustainable development pathways, and the key to realizing this is reliable evidence. Accurate information on forest resources is also needed to monitor progress towards the nationally determined contributions of countries under the Paris Agreement on climate change; the Global Forest Goals and Targets of the United Nations Strategic Plan for Forests 2017–2030; and the forthcoming post-2020 global biodiversity framework and United Nations Decade on Ecosystem Restoration.

FAO completed its first assessment of the world's forest resources in 1948. At that time, its major objective was to collect information on available timber supply to satisfy post-war reconstruction demand. Since then, the Global Forest Resources Assessment (FRA) has evolved into a comprehensive evaluation of forest resources and their condition, management and uses, covering all the thematic elements of sustainable forest management.

This, the latest of these assessments, examines the status of, and trends in, forest resources over the period 1990–2020, drawing on the efforts of hundreds of experts worldwide. The production of FRA 2020 also involved collaboration among many partner organizations, thereby reducing the reporting burden on countries, increasing synergies among reporting processes, and improving data consistency.

The results of FRA 2020 are available in several formats, including this report and an online database containing the original inputs of countries and territories as well as desk studies and regional and global analyses prepared by FAO. I invite you to use these materials to support our common journey towards a more sustainable future with forests.



**Maria Helena Semedo**  
Deputy Director-General



# Acknowledgements

The Global Forest Resources Assessment (FRA) 2020 is the result of a collective effort by the FAO Forestry Department, FAO member countries, institutional and resource partners, and many individuals.

More than 700 people have been directly involved in the FRA 2020 process. They include 342 national correspondents and their alternates and collaborators, who compiled the detailed country reports, and more than 30 external reviewers who, together with FAO experts, supported the national correspondents in obtaining the best-possible quality and consistency in the reports. Ten FAO experts coordinated the FRA 2020 process, including related capacity development, the compilation, review and analysis of data, and preparation of this report.

The FRA 2020 process was supported by two groups of experts: participants in the expert consultation held in Joensuu, Finland, in 2017; and the FRA Advisory Group. The expert consultation provided initial guidance on the scope and reporting content of FRA 2020, and the FRA Advisory Group guided overall implementation.

The Collaborative Forest Resources Questionnaire partners made important contributions to data collection and review. Roman Michalak (Forestry and Timber Section of the United Nations Economic Commission for Europe) and Rastislav Raši (FOREST EUROPE) supported data collection and review for the pan-European countries; they also coordinated the following team of reviewers for those countries: Martin Moravčík, Ivana Pešut, Matej Schwarz, Roksolana Shelest, Venera Surappaeva, Stein Michael Tomter and Mati Valgepea. Adjé Olivier Ahimin (International Tropical Timber Organization) assisted in the preparation and review of reports for francophone African countries. Florence Palla and Donald Jomha Djossi (Central Africa Forest Observatory of the Central African Forest Commission) assisted with the preparation and review of reports for the Central African countries. Lars Gunnar Marklund (Swedish University of Agricultural Sciences) assisted in the data-collection, review, analysis and reporting phases of the FRA 2020 process. Tom Brandeis (United States Forest Service) supported the reporting and review process for the Caribbean English-speaking countries.

A number of countries and institutions provided the FRA 2020 process with technical support, including the Center for International Forestry Research, the National Forestry Commission (Mexico), the Forest Stewardship Council, the Forest Survey of India, the Joint Research Centre of the European Commission, the Natural Resources Institute Finland, the Programme for the Endorsement of Forest Certification, the Swedish University of Agricultural Sciences, the Pacific Community, and Wageningen University.

Collaboration with Google and SERVIR (a joint venture between the National Aeronautics and Space Administration of the United States of America and the United States Agency for International Development) ensured that all countries and territories had access to freely available geospatial data and products, and it also enabled the customization of Collect Earth Online for the collection of data for the FRA remote sensing survey.

The FRA 2020 process and its various activities received financial support from Finland's Ministry for Foreign Affairs and Ministry of Agriculture and Forestry; the European Union; the Government of Norway; the Global Environment Facility; Australia's Department of Agriculture, Water and the Environment; New Zealand's Ministry for Primary Industries; Japan's Forestry Agency in the Ministry of Agriculture, Forestry and Fisheries; and Natural Resources Canada.

The drafting and preparation of this report was coordinated by Anssi Pekkarinen, Monica Garzuglia and Örjan Jonsson. Other contributors were Anne Branthomme, Benjamin Caldwell, Valeria Contessa, Donatas Dudutis, Adolfo Kindgard, Jarkko Koskela, Arvydas Lebedys, Agamy Mohamed, Peter Moore, Chiara Patriarca, Sara Maulo and Simona Sorrenti. The FRA 2020 process was supported by Lucilla Marinaro, Marisalee Palermo, Giordana Conti and Esther Phillips.

The report was edited by Alastair Sarre and proofread by James Kenneth Varah. Chiara Caproni did the design and layout.

FAO is grateful to all countries and territories, institutions and individuals who have made FRA 2020 possible.



# Acronyms and abbreviations

|               |   |
|---------------|---|
| <b>BCEF</b>   | biomass conversion and expansion factor                 |
| <b>CFRQ</b>   | Collaborative Forest Resources Questionnaire            |
| <b>FAO</b>    | Food and Agriculture Organization of the United Nations |
| <b>FRA</b>    | Global Forest Resources Assessment                      |
| <b>FSC</b>    | Forest Stewardship Council                              |
| <b>Gt</b>     | gigatonne(s)  |
| <b>ha</b>     | hectare(s)  |
| <b>IPCC</b>   | Intergovernmental Panel on Climate Change               |
| <b>IUCN</b>   | International Union for Conservation of Nature          |
| <b>n.a.</b>   | not applicable  |
| <b>NFI</b>    | national forest inventory                               |
| <b>n.s.</b>   | not significant   |
| <b>PEFC</b>   | Programme for the Endorsement of Forest Certification   |
| <b>RSS</b>    | remote sensing survey                                   |
| <b>SDG</b>    | Sustainable Development Goal                            |
| <b>UNFCCC</b> | United Nations Framework Convention on Climate Change   |



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Note that numbers given in the text, tables and figures in this report may not sum to the totals indicated and percentages may not tally to 100 due to rounding. Not all countries reported on all parameters mentioned herein.

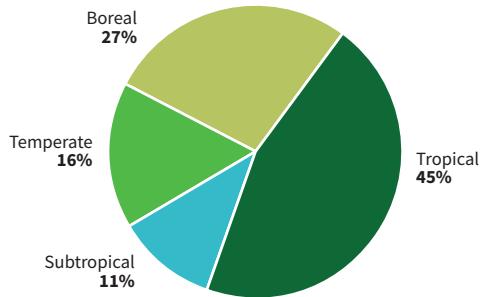
# Key findings

## FORESTS COVER NEARLY ONE-THIRD OF THE LAND GLOBALLY

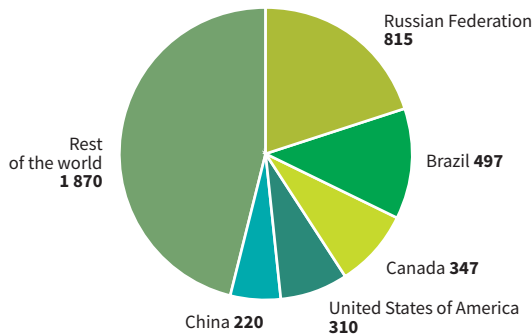
The world has a total forest area of 4.06 billion hectares (ha), which is 31 percent of the total land area. This area is equivalent to 0.52 ha per person<sup>1</sup> – although forests are not distributed equally among the world’s people or geographically. The tropical domain has the largest proportion of the world’s forests (45 percent), followed by the boreal, temperate and subtropical domains.

More than half (54 percent) of the world’s forests is in only five countries – the Russian Federation, Brazil, Canada, the United States of America and China.

Proportion of global forest area by climatic domain, 2020



Top five countries for forest area, 2020 (million ha)



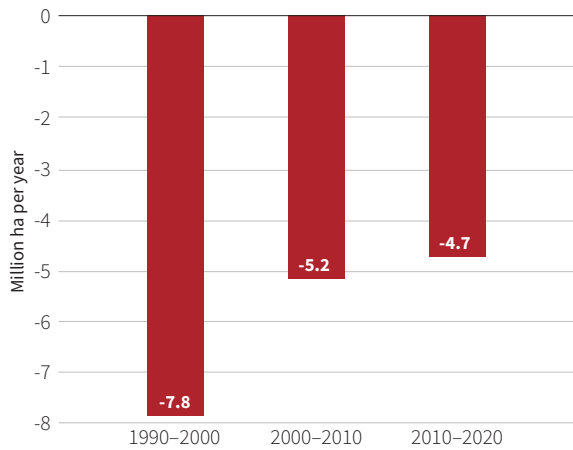
## THE WORLD’S FOREST AREA IS DECREASING, BUT THE RATE OF LOSS HAS SLOWED

The world has lost a net area of 178 million ha of forest since 1990, which is an area about the size of Libya.

The rate of net forest loss decreased substantially over the period 1990–2020 due to a reduction in deforestation in some countries, plus increases in forest area in others through afforestation and the natural expansion of forests.

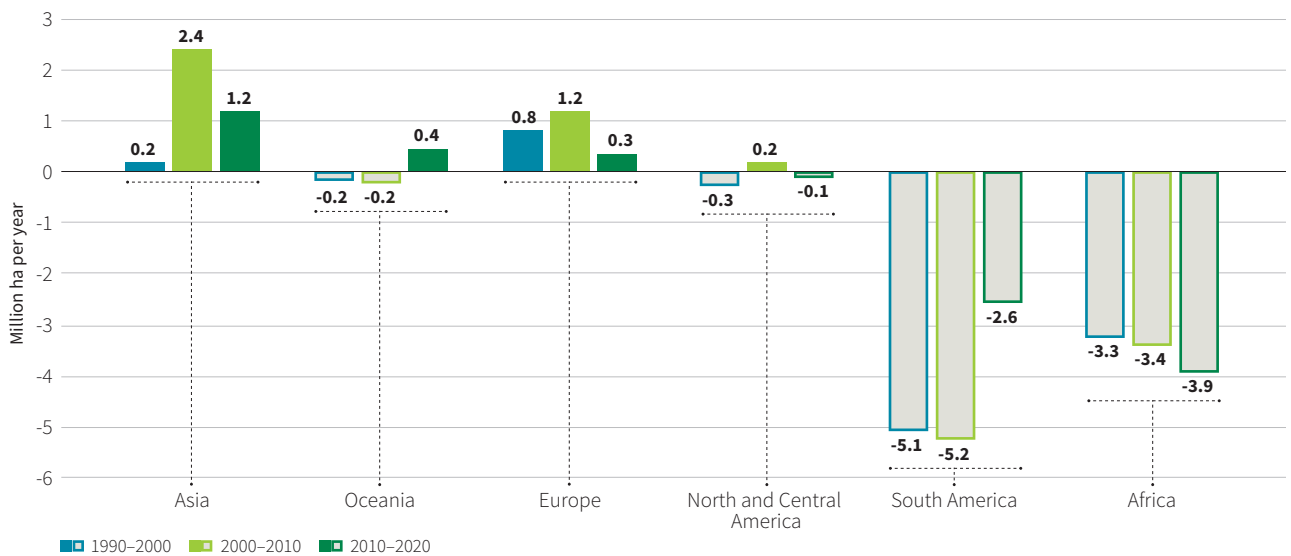
The rate of net forest loss declined from 7.8 million ha per year in the decade 1990–2000 to 5.2 million ha per year in 2000–2010 and 4.7 million ha per year in 2010–2020. The rate of decline of net forest loss slowed in the most recent decade due to a reduction in the rate of forest expansion.

Global annual forest area net change, by decade, 1990–2020



<sup>1</sup> Calculated assuming a global population of 7.79 billion people, as estimated in United Nations, Department of Economic and Social Affairs, Population Division (2019).

## Annual forest area net change, by decade and region, 1990–2020



### AFRICA HAS THE HIGHEST NET LOSS OF FOREST AREA

Africa had the highest annual rate of net forest loss in 2010–2020, at 3.9 million ha, followed by South America, at 2.6 million ha.

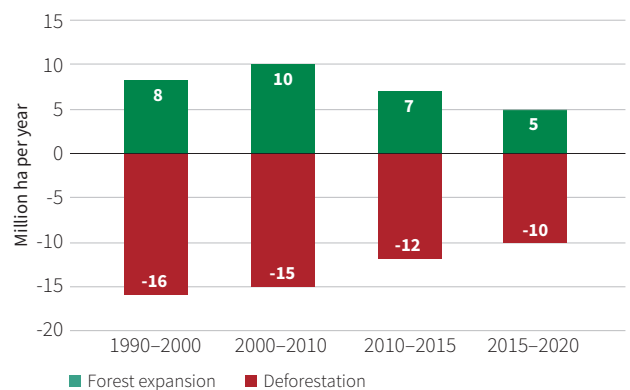
The rate of net forest loss has increased in Africa in each of the three decades since 1990. It has declined substantially in South America, however, to about half the rate in 2010–2020 compared with 2000–2010.

Asia had the highest net gain of forest area in 2010–2020, followed by Oceania and Europe.<sup>2</sup> Nevertheless, both Europe and Asia recorded substantially lower rates of net gain in 2010–2020 than in 2000–2010. Oceania experienced net losses of forest area in the decades 1990–2000 and 2000–2010.

### DEFORESTATION CONTINUES, BUT AT A LOWER RATE

An estimated 420 million ha of forest has been lost worldwide through deforestation since 1990, but the rate of forest loss has declined substantially. In the most recent five-year period (2015–2020), the annual rate of deforestation was estimated at 10 million ha, down from 12 million ha in 2010–2015.

### Annual rate of forest expansion and deforestation, 1990–2020



<sup>2</sup> According to the regional breakdown used in FRA 2020, Europe includes the Russian Federation.

### MORE THAN 90 PERCENT OF THE WORLD'S FORESTS HAS REGENERATED NATURALLY

Ninety-three percent (3.75 billion ha) of the forest area worldwide is composed of naturally regenerating forests and 7 percent (290 million ha) is planted.

The area of naturally regenerating forest has decreased since 1990 (at a declining rate of loss), but the area of planted forest has increased by 123 million ha. The rate of increase in the area of planted forest has slowed in the last ten years.

### PLANTATIONS ACCOUNT FOR ABOUT 3 PERCENT OF THE WORLD'S FORESTS

Plantation forests cover about 131 million ha, which is 3 percent of the global forest area and 45 percent of the total area of planted forests.

The highest share of plantation forest is in South America, where this forest type represents 99 percent of the total planted forest area and 2 percent of the total forest area.

The lowest share of plantation forest is in Europe, where it represents 6 percent of the planted forest estate and 0.4 percent of the total forest area.

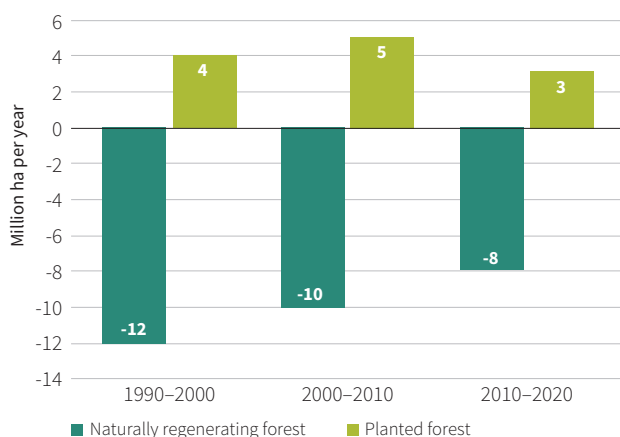
Globally, 44 percent of plantation forests feature introduced species. There are large differences between regions: for example, plantation forests in North and Central America are composed mostly of native species and those in South America consist almost entirely of introduced species.

### MORE THAN 700 MILLION HA OF FOREST IS IN LEGALLY ESTABLISHED PROTECTED AREAS

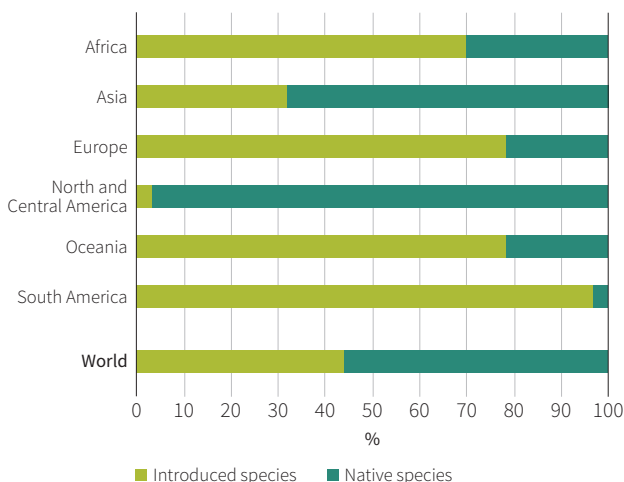
There is an estimated 726 million ha of forest in protected areas worldwide. Of the six world regions, South America has the highest share of forests in protected areas, at 31 percent.

The area of forest in protected areas globally has increased by 191 million ha since 1990, but the rate of annual increase slowed in 2010–2020.

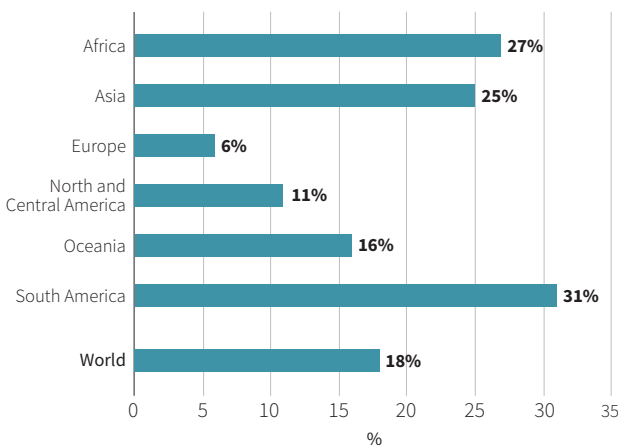
Annual net change in area of naturally regenerating and planted forest, by decade, 1990–2020



Proportion of introduced and native species in plantation forest, by region, 2020



Proportion of forest in protected areas, by region, 2020



### PRIMARY FORESTS COVER ABOUT 1 BILLION HA

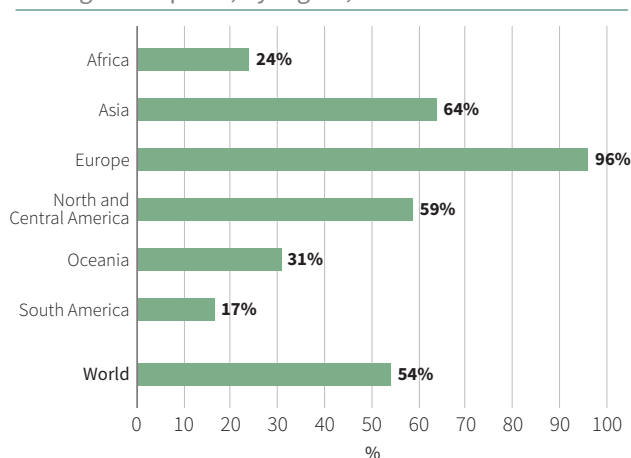
The world still has at least 1.11 billion ha of primary forest – that is, forests composed of native species in which there are no clearly visible indications of human activity and the ecological processes have not been significantly disturbed. Combined, three countries – Brazil, Canada and the Russian Federation – host more than half (61 percent) of the world’s primary forest.

The area of primary forest has decreased by 81 million ha since 1990, but the rate of loss more than halved in 2010–2020 compared with the previous decade.

### MORE THAN 2 BILLION HA OF FOREST HAS MANAGEMENT PLANS

Most of the forests in Europe have management plans; on the other hand, management plans exist for less than 25 percent of forests in Africa and less than 20 percent in South America. The area of forest under management plans is increasing in all regions – globally, it has grown by 233 million ha since 2000, reaching 2.05 billion ha in 2020.

Proportion of forest area with long-term management plans, by region, 2020



### FIRE IS A PREVALENT FOREST DISTURBANCE IN THE TROPICS

Forests face many disturbances that can adversely affect their health and vitality and reduce their ability to provide a full range of goods and ecosystem services. About 98 million ha of forest was affected by fire in 2015;<sup>3</sup> this was mainly in the tropical domain, where fire burned about 4 percent of the total forest area in that year. More than two-thirds of the total forest area affected was in Africa and South America.

Insects, disease and severe weather events damaged about 40 million ha of forests in 2015, mainly in the temperate and boreal domains.

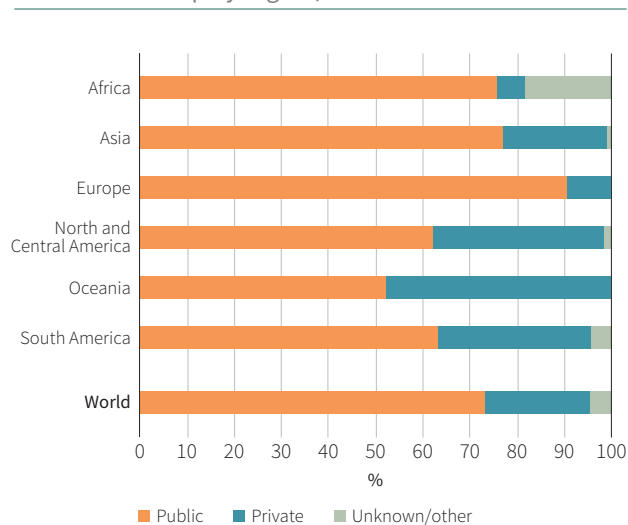
### THE WORLD’S FORESTS ARE MOSTLY PUBLICLY OWNED, BUT THE SHARE OF PRIVATELY OWNED FORESTS HAS INCREASED SINCE 1990

Seventy-three percent of the world’s forests is under public ownership,<sup>4</sup> 22 percent is privately owned, and the ownership of the remainder is categorized as either “unknown” or “other” (the latter mainly comprising forests where ownership is disputed or in transition).

Public ownership is predominant in all regions and most subregions. Of the regions, Oceania, North and Central America and South America have the highest proportions of private forests.

Globally, the share of publicly owned forests has decreased since 1990 and the area of forest under private ownership has increased.

Forest ownership by region, 2015



<sup>3</sup> The latest year for which global data are available.

<sup>4</sup> As of 2015, the latest year for which global data are available.



Public administrations hold management rights to 83 percent of the publicly owned forest area globally. Management by public administrations is particularly predominant in South America, where it accounts for 97 percent of management responsibility in publicly owned forests. The share of public administration management rights has decreased globally since 1990, with an increasing share of publicly owned forests managed by business entities and institutions and by indigenous and tribal communities.

**THE WORLD’S FOREST GROWING STOCK IS DECLINING**

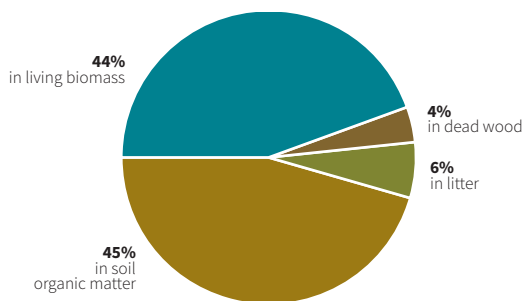
The world’s total growing stock of trees decreased slightly, from 560 billion m<sup>3</sup> in 1990 to 557 billion m<sup>3</sup> in 2020, due to a net decrease in forest area. On the other hand, growing stock is increasing per unit area globally and in all regions; it rose from 132 m<sup>3</sup> per ha in 1990 to 137 m<sup>3</sup> per ha in 2020. Growing stock per unit area is highest in the tropical forests of South and Central America and West and Central Africa.

The world’s forests contain about 606 gigatonnes of living biomass (above- and below-ground) and 59 gigatonnes of dead wood. The total biomass has decreased slightly since 1990, but biomass per unit area has increased.

**TOTAL FOREST CARBON STOCK IS DECREASING**

Most forest carbon is found in the living biomass (44 percent) and soil organic matter (45 percent), with the remainder in dead wood and litter. The total carbon stock in forests decreased from 668 gigatonnes in 1990 to 662 gigatonnes in 2020; carbon density increased slightly over the same period, from 159 tonnes to 163 tonnes per ha.

Proportion of carbon stock in forest carbon pools, 2020



**ABOUT 30 PERCENT OF ALL FORESTS IS USED PRIMARILY FOR PRODUCTION**

Globally, about 1.15 billion ha of forest is managed primarily for the production of wood and non-wood forest products. In addition, 749 million ha is designated for multiple use, which often includes production.

Worldwide, the area of forest designated primarily for production has been relatively stable since 1990, but the area of multiple-use forest has decreased by about 71 million ha.

**ABOUT TEN PERCENT OF THE WORLD’S FORESTS IS ALLOCATED FOR BIODIVERSITY CONSERVATION**

Globally, 424 million ha of forest is designated primarily for biodiversity conservation. In total, 111 million ha has been so designated since 1990, of which the largest part was allocated between 2000 and 2010. The rate of increase in the area of forest designated primarily for biodiversity conservation has slowed in the last ten years.

**THE AREA OF FOREST DESIGNATED PRIMARILY FOR SOIL AND WATER PROTECTION IS INCREASING**

An estimated 398 million ha of forest is designated primarily for the protection of soil and water, an increase of 119 million ha since 1990. The rate of increase in the area of forest allocated for this purpose has grown over the entire period but especially in the last ten years.

**MORE THAN 180 MILLION HA OF FOREST IS USED MAINLY FOR SOCIAL SERVICES**

An area of 186 million ha of forest worldwide is allocated for social services such as recreation, tourism, education research and the conservation of cultural and spiritual sites. The area designated for this forest use has increased at a rate of 186 000 ha per year since 2010.





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# Introduction



# S

ince its creation, the Food and Agriculture Organization of the United Nations (FAO) has, at the request of its member countries, regularly collected, analysed and disseminated information on the status of and trends in the world's forest resources through the Global Forest Resources Assessment (FRA).

The scope, methodology and periodicity of FRAs have evolved over time in response to changing information needs. Early assessments were mainly FAO-driven processes focused on timber availability; later assessments have been country-driven, with a more holistic perspective (FAO, 2018a). Since 2005, FRAs have relied on country data provided by a well-established network of officially nominated national correspondents.

As FRAs have evolved to become more comprehensive, the amount of information requested from members has increased substantially. In the past, the reporting burden on countries was exacerbated by requests for the same or similar data from other forest-related reporting processes. Starting from FRA 2005, however, FAO's FRA secretariat has collaborated with other international reporting processes and organizations involved in the collection of forest-related data, and it has worked with members of the Collaborative Partnership on Forests to improve definitions and streamline reporting. This approach led to the establishment of the Collaborative Forest Resources Questionnaire (CFRQ),<sup>5</sup> which was used in the production of FRA 2015. In consultation with countries and international experts, the FRA secretariat also reviewed the scope of assessments with the aim of avoiding overlaps with other data-collection processes and further reducing the reporting burden.

<sup>5</sup> In 2011, FAO, the International Tropical Timber Organization, FOREST EUROPE, the United Nations Economic Commission for Europe, the Observatory of Central African Forests and the countries of the Montréal Process combined to create the CFRQ. This joint questionnaire was established with the aim of reducing the reporting burden on countries and increasing data consistency across organizations through standardized definitions and the common timing of data collection.

FRA 2020 has continued on this path, with adaptations to its scope and reporting periodicity to better respond to recent developments in international forestry. For the first time since FRA 2000, the number of variables has been reduced (to about 60 broad categories), and an online platform has been put in place to facilitate reporting. This platform also serves to increase transparency, the reliability of results, and the accessibility and usability of data for end users (Box 1).

## Process

Preparations for FRA 2020 began with an internal evaluation of FRA 2015 and an online user survey, which helped determine the scope and reporting content of FRA 2020. Scope and content were also addressed in consultations with various teams in the FAO Forestry Department, the FRA Advisory Group,<sup>6</sup> CFRQ partners and the FAO/United Nations Economic Commission for Europe Team of Specialists on Monitoring Sustainable Forest Management. The Seventh Expert Consultation on FRA, held in Joensuu, Finland, in June 2017, concluded this consultation cycle and provided important inputs into the scope and reporting content of FRA 2020 (Luke, 2017). The recommendations of the Seventh Expert Consultation focused on developing the capacity of FRA to provide timely responses to information requirements while also further reducing the reporting burden on countries. The agenda of that meeting reflected significant recent developments in international forest policy, including the Paris Agreement on climate change, the Sustainable Development Goals (SDGs) (Box 2, p. 7),

<sup>6</sup> The FRA Advisory Group was established in 2002 on the recommendation of an expert consultation in Kotka, Finland. The FRA Advisory Group is informal in nature, but it is recognized by FAO's Committee on Forestry, which generally endorses its recommendations. The group has a long-term commitment to meet annually. Its role is to review FRA activities and outputs and to make recommendations aimed at strengthening existing institutional networks and making future FRAs more user-oriented and demand-driven and more closely linked with other international processes.

## Box 1. The Global Forest Resources Assessment online platform

Evaluations of previous Global Forest Resources Assessments (FRAs) identified a need for an online tool to facilitate reporting and the dissemination of results to end users. The FRA 2020 online platform aims to:

- **Increase transparency** – the platform contains all the documentation necessary for understanding how the reported figures were produced, including original data sources, definitions, and the methodologies applied to convert national figures to FRA estimates.
- **Ensure ease of use** – the platform has an intuitive interface enabling easy data entry, copying and pasting from existing datasheets, and the uploading of existing documentation.
- **Add value** – the platform expedites reporting and guarantees consistency in reported values.
- **Improve communication** – the platform enables a transparent review process and facilitates communication between countries and reviewer teams.
- **Improve dissemination** – the platform provides easy access to country-reported data and summary information.

For countries that lack inventory and monitoring systems capable of producing annual data, the platform

is a useful tool for generating consistent interpolations and extrapolations of data and provides a transparent mechanism for reviewing data and updating them. To facilitate the reporting process, especially for countries where forest information is limited or unavailable, the platform enables access to previous country reports as well as freely available geospatial data derived from remote sensing.

The platform stores all the information and data provided by countries and territories, which will substantially expedite future reporting.

The platform makes a significant contribution to the implementation of the 2030 Agenda for Sustainable Development and to reporting on the forest-related indicators of the Sustainable Development Goals (SDGs), which was initiated in 2016 and will continue annually. In addition to the SDGs, the platform serves as a common reporting tool for other partners of the Collaborative Forest Resources Questionnaire. For example, the platform has been used to collect data for pan-European reporting on indicators of sustainable forest management in collaboration with FOREST EUROPE and the United Nations Economic Commission for Europe.

**TABLE 1. Key milestones in the development of the Global Forest Resources Assessment 2020**

| Milestone/activity                               | Date   | Comment   |
|--|--|---|
| Global meeting of national correspondents        | March 2018                                     | Launch of the Global Forest Resources Assessment (FRA) 2020 process. Training of national correspondents and work on key variables for reporting on the Sustainable Development Goals |
| Deadline for submission of draft country reports | Ten days before regional/subregional workshops | Draft country reports submitted for first review at least ten days before participation in regional/subregional workshops   |
| Regional/subregional workshops                   | April 2018–December 2018                       | Technical assistance and review of draft country reports  |
| Official validation of final country reports     | September 2019                                 | Official request for validation of final country reports sent to national authorities   |
| Release of FRA 2020 key findings                 | May 2020                                       | Key results of FRA 2020   |
| Launch of FRA 2020 main report                   | Second half of 2020                            | Full results, country reports and database published at the 25th Session of the FAO Committee on Forestry   |

and the United Nations Strategic Plan for Forests 2017–2030,<sup>7</sup> all of which have set new demands for the FRA process in terms of both scope and periodicity.

The FRA 2020 country reporting process started with a technical meeting in Toluca, Mexico, in March 2018 (Table 1 shows key milestones in the process). This meeting brought together nearly 160 participants from more than 90 countries, including national correspondents, representatives of the CFRQ, and members of the FRA Advisory Group. At the meeting, national correspondents familiarized themselves with all aspects of the reporting process.

Throughout the reporting phase, Regional FRA focal points were in regular contact with the national correspondents and their teams to provide technical support on the reporting tables, the analysis and interpretation of national data, and the use of the online reporting platform.

Nine regional and subregional workshops were organized in April–December 2018 to further support countries in compiling and finalizing the FRA 2020 country reports (FAO, undated). These workshops provided a forum in which national correspondents could share their experiences with colleagues from other countries.

National correspondents submitted their country reports, once compiled, through the online platform for technical review. In this review, the draft country reports underwent detailed checks to ensure completeness and the correct application of definitions and methodologies. Internal consistency was checked and a comparison made with information provided for FRA 2015 and with other published information sources. Around 30 experts from among FAO staff, CFRQ partners and other international bodies contributed to the review process. A final validation phase was conducted to officially inform the heads of forestry of each country of the contents of the report and to request their clearance for publication on a no-objection basis.

<sup>7</sup> The United Nations Strategic Plan for Forests 2017–2030 provides a global framework for action at all levels to sustainably manage all types of forests and trees outside forests, and to halt deforestation and forest degradation. The plan was agreed at a special session of the United Nations Forum on Forests in January 2017 and subsequently adopted by the United Nations General Assembly in April 2017.

## Scope

FRA 2020 examines the status and trends of around 60 broad categories (under seven main topics) in the period 1990–2020. The backbone of the assessment are data reported through standardized country reports, which were compiled by officially nominated national correspondents through an online platform, as described above.

Each country report contains 22 reporting tables organized around the following main topics: forest extent and characteristics; growing stock, biomass and carbon; designation and management objectives; ownership and management rights; disturbances; policies and legislation; and employment, education and non-wood forest products. Annex 1 summarizes data for variables at the global and regional levels, and Annex 2 presents data on forest area for all countries and territories.

For each reporting table, countries were requested to provide full references for original data, describe the methodologies used for estimation, forecasting and reclassification, and explain any assumptions made.

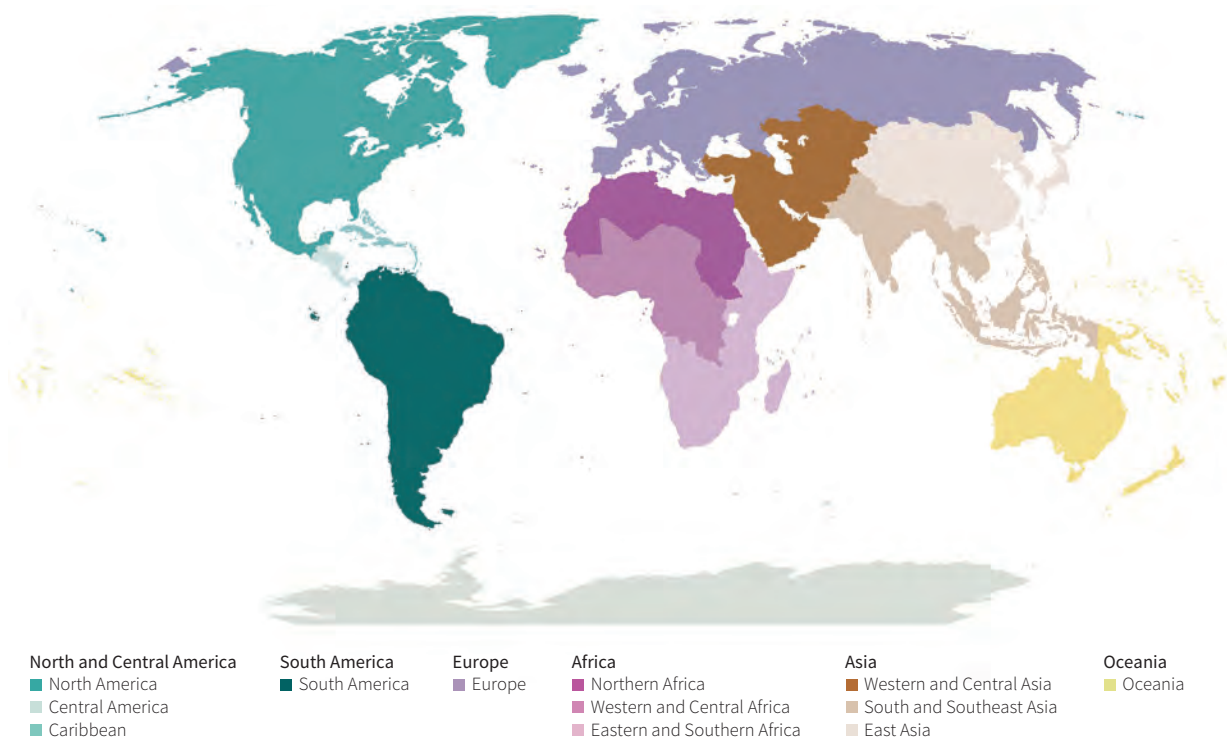
A total of 236 countries and territories are included in FRA 2020, based on the list used by the United Nations Statistics Division (United Nations Statistics Division, undated). The following listed units were excluded from FRA 2020 unless otherwise indicated:

- Åland Islands (included under Finland in FRA 2020)
- British Indian Ocean Territory
- Channel Islands (listed separately as Guernsey and Jersey)
- China, Hong Kong SAR (included under China)
- China, Macao SAR (included under China)
- Christmas Island
- Cocos (Keeling) Islands
- French Southern Territories
- Heard and McDonald Islands
- South Georgia and the South Sandwich Islands
- United States Minor Outlying Islands.

The Netherlands Antilles, reported as a single entity in FRA 2015, is reported in FRA 2020 as Bonaire, Sint Eustatius and Saba, Curaçao and Sint Maarten (Dutch part).

The regional and subregional groupings are those used in previous FRAs (Figure 1).

FIGURE 1. Regional and subregional breakdown used in the Global Forest Resources Assessment 2020



Source: Adapted from United Nations World map, 2020.

## Data analysis

Data submitted by countries through the online platform were stored in a database for easy retrieval and analysis. Forty-seven desk studies, representing 0.5 percent of the total forest area, were prepared for countries and territories that did not submit reports.

National data were aggregated to derive subregional, regional and global estimates. Trend estimates generally only include countries that reported complete time series (although, in some cases, gap-filling was performed for missing values to obtain complete time series for estimates of trends). It is not always possible, therefore, to reproduce the estimates of global, regional and subregional aggregates presented in this report by aggregating the reported country data.

This report presents the findings of the data analysis, comprising the status of and main trends in each variable.

## Outputs

In addition to this main report, outputs of FRA 2020 include:

- 236 country and territory reports, each in the language of official correspondence (English, French, Russian or Spanish);
- an interactive database with the complete FRA 2020 dataset;
- key findings (a summary of the FRA 2020 main findings at the global and regional levels in English, French and Spanish);
- FRA working papers, including on the FRA 2020 terms and definitions, FRA 2020 guidelines and specifications, and workshop reports; and
- scientific papers and special studies using FRA 2020 data, produced in collaboration with partner institutions and international experts (in preparation).

All FRA-related materials are available at [www.fao.org/forest-resources-assessment](http://www.fao.org/forest-resources-assessment).



## Box 2. Global Forest Resources Assessment reporting and the Sustainable Development Goals

The 193 member states of the United Nations adopted the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development in September 2015. The SDGs are global objectives expected to guide the actions of the international community between 2016 and 2030. A global indicator framework, which includes 232 indicators, was agreed in March 2017. Forests are important in several of the SDGs. In particular, SDG 15 – “life on land” – emphasizes the importance of forests for the sustainability of terrestrial ecosystems (Figure 2). FAO is the designated United Nations custodian agency for 21 SDG indicators and a contributing agency for another five. Three of these indicators are under SDG 15, and data for two of these are collected and reported through the Global Forest Resources Assessment.

Indicator 15.1.1 (“forest area as a proportion of total land area”) is derived directly by dividing the forest area reported by countries and territories to FRA by the official land area of each country and territory in 2015 (as reported to FAOSTAT); Figure 3 shows the indicator values, by region, for 2000, 2010, 2015 and 2020.

Indicator 15.2.1 (“progress towards sustainable forest management”) is more difficult to measure because there is no single quantifiable and measurable characteristic that fully encompasses the many dimensions of sustainable forest management. FAO worked with partners to develop a methodology for reporting, and a set of five subindicators was established to measure progress towards the economic, social and environmental dimensions of sustainable forest management.

The five subindicators are:

1. Forest area annual net change rate
2. Above-ground biomass stock in forest
3. Proportion of forest area located within legally established protected areas
4. Proportion of forest area under long-term forest management plans
5. Forest area under independently verified forest management certification schemes.

Subindicators 1–3 address the environmental values of forests, focusing on changes in forest area over time, biomass stored in forest, and actions taken to protect and maintain biodiversity and other natural and cultural resources. Subindicators 4 and 5 address all dimensions of sustainable forest management, including economic and social aspects.

The existence of forest management plans indicates the intention to manage the forests for long-term purposes. The area of certified forest provides information on the area of forest in which management complies with national or international standards, including independent verification.

Data on subindicators 1–4 are collected through the FRA country reporting process, and data for subindicator 5 are obtained from the main certification bodies (Box 6, p. 74). Detailed definitions and methodologies for each indicator and subindicator are available in the SDG metadata repository.<sup>8</sup>

At the regional and global levels, “traffic lights” are used to indicate, for each subindicator, whether the situation is stable, improving or deteriorating (Figure 4).

Figure 2. Sustainable Development Goal 15, and relevant targets

| SDG 15  | Targets*   | Indicators reported through FRA                        |
|---|--|--|
|  <p>Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</p> | 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements | 15.1.1: Forest area as a proportion of total land area |
|   | 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally  | 15.2.1: Progress towards sustainable forest management |

\* The full set of targets and indicators under SDG 15 is available at [www.un.org/sustainabledevelopment/biodiversity](http://www.un.org/sustainabledevelopment/biodiversity).

(Continued)

<sup>8</sup> The SDG indicators metadata repository is available at <https://unstats.un.org/sdgs/metadata>.

Box 2. (Continued)

FAO has reported data for these indicators and subindicators to the SDG secretariat annually since 2017. Reports up to 2019 were based on data from FRA 2015; from 2020 they will be based on FRA 2020, with updates from countries as new data become available.

Figure 3. Forest area as a proportion (%) of total land area, 2000, 2010 and 2015–2020, by Sustainable Development Goal regional grouping



(Continued)

Box 2. (Continued)

Figure 4. Traffic-light dashboard for subindicators of indicator 15.2.1, 2020

| SDG Region                               | Forest area annual net change rate <sup>1</sup> | Above-ground biomass stock in forest (t/ha) | Proportion of forest area with in legally established protected areas | Proportion of forest area under a long-term forest management plan | Forest area certified <sup>2</sup> |
|--|---|---|---|--|------------------------------------|
| <b>WORLD</b>                             | ●   | ●   | ●   | ●  | ●                                  |
| Central and Southern Asia                | ●   | ●   | ●   | ●  | ●                                  |
| Central Asia                             | ●   | ●   | ●   | ●  | ●                                  |
| Southern Asia                            | ●   | ●   | ●   | ●  | ●                                  |
| Eastern and South-Eastern Asia           | ●   | ●   | ●   | ●  | ●                                  |
| Eastern Asia                             | ●   | ●   | ●   | ●  | ●                                  |
| South-Eastern Asia                       | ●   | ●   | ●   | ●  | ●                                  |
| Northern Africa and Western Asia         | ●   | ●   | ●   | ●  | ●                                  |
| Northern Africa                          | ●   | ●   | ●   | ●  | ●                                  |
| Western Asia                             | ●   | ●   | ●   | ●  | ●                                  |
| Sub-Saharan Africa                       | ●   | ●   | ●   | ●  | ●                                  |
| Europe and Northern America              | ●   | ●   | ●   | ●  | ●                                  |
| Europe                                   | ●   | ●   | ●   | ●  | ●                                  |
| Northern America                         | ●   | ●   | ●   | ●  | ●                                  |
| Latin America and the Caribbean          | ●   | ●   | ●   | ●  | ●                                  |
| Oceania                                  | ●   | ●   | ●   | ●  | ●                                  |
| Oceania (exc. Australia and New Zealand) | ●   | ●   | ●   | ●  | ●                                  |
| Australia and New Zealand                | ●   | ●   | ●   | ●  | ●                                  |
| Landlocked Developing Countries (LLDCs)  | ●   | ●   | ●   | ●  | ●                                  |
| Least Developed Countries (LDCs)         | ●   | ●   | ●   | ●  | ●                                  |
| Small Island Developing States (SIDS)    | ●   | ●   | ●   | ●  | ●                                  |

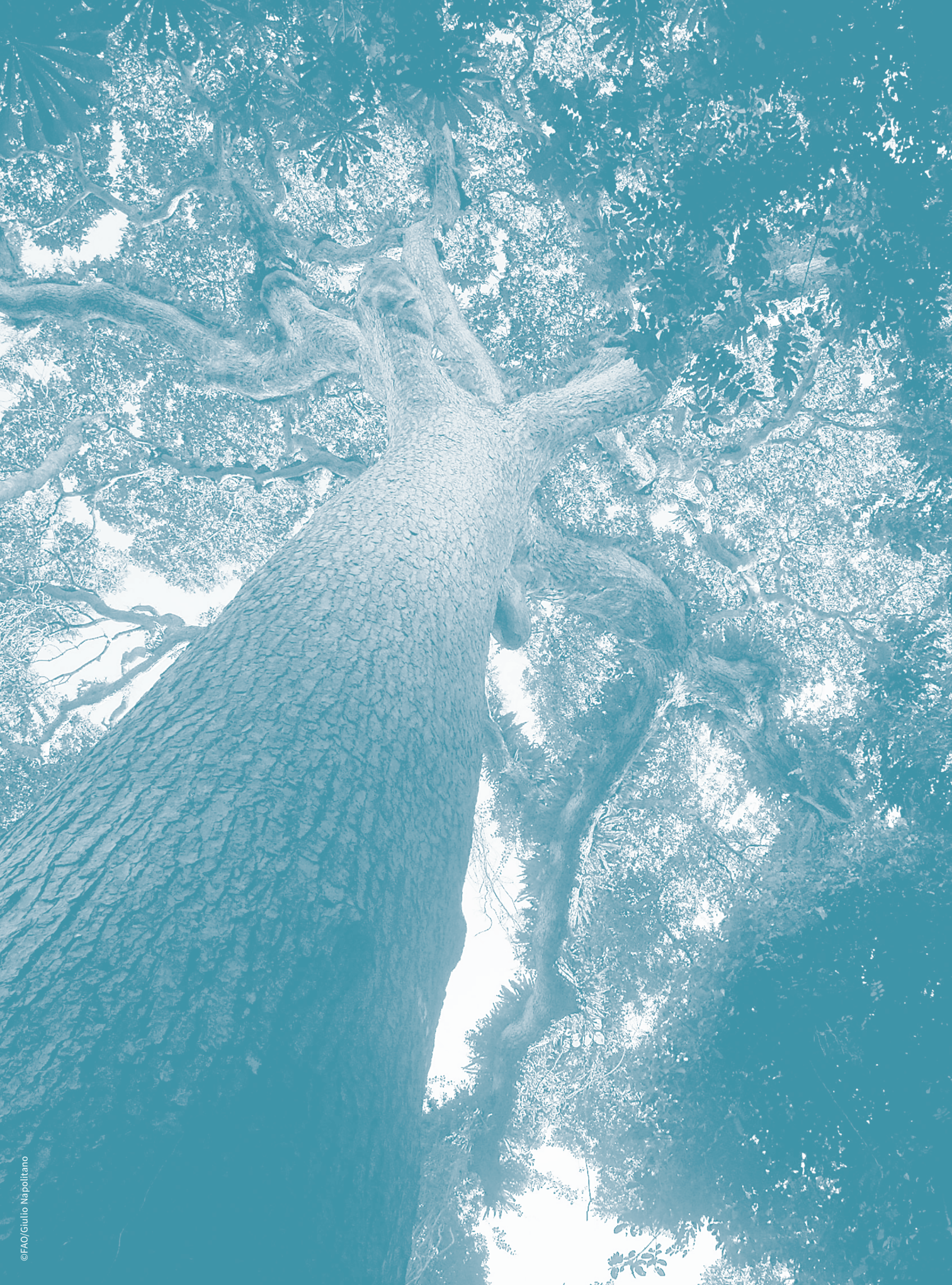
● Positive change   
● No/small change   
● Negative change   
● No certified areas

<sup>1</sup> Calculated as the compound annual change rate.  
<sup>2</sup> Includes areas certified under the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification.





# 2 Forest extent and changes



# F

Forests are crucial resources for addressing SDGs related to sustainable production and consumption, poverty alleviation, food security, biodiversity conservation and climate change.

The benefits of forests go well beyond forest boundaries and help maintain suitable conditions for life on Earth. Monitoring the extent and other aspects of the world's forests assists in identifying and amending unsustainable practices and in restoring and rehabilitating degraded forest landscapes.

## Box 3. Difference between deforestation and forest area net change

Deforestation is the conversion of forest to other land uses, such as agriculture and infrastructure. On the other hand, forest area can increase when trees are planted on land that was not previously forested ("afforestation") or when trees grow back on abandoned agricultural or other land ("natural forest expansion").

Over a given period, the sum of all losses due to deforestation and all gains due to afforestation and natural forest expansion results in forest area net change. Depending on whether forest expansion or deforestation prevails, forest area net change can be positive, meaning there has been an overall gain in forest area, or negative, meaning an overall loss of forest area. Thus:

$$\text{Forest area net change} = \sum \text{gains (forest expansion)} - \sum \text{losses (deforestation)}$$

The difference between forest area net change and deforestation is that the former is the result of all losses and gains and the latter takes into account only the area of forest that has been converted to other land uses. In FRA 2020, the net change in forest area was calculated as the difference in forest area between two points in time.

Information on forest area and the way it changes over time is essential for measuring progress towards the SDGs. Forests feature in the SDGs because of their significant contributions to food security and livelihoods and for the many products and ecosystem services they provide. SDG 15 ("life on land"), in particular, puts forests at the centre of the sustainability of terrestrial ecosystems, aiming to "protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss".

Changes in forest area over time reflect changes in demand for land for other uses. But, on its own, this parameter is insufficient to describe and explain complex land-use dynamics. Additional information is needed to understand how much forest has been lost due to conversion to other land uses and how much has been gained due to natural expansion and afforestation.

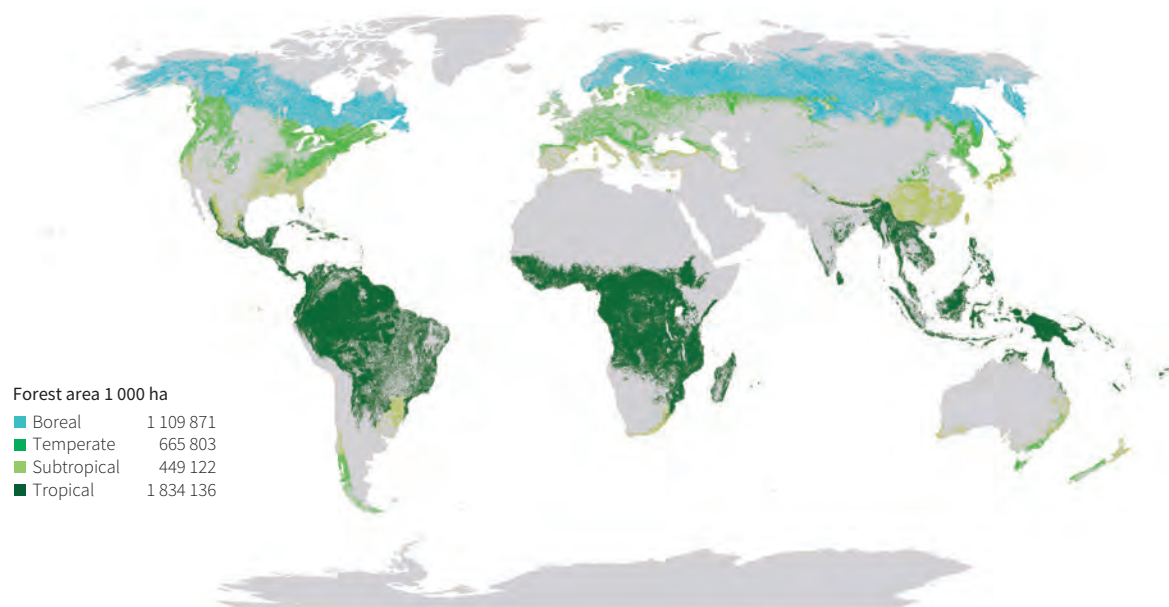
This chapter provides insight into such dynamics, presenting estimates of both deforestation and net forest area change at the regional and global levels (Box 3). It also provides data on two non-forest categories, "other wooded land" and "other land with tree cover", both of which are important resources in many countries.

## Forest area

### STATUS

FRA 2020 received data (or, for desk studies, made estimates based on available information) on forest area in 2020 for all 236 countries and territories included in the assessment. The global average of the reference years for the data used to estimate forest area for 2020 is 2011. Estimates for countries with large forest areas, however, are mostly based on more recent data; thus, 2015 is the weighted average reference year for forest area. In total, 143 countries and territories encompassing 80 percent of the world's total forest area based their forest-area estimates for 2020 on data published in 2013 or later. The availability of new data not only increases the reliability of forest-area estimates for 2020; in most cases

FIGURE 5. The global distribution of forests, by climatic domain



Source: Adapted from United Nations World map, 2020.

TABLE 2. Forest area, by region and subregion, 2020

| Region/subregion                       | Forest area      |                        |
|--|------------------|------------------------|
|  | 1 000 ha         | % of world forest area |
| Eastern and Southern Africa            | 295 778          | 7                      |
| Northern Africa                        | 35 151           | 1                      |
| Western and Central Africa             | 305 710          | 8                      |
| <b>Total Africa</b>                    | <b>636 639</b>   | <b>16</b>              |
| East Asia                              | 271 403          | 7                      |
| South and Southeast Asia               | 296 047          | 7                      |
| Western and Central Asia               | 55 237           | 1                      |
| <b>Total Asia</b>                      | <b>622 687</b>   | <b>15</b>              |
| Europe excl. Russian Federation        | 202 150          | 5                      |
| <b>Total Europe</b>                    | <b>1 017 461</b> | <b>25</b>              |
| Caribbean                              | 7 889            | 0                      |
| Central America                        | 22 404           | 1                      |
| North America                          | 722 417          | 18                     |
| <b>Total North and Central America</b> | <b>752 710</b>   | <b>19</b>              |
| <b>Total Oceania</b>                   | <b>185 248</b>   | <b>5</b>               |
| <b>Total South America</b>             | <b>844 186</b>   | <b>21</b>              |
| <b>WORLD</b>                           | <b>4 058 931</b> | <b>100</b>             |

it also improves trend estimates derived from historical and previously reported data. In most cases, data from 2013 or later were unavailable for FRA 2015; their availability for FRA 2020 explains differences in forest-area estimates in FRA 2015 and FRA 2020 for the same reference years.

The global forest area in 2020 is estimated at 4.06 billion ha, which is 31 percent of the total land area. This area is equivalent to 0.52 ha of forest per capita,<sup>9</sup> although forests are not distributed equally among the world's people or geographically. Forty-five percent of the world's forests are in the tropical domain, followed by the boreal (27 percent), temperate (16 percent) and subtropical (11 percent) domains (Figure 5). Table 2 shows the distribution of forest area at the regional and subregional levels. Europe accounts for 25 percent of the world's forest area, followed by South America (21 percent), North and Central America (19 percent), Africa (16 percent), Asia (15 percent) and Oceania (5 percent).

More than half (54 percent) of the world's forest area is in only five countries – the Russian Federation, Brazil, Canada, the United States of America and China. The ten countries with the largest forest area account for about two-thirds (66 percent) of the world total (Table 3).

<sup>9</sup> Calculated assuming a global population of 7.79 billion people, as estimated by United Nations, Department of Economic and Social Affairs, Population Division (2019).



**TABLE 3. Top ten countries for forest area, 2020**

| Ranking | Country                          | Forest area |                        |              |
|---------|----------------------------------|-------------|------------------------|--------------|
|         |                                  | 1 000 ha    | % of world forest area | % cumulative |
| 1       | Russian Federation               | 815 312     | 20                     | 20           |
| 2       | Brazil                           | 496 620     | 12                     | 32           |
| 3       | Canada                           | 346 928     | 9                      | 41           |
| 4       | United States of America         | 309 795     | 8                      | 49           |
| 5       | China                            | 219 978     | 5                      | 54           |
| 6       | Australia                        | 134 005     | 3                      | 57           |
| 7       | Democratic Republic of the Congo | 126 155     | 3                      | 60           |
| 8       | Indonesia                        | 92 133      | 2                      | 63           |
| 9       | Peru                             | 72 330      | 2                      | 64           |
| 10      | India                            | 72 160      | 2                      | 66           |

Eight countries and territories – the Falkland Islands (Malvinas),<sup>10</sup> Gibraltar, Holy See, Monaco, Nauru, Qatar, Svalbard and Jan Mayen Islands, and Tokelau – have no forest at all. Another 50 countries and territories have forest on less than 10 percent of their total land areas. Table 4 shows the top ten countries and territories for forest area as a percentage of total land area; among those, the value is 90 percent or above in seven countries (Figure 6).

### TRENDS

Trends in forest area were estimated for all 236 countries and territories in the assessment. They were analysed over a 30-year period divided into three decades: 1990–2000, 2000–2010 and 2010–2020. Note that, although reporting on forest area has generally improved, relatively few countries and territories have reliable data over the period, and the trends discussed below should be treated with caution.

The global forest area declined by about 178 million ha (an area approximately the size of Libya) in the 30 years from 1990 to 2020 (Table 5). The rate of net forest loss has decreased since 1990, a result of reduced deforestation in some countries and forest gains in others. The annual net loss of forest area declined from 7.84 million ha in 1990–2000, to 5.17 million ha in 2000–2010, to 4.74 million in 2010–2020 (Table 6 and Figure 6 show this parameter by region and subregion). The rate of decline of net forest loss in the most recent decade was due mainly to a reduction in the rate of forest gain (i.e. afforestation and the natural expansion of forests).

<sup>10</sup> A dispute exists between the Government of Argentina and the Government of the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

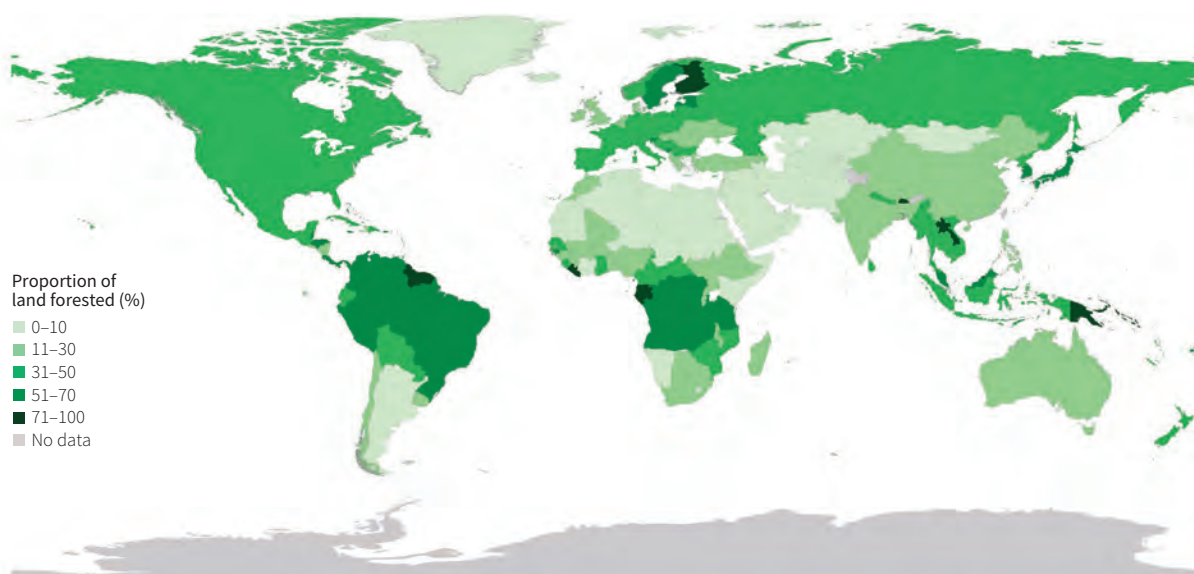
**TABLE 4. Top ten countries and territories for forest area as a percentage of total land area, 2020**

| Ranking | Country                          | Forest area |                      |
|---------|----------------------------------|-------------|----------------------|
|         |                                  | 1 000 ha    | % of total land area |
| 1       | Suriname                         | 15 196      | 97                   |
| 2       | French Guyana                    | 8 003       | 97                   |
| 3       | Guyana                           | 18 415      | 94                   |
| 4       | Micronesia (Federated States of) | 64          | 92                   |
| 5       | Gabon                            | 23 531      | 91                   |
| 6       | Solomon Islands                  | 2 523       | 90                   |
| 7       | Palau                            | 41          | 90                   |
| 8       | Equatorial Guinea                | 2 448       | 87                   |
| 9       | American Samoa                   | 17          | 86                   |
| 10      | Papua New Guinea                 | 35 856      | 79                   |

Africa had the highest net loss of forest area in the decade to 2020, with Eastern and Southern Africa and Western and Central Africa accounting for most of the losses. There has been an increase in the average annual rate of net forest loss in Africa since 1990, from 3.28 million ha in 1990–2000, to 3.40 million ha in 2000–2010, to 3.94 million ha in the most recent decade. The increase in the rate over the period was most evident in Eastern and Southern Africa, where it grew from 1.35 million ha per year in the 1990s to 1.91 million ha per year in 2010–2020.

South America had the second-highest average annual rate of net forest loss in 2010–2020, at 2.60 million ha, although this was less than half the rate in 2000–2010 (5.25 million ha). The regional trend mostly reflects changes

FIGURE 6. Forest area as a percentage of total land area, 2020



Source: Adapted from United Nations World map, 2020.

TABLE 5. Forest area, by region and subregion, 1990–2020

| Region/subregion                       | Forest area (1 000 ha) |                  |                  |                  |
|--|------------------------|------------------|------------------|------------------|
|  | 1990                   | 2000             | 2010             | 2020             |
| Eastern and Southern Africa            | 346 034                | 332 580          | 314 849          | 295 778          |
| Northern Africa                        | 39 926                 | 38 104           | 36 833           | 35 151           |
| Western and Central Africa             | 356 842                | 339 365          | 324 333          | 305 710          |
| <b>Total Africa</b>                    | <b>742 801</b>         | <b>710 049</b>   | <b>676 015</b>   | <b>636 639</b>   |
| East Asia                              | 209 906                | 229 071          | 252 390          | 271 403          |
| South and Southeast Asia               | 326 511                | 308 077          | 305 461          | 296 047          |
| Western and Central Asia               | 48 976                 | 50 262           | 53 109           | 55 237           |
| <b>Total Asia</b>                      | <b>585 393</b>         | <b>587 410</b>   | <b>610 960</b>   | <b>622 687</b>   |
| Europe excl. Russian Federation        | 185 369                | 193 000          | 198 847          | 202 150          |
| <b>Total Europe</b>                    | <b>994 319</b>         | <b>1 002 268</b> | <b>1 013 982</b> | <b>1 017 461</b> |
| Caribbean                              | 5 961                  | 6 808            | 7 497            | 7 889            |
| Central America                        | 28 002                 | 25 819           | 23 706           | 22 404           |
| North America                          | 721 317                | 719 721          | 722 987          | 722 417          |
| <b>Total North and Central America</b> | <b>755 279</b>         | <b>752 349</b>   | <b>754 190</b>   | <b>752 710</b>   |
| <b>Total Oceania</b>                   | <b>184 974</b>         | <b>183 328</b>   | <b>181 015</b>   | <b>185 248</b>   |
| <b>Total South America</b>             | <b>973 666</b>         | <b>922 645</b>   | <b>870 154</b>   | <b>844 186</b>   |
| <b>WORLD</b>                           | <b>4 236 433</b>       | <b>4 158 050</b> | <b>4 106 317</b> | <b>4 058 931</b> |

**TABLE 6. Annual average net change in forest area, by region and subregion, 1990–2020**

| Region/subregion                       | Forest area annual change |              |               |              |               |              |
|--|---------------------------|--------------|---------------|--------------|---------------|--------------|
|  | 1990–2000                 |              | 2000–2010     |              | 2010–2020     |              |
|  | 1 000 ha/yr               | %            | 1 000 ha/yr   | %            | 1 000 ha/yr   | %            |
| Eastern and Southern Africa            | -1 345                    | -0.40        | -1 773        | -0.55        | -1 907        | -0.62        |
| Northern Africa                        | -182                      | -0.47        | -127          | -0.34        | -168          | -0.47        |
| Western and Central Africa             | -1 748                    | -0.50        | -1 503        | -0.45        | -1 862        | -0.59        |
| <b>Total Africa</b>                    | <b>-3 275</b>             | <b>-0.45</b> | <b>-3 403</b> | <b>-0.49</b> | <b>-3 938</b> | <b>-0.60</b> |
| East Asia                              | 1 917                     | 0.88         | 2 332         | 0.97         | 1 901         | 0.73         |
| South and Southeast Asia               | -1 843                    | -0.58        | -262          | -0.09        | -941          | -0.31        |
| Western and Central Asia               | 129                       | 0.26         | 285           | 0.55         | 213           | 0.39         |
| <b>Total Asia</b>                      | <b>202</b>                | <b>0.03</b>  | <b>2 355</b>  | <b>0.39</b>  | <b>1 173</b>  | <b>0.19</b>  |
| Europe excl. Russian Federation        | 763                       | 0.40         | 585           | 0.30         | 330           | 0.16         |
| <b>Total Europe</b>                    | <b>795</b>                | <b>0.08</b>  | <b>1 171</b>  | <b>0.12</b>  | <b>348</b>    | <b>0.03</b>  |
| Caribbean                              | 85                        | 1.34         | 69            | 0.97         | 39            | 0.51         |
| Central America                        | -218                      | -0.81        | -211          | -0.85        | -130          | -0.56        |
| North America                          | -160                      | -0.02        | 327           | 0.05         | -57           | -0.01        |
| <b>Total North and Central America</b> | <b>-293</b>               | <b>-0.04</b> | <b>184</b>    | <b>0.02</b>  | <b>-148</b>   | <b>-0.02</b> |
| <b>Total Oceania</b>                   | <b>-165</b>               | <b>-0.09</b> | <b>-231</b>   | <b>-0.13</b> | <b>423</b>    | <b>0.23</b>  |
| <b>Total South America</b>             | <b>-5 102</b>             | <b>-0.54</b> | <b>-5 249</b> | <b>-0.58</b> | <b>-2 597</b> | <b>-0.30</b> |
| <b>WORLD</b>                           | <b>-7 838</b>             | <b>-0.19</b> | <b>-5 173</b> | <b>-0.13</b> | <b>-4 739</b> | <b>-0.12</b> |

Note: The rate of change (%) is calculated as the compound annual change rate.

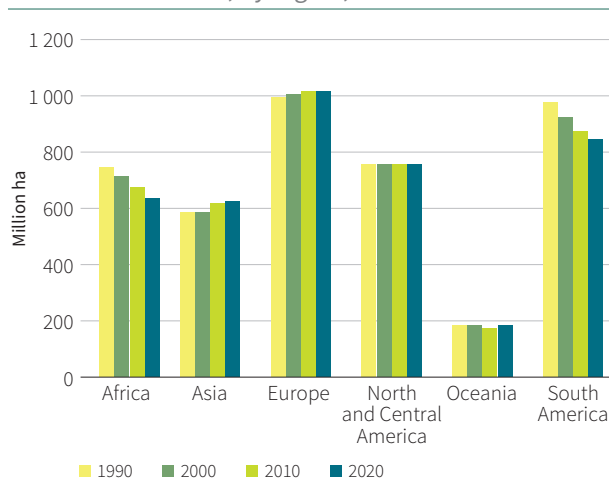
in Brazil, where the annual rate of net forest loss increased from 3.78 million ha in 1990–2000 to 3.95 million ha in 2000–2010 before declining to 1.50 million ha in 2010–2020.

Paraguay and Peru both recorded increases in the annual rate of net forest loss between 1990 and 2020. In Paraguay, the rate increased from 255 000 ha per year in 1990–2000, to 342 000 ha in 2000–2010, to 347 000 ha in 2010–2020. In Peru, the rate of loss climbed from 115 000 ha per year in 1990–2000, to 125 000 ha in 2000–2010, to 172 000 ha in the most recent decade.

North and Central America had an average annual net loss of forest area of 293 000 ha in 1990–2000, a net annual gain of 184 000 ha in 2000–2010, and a net annual loss of 148 000 ha in 2010–2020. This fluctuation mainly reflects changes in data collection in the national forest inventory of the United States of America and, as explained in that country’s report, it does not reflect real forest-area dynamics.

Asia had the highest net gain in forest area in 2010–2020, the majority of which was in East Asia, with China reporting a net annual increase of 1.94 million ha. Asia has recorded an overall net increase in forest area since 1990, with the area increasing by 202 000 ha per year in 1990–2000, 2.35 million ha per year in 2000–2010, and 1.17 million ha per year in 2010–2020. Subregionally, net forest losses were recorded

**FIGURE 7. Forest area, by region, 1990–2020**



between 1990 and 2020 in South and Southeast Asia due to significant declines in forest area in Cambodia, Indonesia and Myanmar, although these were partially offset subregionally by forest-area gains in India and Viet Nam. The rate of net forest loss decreased significantly in South and Southeast Asia over the period, from 1.84 million ha per year in

**TABLE 7. Top ten countries for average annual net loss of forest area, 2010–2020**

| Ranking | Country                          | Annual net change |       |
|---------|----------------------------------|-------------------|-------|
|         |                                  | 1 000 ha/yr       | %     |
| 1       | Brazil                           | -1 496            | -0.30 |
| 2       | Democratic Republic of the Congo | -1 101            | -0.83 |
| 3       | Indonesia                        | -753              | -0.78 |
| 4       | Angola                           | -555              | -0.80 |
| 5       | United Republic of Tanzania      | -421              | -0.88 |
| 6       | Paraguay                         | -347              | -1.93 |
| 7       | Myanmar                          | -290              | -0.96 |
| 8       | Cambodia                         | -252              | -2.68 |
| 9       | Bolivia (Plurinational State of) | -225              | -0.43 |
| 10      | Mozambique                       | -223              | -0.59 |

Note: The rate of change (%) is calculated as the compound annual change rate.

1990–2000 to 941 000 ha per year in 2010–2020. This decline was due mainly to a substantial reduction in forest loss in Indonesia, down from 1.73 million ha per year in 1990–2000 to 753 000 ha per year in 2010–2020.

Oceania recorded the second-largest average annual net gain in forest area (after Asia) in 2010–2020, at 423 000 ha, reversing the region’s negative trend of previous decades. The reversal mainly reflects changes reported by Australia, from an average annual net loss of 207 000 ha in 1990–2000 and 227 000 ha in 2000–2010 to an average annual net gain of 446 000 ha in 2010–2020.

**TABLE 8. Top ten countries for average annual net gain in forest area, 2010–2020**

| Ranking | Country                  | Annual net change |      |
|---------|--------------------------|-------------------|------|
|         |                          | 1 000 ha/yr       | %    |
| 1       | China                    | 1 937             | 0.93 |
| 2       | Australia                | 446               | 0.34 |
| 3       | India                    | 266               | 0.38 |
| 4       | Chile                    | 149               | 0.85 |
| 5       | Viet Nam                 | 126               | 0.90 |
| 6       | Turkey                   | 114               | 0.53 |
| 7       | United States of America | 108               | 0.03 |
| 8       | France                   | 83                | 0.50 |
| 9       | Italy                    | 54                | 0.58 |
| 10      | Romania                  | 41                | 0.62 |

Note: The rate of change (%) is calculated as the compound annual change rate.

There was a net gain in forest area in Europe in the three decades to 2020. The average annual net gain increased from 795 000 ha in 1990–2000 to 1.17 million ha in 2000–2010, before dropping to 348 000 ha in 2010–2020. The increase between 2000 and 2010 was due mainly to the Russian Federation, which reported average annual net gains of 31 900 ha in 1990–2000, 587 000 ha in 2000–2010 and 17 600 ha in 2010–2020.

Table 7 shows the top ten countries worldwide for average annual net losses of forest area between 2010 and 2020, and Table 8 shows the top ten countries for average annual net gains in forest area in the same period.

## DEFORESTATION

Because information on forest area net change alone is insufficient to describe the complexity of land-use dynamics, countries were asked to provide estimates of forest expansion (afforestation and natural forest expansion) and deforestation for FRA 2020.

The collected data enabled the estimation of the deforestation rate at the regional and global levels over the reporting period.

An estimated 420 million ha of forest was lost through deforestation between 1990 and 2020, although the rate slowed over the period. Deforestation occurred at a rate of 15.8 million ha per year in 1990–2000, 15.1 million ha per year in 2000–2010, 11.8 million ha in 2010–2015 and 10.2 million ha per year in 2015–2020.

More than 90 percent of deforestation in 1990–2020 was in the tropical domain (Table 9), where the rate averaged 9.28 million ha per year in 2015–2020 (which, nevertheless, was significantly lower than the tropical average in 1990–2000 of 13.8 million ha per year). The

**TABLE 9. Deforestation rate, by climatic domain, for four periods spanning 1990–2020**

| Climatic domain | Deforestation (million ha/yr) |             |             |             |
|-----------------|-------------------------------|-------------|-------------|-------------|
|                 | 1990–2000                     | 2000–2010   | 2010–2015   | 2015–2020   |
| Boreal          | 0.10                          | 0.09        | 0.13        | 0.06        |
| Temperate       | 0.49                          | 0.54        | 0.53        | 0.31        |
| Subtropical     | 1.44                          | 1.35        | 0.88        | 0.50        |
| Tropical        | 13.8                          | 13.2        | 10.3        | 9.3         |
| <b>TOTAL</b>    | <b>15.8</b>                   | <b>15.1</b> | <b>11.8</b> | <b>10.2</b> |

**TABLE 10. Deforestation rate, by region and subregion, for four periods spanning 1990–2020**

| Region/subregion                       | Deforestation (1 000 ha/yr) |               |               |               |
|--|-----------------------------|---------------|---------------|---------------|
|  | 1990–2000                   | 2000–2010     | 2010–2015     | 2015–2020     |
| Eastern and Southern Africa            | 1 781                       | 2 240         | 2 116         | 2 199         |
| Northern Africa                        | 461                         | 442           | 330           | 316           |
| Western and Central Africa             | 1 854                       | 1 631         | 1 998         | 1 899         |
| <b>Total Africa</b>                    | <b>4 096</b>                | <b>4 314</b>  | <b>4 444</b>  | <b>4 414</b>  |
| East Asia                              | 399                         | 353           | 369           | 170           |
| South and Southeast Asia               | 3 689                       | 2 232         | 2 460         | 1 958         |
| Western and Central Asia               | 82                          | 99            | 96            | 107           |
| <b>Total Asia</b>                      | <b>4 170</b>                | <b>2 684</b>  | <b>2 925</b>  | <b>2 235</b>  |
| <b>Total Europe</b>                    | <b>88</b>                   | <b>92</b>     | <b>201</b>    | <b>69</b>     |
| Caribbean                              | 3                           | 2             | 23            | 5             |
| Central America                        | 228                         | 222           | 142           | 168           |
| North America                          | 740                         | 475           | 253           | 263           |
| <b>Total North and Central America</b> | <b>972</b>                  | <b>699</b>    | <b>418</b>    | <b>436</b>    |
| <b>Total Oceania</b>                   | <b>655</b>                  | <b>662</b>    | <b>458</b>    | <b>42</b>     |
| <b>Total South America</b>             | <b>5 837</b>                | <b>6 667</b>  | <b>3 354</b>  | <b>2 953</b>  |
| <b>WORLD</b>                           | <b>15 818</b>               | <b>15 117</b> | <b>11 801</b> | <b>10 150</b> |

annual rate of deforestation decreased significantly in the subtropical domain between the two periods of 1990–2000 and 2015–2020, from 1.44 million ha to 0.50 million ha. The deforestation rate decreased slightly in the temperate domain between these two periods and was relatively low in the boreal domain.

The highest annual deforestation rate in 2015–2020 was in Africa (4.41 million ha), followed by South America (2.96 million ha) and Asia (2.24 million ha) (Table 10). In Africa, most of the deforestation was in Eastern and Southern Africa (2.20 million ha per year) and Western and Central Africa (1.90 million ha per year). In Asia, the deforestation occurred mostly in South and Southeast Asia (1.96 million ha per year).

The deforestation rate has increased in Africa since 1990, although there was a modest decrease in the rate in 2015–2020 compared with 2010–2015. On the other hand, the deforestation rates in Asia and South America are now almost half what they were in the 1990s.

The deforestation rate increased slightly in Oceania in 2000–2010 compared with 1990–2000 but has decreased since, including in 2015–2020.

Although coverage is good (i.e. by country) for data on deforestation, afforestation and natural forest expansion in FRA 2020, and their quality is higher than in the previous assessments, major gaps and deficiencies remain. Therefore, estimates in FRA 2020 of forest area change dynamics at the country level should be treated with caution.

#### Box 4. Seeing the forest and the trees

Satellite remote sensing is an efficient way to monitor many environmental variables. Existing and forthcoming space-borne data streams, which can produce vast amounts of information at varying levels of detail, are also increasingly subject to “open data” policies, under which they are freely available to the global community.

Passive remote sensing measures the electromagnetic radiation reflected by or emitted from the Earth. Active remote sensing satellites use their own energy sources to illuminate the Earth and detect and measure the reflected radiation. In optimal conditions, both types of remote sensing can produce high-quality information at a low cost. For forest monitoring, however, a number of significant challenges need to be taken into account when producing and using remote sensing-based information products.

In the FAO Global Forest Resources Assessment, the United Nations Framework Convention on Climate Change and many other international processes and institutions, “forest” is primarily a definition of a **land use**. Therefore, an area of land can be forest even if it doesn’t have trees on it. On the other hand, agricultural and urban areas with tree cover may be considered as land uses other than forest. This can be problematic for automated analyses of satellite remote sensing data because the sensors can only observe **land cover**.

Remote sensing instruments also have certain limitations in separating forest from other vegetation types – such as the inability of medium-resolution optical sensors to measure vegetation height. In certain conditions, therefore, it is common for low and dense woody vegetation such as bushland and shrubland to be

misclassified as tree cover (see photo this page). On the other hand, forests with sparse canopy cover or that lack leaves (e.g. during dormancy) may unintentionally be omitted from forest-area estimates.

The use of remote sensing for assessing land-cover and land-use change is even more complex. In the context of forestry, land-cover change may be caused, for example, by certain forest management practices and natural disturbances. A change in land cover, however, does not necessarily mean a change in land use. The impact of a wildfire is a typical example of this: the fire may cause a significant (usually temporary) change in vegetation cover but does not necessarily result in a change in land use. Another example is clearcutting as part of forest management – the clearcut land will be without tree cover only temporarily because it will be reforested through planting, seeding or natural regeneration.

Another common challenge in the use of remote sensing for forest monitoring is the time factor in tree-cover loss and recovery. This challenge can be explained using an example: the clearcutting of a stand of trees in boreal forest would be immediately observable using remote sensing, but the regrowth of the stand would be apparent only after 10–20 years. Thus, the use of a short observation period may result in the misclassification of tree-cover change as land-use change (i.e. deforestation).

Finally, the quality of remote sensing-based mapping products varies significantly, depending on factors such as the characteristics of the target area; the sensor used; image resolution; the classification or estimation methodology used; data preprocessing; acquisition date; and the land-cover categories applied and their definitions. A comparison of eight globally available products showed that previous satellite-based estimates of global forest area varied from 3.2 billion ha to 4.1 billion ha (Sexton *et al.*, 2015), with the highest level of disagreement among products in sparsely forested areas (Figure 8). Therefore, caution is required when estimating forest change by comparing two independent mapping products (see Box 5, for example).

Remote sensing is a valuable tool for land-cover assessment and monitoring, but it should be used with care. There is a need to use consistent terminology, differentiate clearly between land cover and land use, and recognize that global remote sensing products may have significant limitations at the local scale. On their own, remote sensing-derived estimates of land

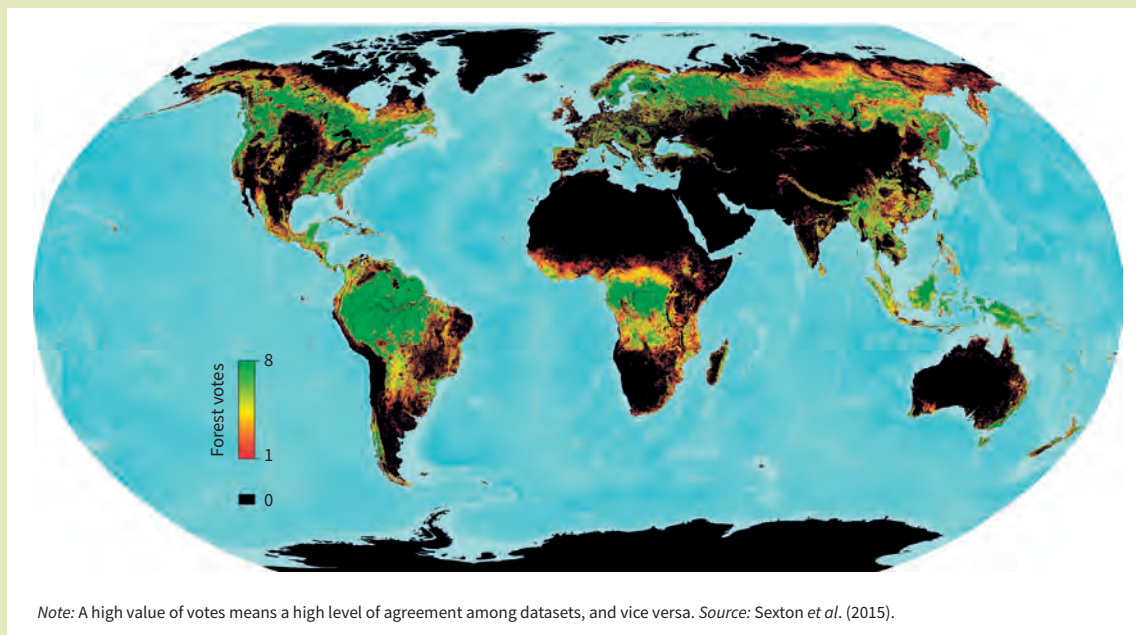
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Cotopaxi, Ecuador (4 300 metres above sea level). According to the Global Forest Change product (Hansen *et al.*, 2013), this area has approximately 22 percent of tree cover, but a visit to the field revealed that it had no trees.

Figure 8. Global distribution of consensus among eight satellite-based datasets



cover and land-cover change are insufficient to support holistic policy formulation and decision-making – which also require data on, among other things, growing stock, biomass, carbon stock, biodiversity and forest

health. Responding to these data needs requires a well-designed, multipurpose field inventory, which can also be used to derive reliable forest-area estimates with known confidence limits.

## Other land with tree cover

### STATUS

The category “other land with tree cover” comprises areas found in rural landscapes and urban settings that meet the thresholds for tree cover established by FAO’s forest definition but for which the land use is not forest (and therefore the land does not meet FAO’s forest definition). This category is reported here because of its importance in the provision of goods and ecosystem services. It has four subcategories: trees in urban settings; tree orchards; palms; and agroforestry.

Table 11 (p. 23) shows the estimated areas in each of these subcategories, by region and subregion. Not all countries reported areas in all subcategories. Overall, there is an estimated 11.8 million ha of palms in 94 countries and territories, mostly in Asia (8.18 million ha), Africa (1.66 million ha) and South America (1.01 million ha).

Seventy-six countries and territories reported a total area of tree orchards of 27.8 million ha, mostly in Asia (11.7 million ha), Europe (8.34 million ha), Africa (3.99 million ha) and North and Central America (3.41 million ha).

Seventy-one countries and territories reported an area of 45.4 million ha of agroforestry in 2020, mostly in Asia (31.2 million ha) and Africa (12.8 million ha). There is an estimated 1.28 million ha of agroforestry in North and Central America.

Trees in urban settings were reported by 52 countries and territories, with a total area of 20.3 million ha. Of this, more than two-thirds (13.8 million ha) is in North and Central America, with more modest areas in Europe (2.77 million ha) and Asia (2.40 million ha).

### TRENDS

Figure 9 shows global change in the area of other land with tree cover from 1990 to 2020. The trend for palms is based on data reported by 83 countries and territories. The area

### Box 5. Understanding regional differences between products in estimated forest area and tree cover

A comparison was made of estimates of forest area by the Global Forest Resources Assessment (FRA) and of tree cover derived from the Global Forest Change (GFC) product (University of Maryland), at the subregional level. Data for 2010 were used for the comparison because this was the most recent year for which the GFC tree-cover layer was available.<sup>11</sup>

The largest relative differences between the two sets of estimates were in Northern Africa and Western and Central Asia, where FRA forest-area estimates **were much higher** than those derived using the GFC. In these regions, the forest share of the total land area was typically low (less than 5 percent); these regions are characterized by open-forest formations such as open woodlands, savannas and the saxaul forests of Central Asia.

In Central America, Western and Central Africa, and South and Southeast Asia, FRA estimates of total forest area **were lower** than those derived from the GFC product. In these subregions, the share of the land area with forest cover is high (>30 percent), with large areas characterized by tropical rainforest, having high (>70 percent) crown cover, and also by landscapes consisting of 10–30 percent tree cover and 50 percent croplands (Mayaux *et al.*, 2013).

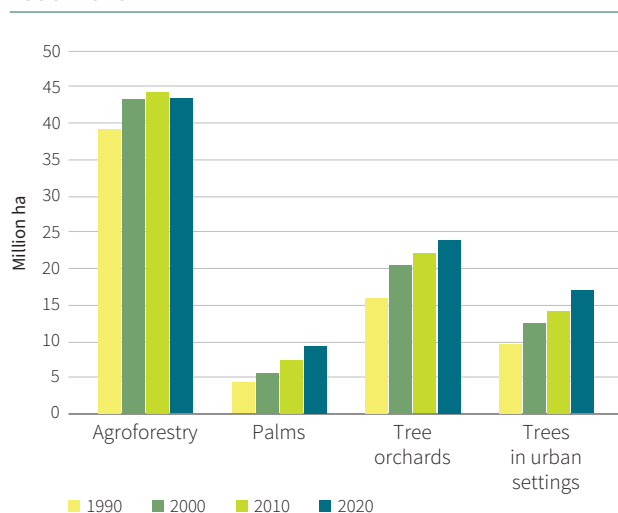
There are many reasons for these differences. The GFC used optical remote sensing; as described in Box 4, this technology has certain challenges in detecting open-forest formations, which are widespread in Northern Africa and Western and Central Asia. Moreover, separating forest from “other wooded land” is sometimes problematic in those

regions, which may affect FRA estimates. This is likely to be especially true in Western and Central Asia, where 16 of 25 countries reported forest-area data based on secondary sources such as land registers and questionnaires.

In those areas where FRA estimates of forest area were much lower than those of the GFC, the likely explanation is that remote sensing-based estimates include large areas of agricultural land with canopy cover (e.g. oil palm and cacao), agroforestry, and other vegetation not meeting the FRA definition of forest. In such areas, the quality of data used for the FRA reports is high, with only 2 of 51 countries basing their estimates on the lowest-tier sources (see Box 11).

Overall, more work is required to determine the reasons for differences between the datasets and thereby to better understand the extent and dynamics of global forest resources. Cross-checking country-reported data with other data sources and understanding the reasons for differences will help improve both the remote sensing products and FRA reports and increase the overall transparency of forest resource information. To this end, the FRA process seeks to improve the capacity of countries to access and use remote sensing data and products. During the process to produce FRA 2020, FAO took initial steps towards integrating freely available geospatial data and products into the new FRA reporting platform, with support from Google. This work will continue in coming years with the aim of helping countries assess the value of remote sensing data and products and supporting them to integrate such products into national processes.

FIGURE 9. Global area of other land with tree cover, 1990–2020



of palms more than doubled between 1990 and 2020, from 4.20 million ha to 9.34 million ha. Most of the increase was in Asia (up from 3.14 million ha in 1990 to 7.61 million ha in 2020) and mainly in Malaysia (up from 2.35 million ha to 6.36 million ha).

Seventy-six countries and territories reported on trends in the area of tree orchards, which increased by 7.64 million ha between 1990 and 2020. Asia contributed a large part of this, with the area in that region growing from 5.71 million ha in 1990 to 11.7 million ha in 2020. Most of the increase was in China (up from 3.95 million ha to 10.2 million ha).

Fifty-four countries and territories reported trend data on agroforestry. The area of land subject to agroforestry increased by 4.21 million ha between 1990

<sup>11</sup> The GFC data used in this analysis were generated using a 30 percent tree-cover threshold. The data were downloaded from [www.globalforestwatch.org](http://www.globalforestwatch.org)



**TABLE 11. Area of other land with tree cover, by region and subregion, 2020**

| Region/subregion                       | Agroforestry               |                 | Palms                      |                 | Tree orchards              |                 | Trees in urban settings    |                 |
|--|----------------------------|-----------------|----------------------------|-----------------|----------------------------|-----------------|----------------------------|-----------------|
|  | No. of reporting countries | Area (1 000 ha) | No. of reporting countries | Area (1 000 ha) | No. of reporting countries | Area (1 000 ha) | No. of reporting countries | Area (1 000 ha) |
| Eastern and Southern Africa            | 5                          | 1 385           | 3                          | 774             | 3                          | 10              | 3                          | 3               |
| Northern Africa                        | 3                          | 159             | 4                          | 368             | 3                          | 3 688           | 4                          | 944             |
| Western and Central Africa             | 6                          | 11 234          | 6                          | 510             | 5                          | 295             | 2                          | 18              |
| <b>Total Africa</b>                    | <b>14</b>                  | <b>12 778</b>   | <b>13</b>                  | <b>1 652</b>    | <b>11</b>                  | <b>3 993</b>    | <b>9</b>                   | <b>965</b>      |
| East Asia                              | 2                          | 0               | 3                          | 317             | 4                          | 10 558          | 3                          | 321             |
| South and Southeast Asia               | 6                          | 30 695          | 8                          | 7 639           | 8                          | 891             | 4                          | 253             |
| Western and Central Asia               | 8                          | 506             | 10                         | 225             | 9                          | 243             | 6                          | 1 821           |
| <b>Total Asia</b>                      | <b>16</b>                  | <b>31 201</b>   | <b>21</b>                  | <b>8 181</b>    | <b>21</b>                  | <b>11 692</b>   | <b>13</b>                  | <b>2 395</b>    |
| <b>Total Europe</b>                    | <b>20</b>                  | <b>75</b>       | <b>36</b>                  | <b>10</b>       | <b>28</b>                  | <b>8 338</b>    | <b>15</b>                  | <b>2 767</b>    |
| Caribbean                              | 7                          | 459             | 6                          | 57              | 5                          | 8               | 6                          | 26              |
| Central America                        | 3                          | 696             | 1                          | 111             | 0                          | 0               | 0                          | 0               |
| North America                          | 4                          | 129             | 4                          | 99              | 5                          | 3 399           | 2                          | 13 751          |
| <b>Total North and Central America</b> | <b>14</b>                  | <b>1 284</b>    | <b>11</b>                  | <b>266</b>      | <b>10</b>                  | <b>3 407</b>    | <b>8</b>                   | <b>13 777</b>   |
| <b>Total Oceania</b>                   | <b>2</b>                   | <b>1</b>        | <b>7</b>                   | <b>645</b>      | <b>4</b>                   | <b>20</b>       | <b>2</b>                   | <b>216</b>      |
| <b>Total South America</b>             | <b>5</b>                   | <b>93</b>       | <b>6</b>                   | <b>1 013</b>    | <b>2</b>                   | <b>338</b>      | <b>5</b>                   | <b>159</b>      |
| <b>WORLD</b>                           | <b>71</b>                  | <b>45 432</b>   | <b>94</b>                  | <b>11 767</b>   | <b>76</b>                  | <b>27 788</b>   | <b>52</b>                  | <b>20 279</b>   |

and 2020, from 39.1 million ha to 43.3 million ha. Most of the increase was in Asia (up by 2.47 million ha) and Africa (up by 1.62 million ha).

The area of land occupied by trees in urban settings, as reported by 36 countries and territories, increased by 7.45 million ha between 1990 and 2020, from 9.66 million ha to 17.1 million ha. There were increases in all regions, with the largest in North and Central America (up from 7.66 million ha in 1990 to 13.8 million ha in 2020), mostly in the United States of America.

## Other wooded land

### STATUS

FRA 2020 received information on the area of “other wooded land” in 2020 from all countries and territories except Australia (where it is included in “other land area”). The area of other wooded land worldwide is estimated at 977 million ha, which is 7 percent of the total land area (Table 12). Africa has the largest area of other wooded land (446 million ha), followed by Asia (191 million ha), South America (147 million ha), Europe (100 million ha), North and Central America (90.5 million ha) and Oceania (2.47 million ha).

Table 13 shows the top ten countries for other wooded land, four of which (Brazil, Canada, China and the Russian Federation) are also in the top ten for forest area.

**TABLE 12. Area of other wooded land, by region and subregion, 2020**

| Region/subregion                       | Other wooded land (1 000 ha) |
|--|------------------------------|
| Eastern and Southern Africa            | 284 447                      |
| Northern Africa                        | 59 122                       |
| Western and Central Africa             | 101 941                      |
| <b>Total Africa</b>                    | <b>445 509</b>               |
| East Asia                              | 114 620                      |
| South and Southeast Asia               | 56 741                       |
| Western and Central Asia               | 19 614                       |
| <b>Total Asia</b>                      | <b>190 976</b>               |
| <b>Total Europe</b>                    | <b>100 499</b>               |
| Caribbean                              | 2 113                        |
| Central America                        | 4 616                        |
| North America                          | 83 786                       |
| <b>Total North and Central America</b> | <b>90 515</b>                |
| <b>Total Oceania</b>                   | <b>2 474</b>                 |
| <b>Total South America</b>             | <b>146 645</b>               |
| <b>WORLD</b>                           | <b>976 619</b>               |

**TABLE 13. Top ten countries for area of other wooded land, 2020**

| Ranking | Country            | Other wooded land |                |
|---------|--------------------|-------------------|----------------|
|         |                    | Area (1 000 ha)   | % of land area |
| 1       | China              | 109 545           | 12             |
| 2       | Russian Federation | 74 885            | 5              |
| 3       | Argentina          | 62 964            | 23             |
| 4       | Namibia            | 54 081            | 66             |
| 5       | South Africa       | 49 682            | 41             |
| 6       | Canada             | 40 866            | 4              |
| 7       | Brazil             | 38 713            | 5              |
| 8       | South Sudan        | 32 582            | 52             |
| 9       | Kenya              | 32 271            | 57             |
| 10      | Botswana           | 26 491            | 47             |

#### TRENDS

Worldwide, the area of other wooded land decreased by 30.6 million ha between 1990 and 2020, although the big declines in 1990–2000 and 2000–2010 were offset somewhat

by a small gain in 2010–2020 (Table 14). Both Asia and North and Central America reported significant increases in the most recent decade, but this finding should be treated with caution for the latter region because, to a large extent, the increase in North and Central America is explained by the inclusion of arid wooded land in the western United States of America, which previously was not counted.

In South America, the rate of decrease in the area of other wooded land slowed significantly in the most recent decade, due mainly to an increase in the area of other wooded land reported by Chile. Similar to the trend in North and Central America, that increase can mainly be attributed to a greater level of detail in mapping rather than to an actual increase.

Large declines in the area of other wooded land were recorded in all African subregions, driven mainly by losses in Angola, Chad, Madagascar, Sudan and the United Republic of Tanzania; combined, these countries accounted for more than 80 percent of the loss.

Many countries face challenges in monitoring the area of other wooded land, largely associated with difficulties in measuring tree-canopy cover in the range of 5–10 percent; thus, many countries lack reliable data on this parameter.

**TABLE 14. Area of other wooded land and annual change, by region and subregion, 1990–2020**

| Region/subregion                       | Other wooded land (1 000 ha) |                |                |                | Annual change (1 000 ha/yr) |               |               |
|--|------------------------------|----------------|----------------|----------------|-----------------------------|---------------|---------------|
|  | 1990                         | 2000           | 2010           | 2020           | 1990–2000                   | 2000–2010     | 2010–2020     |
| Eastern and Southern Africa            | 308 141                      | 299 683        | 291 438        | 284 447        | -846                        | -825          | -699          |
| Northern Africa                        | 65 164                       | 63 322         | 61 184         | 59 122         | -184                        | -214          | -206          |
| Western and Central Africa             | 113 135                      | 111 139        | 107 356        | 101 941        | -200                        | -378          | -542          |
| <b>Total Africa</b>                    | <b>486 441</b>               | <b>474 145</b> | <b>459 978</b> | <b>445 509</b> | <b>-1 230</b>               | <b>-1 417</b> | <b>-1 447</b> |
| East Asia                              | 106 006                      | 104 593        | 110 044        | 114 620        | -141                        | 545           | 458           |
| South and Southeast Asia               | 53 850                       | 54 065         | 54 043         | 56 741         | 21                          | -2            | 270           |
| Western and Central Asia               | 16 088                       | 17 153         | 18 872         | 19 614         | 107                         | 172           | 74            |
| <b>Total Asia</b>                      | <b>175 944</b>               | <b>175 810</b> | <b>182 960</b> | <b>190 976</b> | <b>-13</b>                  | <b>715</b>    | <b>802</b>    |
| <b>Total Europe</b>                    | <b>103 775</b>               | <b>98 579</b>  | <b>100 946</b> | <b>100 499</b> | <b>-520</b>                 | <b>237</b>    | <b>-45</b>    |
| Caribbean                              | 2 114                        | 2 259          | 2 152          | 2 113          | 15                          | -11           | -4            |
| Central America                        | 3 634                        | 3 962          | 4 266          | 4 616          | 33                          | 30            | 35            |
| North America                          | 76 836                       | 76 976         | 76 824         | 83 786         | 14                          | -15           | 696           |
| <b>Total North and Central America</b> | <b>82 584</b>                | <b>83 197</b>  | <b>83 242</b>  | <b>90 515</b>  | <b>61</b>                   | <b>5</b>      | <b>727</b>    |
| <b>Total Oceania</b>                   | <b>2 633</b>                 | <b>2 525</b>   | <b>2 509</b>   | <b>2 474</b>   | <b>-11</b>                  | <b>-2</b>     | <b>-3</b>     |
| <b>Total South America</b>             | <b>155 846</b>               | <b>151 496</b> | <b>146 931</b> | <b>146 645</b> | <b>-435</b>                 | <b>-456</b>   | <b>-29</b>    |
| <b>WORLD</b>                           | <b>1 007 222</b>             | <b>985 752</b> | <b>976 566</b> | <b>976 619</b> | <b>-2 147</b>               | <b>-919</b>   | <b>5</b>      |



# 3 Forest characteristics



F

orests encompass a wide range of ecosystems that vary considerably in their characteristics, such as in species composition, structure and the extent of modification by humans

and by non-human factors. Thus, forest area is an insufficient parameter, on its own, for identifying important trends and assessing progress towards sustainable forest management.

FRA identifies two broad categories of forest: naturally regenerating forest, and planted forest. FRA 2020 collected information on both these categories, as well as on certain subcategories discussed below.

There is ongoing debate on the functions and values of naturally regenerating versus planted forests. Naturally regenerating forests (also called natural forests) generally contribute more to biodiversity conservation and provide a wider range of benefits and certain ecosystem services

compared with planted forests. When sustainably managed, planted forests can help reduce harvesting pressure on natural forests, and some may also provide important ecosystem services.

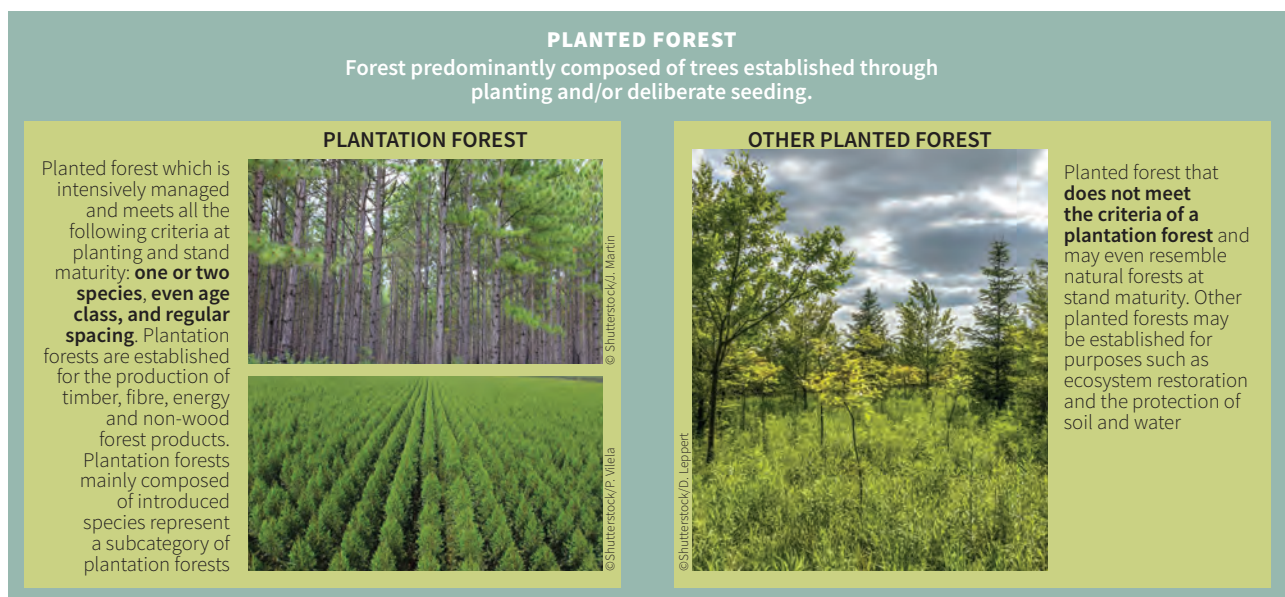
Information was collected on two subcategories of planted forest: “plantation” and “other planted” (Figure 10). Countries also estimated the proportion of their plantation forests mainly composed of introduced species. In addition to the main categories of natural and planted forest, information was collected on primary forests; mangroves; bamboo forests; and rubberwood plantations.

### Naturally regenerating forest

#### STATUS

FRA 2020 received information on the area of naturally regenerating forest in 2020 from 219 countries and

FIGURE 10. Components of planted forest



**TABLE 15. Area of naturally regenerating forest, by region and subregion, 2020**

| Region/subregion                       | Area (1 000 ha)  | % of forest area |
|--|------------------|------------------|
| Eastern and Southern Africa            | 288 639          | 98               |
| Northern Africa                        | 33 168           | 94               |
| Western and Central Africa             | 303 441          | 99               |
| <b>Total Africa</b>                    | <b>625 248</b>   | <b>98</b>        |
| East Asia                              | 173 264          | 64               |
| South and Southeast Asia               | 264 578          | 89               |
| Western and Central Asia               | 49 288           | 90               |
| <b>Total Asia</b>                      | <b>487 130</b>   | <b>78</b>        |
| Europe excl. Russian Federation        | 132 372          | 70               |
| <b>Total Europe</b>                    | <b>928 803</b>   | <b>93</b>        |
| Caribbean                              | 7 008            | 89               |
| Central America                        | 22 014           | 98               |
| North America                          | 676 632          | 94               |
| <b>Total North and Central America</b> | <b>705 654</b>   | <b>94</b>        |
| <b>Total Oceania</b>                   | <b>179 949</b>   | <b>97</b>        |
| <b>Total South America</b>             | <b>823 941</b>   | <b>98</b>        |
| <b>WORLD</b>                           | <b>3 750 724</b> | <b>93</b>        |

territories representing nearly 100 percent of the world's forest area. Naturally regenerating forests account for 93 percent (3.75 billion ha) of the total forest area. Of the regions, Europe has the largest area in this forest category, followed by South America, North and Central America, Africa, Asia and Oceania (Table 15). Naturally regenerating forests constitute 100 percent of the forest resource in 34 countries.

#### TRENDS

FRA 2020 received information on trends in naturally regenerating forests from 216 countries and territories representing 99 percent of the world's forest area. According to these data, the area of naturally regenerating forests decreased by 301 million ha between 1990 and 2020 (Table 16). The overall rate of loss slowed in each ten-year period, from 11.9 million ha per year in 1990–2000, to 10.3 million ha in 2000–2010, to 7.84 million ha in the most recent decade (Table 17).

The area of naturally regenerating forests decreased in all regions except Europe and Oceania between 2010 and 2020, with the biggest loss occurring in sub-Saharan Africa. Overall in Africa, naturally regenerating forest was lost at an average of 3.32 million ha per year in 1990–2000, 3.57 million ha per year in 2000–2010, and 4.01 million ha

**TABLE 16. Area of naturally regenerating forest, by region and subregion, 1990–2020**

| Region/subregion                       | Naturally regenerating forest (1 000 ha) |                  |                  |                  |
|--|--|------------------|------------------|------------------|
|  | 1990                                     | 2000             | 2010             | 2020             |
| Eastern and Southern Africa            | 339 874                                  | 326 366          | 308 090          | 288 639          |
| Northern Africa                        | 38 542                                   | 36 627           | 34 984           | 33 168           |
| Western and Central Africa             | 355 885                                  | 338 136          | 322 316          | 303 441          |
| <b>Total Africa</b>                    | <b>734 301</b>                           | <b>701 128</b>   | <b>665 390</b>   | <b>625 248</b>   |
| East Asia                              | 152 423                                  | 160 773          | 165 507          | 173 264          |
| South and Southeast Asia               | 313 562                                  | 286 574          | 277 679          | 264 578          |
| Western and Central Asia               | 44 965                                   | 45 738           | 47 806           | 49 288           |
| <b>Total Asia</b>                      | <b>510 950</b>                           | <b>493 085</b>   | <b>490 992</b>   | <b>487 130</b>   |
| Europe excl. Russian Federation        | 116 352                                  | 118 921          | 118 854          | 118 819          |
| <b>Total Europe</b>                    | <b>912 651</b>                           | <b>912 829</b>   | <b>914 376</b>   | <b>915 250</b>   |
| Caribbean                              | 5 451                                    | 6 277            | 6 735            | 7 008            |
| Central America                        | 27 928                                   | 25 687           | 23 438           | 22 014           |
| North America                          | 698 721                                  | 687 735          | 683 341          | 676 632          |
| <b>Total North and Central America</b> | <b>732 099</b>                           | <b>719 699</b>   | <b>713 514</b>   | <b>705 654</b>   |
| <b>Total Oceania</b>                   | <b>181 705</b>                           | <b>179 067</b>   | <b>176 037</b>   | <b>179 949</b>   |
| <b>Total South America</b>             | <b>966 621</b>                           | <b>913 239</b>   | <b>855 289</b>   | <b>823 941</b>   |
| <b>WORLD</b>                           | <b>4 038 327</b>                         | <b>3 919 046</b> | <b>3 815 598</b> | <b>3 737 172</b> |

per year in 2010–2020. The increase in the rate of loss in the most recent decade was due mainly to Eastern and Southern Africa, where the rate rose from 1.83 million ha per year in 2000–2010 to 1.96 million ha per year in 2010–2020. Losses in that subregion in 2010–2020 were led by Angola, at 548 000 ha per year.

The rate of loss of naturally regenerating forests declined by almost half (46 percent) in South America in the most recent decade, from 5.80 million ha in 2000–2010 to 3.14 million ha in 2010–2020. This was due mainly to a reduction in Brazil, where the average annual loss declined from 4.32 million ha in 2000–2010 to 1.89 million ha in 2010–2020.

North and Central America reported a net annual loss of naturally regenerating forest of 786 000 ha in 2010–2020, due mainly to North America, with the Caribbean showing a slight increase in area. The region's average annual rate of loss was considerably lower than in 1990–2000, largely because of a decline in the annual loss in North America. This, in turn, was due mainly to the United States of America, where the average annual loss

declined from 354 000 ha in 1990–2000 to 88 200 ha in 2010–2020.

Asia had an overall loss of naturally regenerating forest of 386 000 ha per year in 2010–2020, due mainly to losses in South and Southeast Asia; there were gains in area over the period in East Asia and Western and Central Asia. The average annual rate of loss in Asia was higher in 2010–2020 than in 2000–2010; nevertheless, it was still much (80 percent) lower than in 1990–2000, when it was 1.79 million ha. The declining rate was due mainly to a reduction in losses in South and Southeast Asia, especially Indonesia, which lost naturally regenerating forest at a rate of 2.10 million ha per year in 1990–2000 and a much lower 787 000 ha per year in 2010–2020.

The area of naturally regenerating forests increased in both Europe and Oceania in the most recent decade. In Oceania, the gain of 391 000 ha per year represented a reversal compared with previous decades – when forest area was lost at the rate of 264 000 ha per year in 1990–2000 and 303 000 ha in 2000–2010. This mainly reflects changes in Australia, which reported losses of

**TABLE 17. Annual change in the area of naturally regenerating forest, by region and subregion, 1990–2020**

| Region/subregion                       | Average annual change |              |                       |              |                       |              |
|--|-----------------------|--------------|-----------------------|--------------|-----------------------|--------------|
|  | 1990–2000             |              | 2000–2010             |              | 2010–2020             |              |
|  | Area<br>(1 000 ha/yr) | Rate<br>(%)  | Area<br>(1 000 ha/yr) | Rate<br>(%)  | Area<br>(1 000 ha/yr) | Rate<br>(%)  |
| Eastern and Southern Africa            | -1 351                | -0.40        | -1 828                | -0.57        | -1 945                | -0.65        |
| Northern Africa                        | -192                  | -0.51        | -164                  | -0.46        | -182                  | -0.53        |
| Western and Central Africa             | -1 775                | -0.51        | -1 582                | -0.48        | -1 887                | -0.60        |
| <b>Total Africa</b>                    | <b>-3 317</b>         | <b>-0.46</b> | <b>-3 574</b>         | <b>-0.52</b> | <b>-4 014</b>         | <b>-0.62</b> |
| East Asia                              | 835                   | 0.53         | 473                   | 0.29         | 776                   | 0.46         |
| South and Southeast Asia               | -2 699                | -0.90        | -889                  | -0.31        | -1 310                | -0.48        |
| Western and Central Asia               | 77                    | 0.17         | 207                   | 0.44         | 148                   | 0.31         |
| <b>Total Asia</b>                      | <b>-1 787</b>         | <b>-0.36</b> | <b>-209</b>           | <b>-0.04</b> | <b>-386</b>           | <b>-0.08</b> |
| Russian Federation                     | -239                  | -0.03        | 161                   | 0.02         | 91                    | 0.01         |
| Europe excl. Russian Federation        | 257                   | 0.22         | -7                    | -0.01        | -3                    | 0.00         |
| <b>Total Europe</b>                    | <b>18</b>             | <b>0.00</b>  | <b>155</b>            | <b>0.02</b>  | <b>87</b>             | <b>0.01</b>  |
| Caribbean                              | 83                    | 1.42         | 46                    | 0.71         | 27                    | 0.40         |
| Central America                        | -224                  | -0.83        | -225                  | -0.91        | -142                  | -0.62        |
| North America                          | -1 099                | -0.16        | -439                  | -0.06        | -671                  | -0.10        |
| <b>Total North and Central America</b> | <b>-1 240</b>         | <b>-0.17</b> | <b>-618</b>           | <b>-0.09</b> | <b>-786</b>           | <b>-0.11</b> |
| <b>Total Oceania</b>                   | <b>-264</b>           | <b>-0.15</b> | <b>-303</b>           | <b>-0.17</b> | <b>391</b>            | <b>0.22</b>  |
| <b>Total South America</b>             | <b>-5 338</b>         | <b>-0.57</b> | <b>-5 795</b>         | <b>-0.65</b> | <b>-3 135</b>         | <b>-0.37</b> |
| <b>WORLD</b>                           | <b>-11 928</b>        | <b>-0.30</b> | <b>-10 345</b>        | <b>-0.27</b> | <b>-7 843</b>         | <b>-0.21</b> |

Note: The rate of change (%) is calculated as the compound annual change rate.

**TABLE 18. Area of planted forest, and planted forest as a proportion of total forest area, by region and subregion, 2020**

| Region/subregion                       | Planted forest (1 000 ha) | Planted forest as a proportion of total forest area (%) |
|--|---------------------------|---|
| Eastern and Southern Africa            | 7 139                     | 2   |
| Northern Africa                        | 1 983                     | 6   |
| Western and Central Africa             | 2 269                     | 1   |
| <b>Total Africa</b>                    | <b>11 390</b>             | <b>2</b>  |
| East Asia                              | 98 139                    | 36  |
| South and Southeast Asia               | 31 469                    | 11  |
| Western and Central Asia               | 5 621                     | 10  |
| <b>Total Asia</b>                      | <b>135 230</b>            | <b>22</b>   |
| Europe excl. Russian Federation        | 56 312                    | 30  |
| <b>Total Europe</b>                    | <b>75 193</b>             | <b>7</b>  |
| Caribbean                              | 851                       | 11  |
| Central America                        | 391                       | 2   |
| North America                          | 45 785                    | 6   |
| <b>Total North and Central America</b> | <b>47 027</b>             | <b>6</b>  |
| <b>Total Oceania</b>                   | <b>4 812</b>              | <b>3</b>  |
| <b>Total South America</b>             | <b>20 245</b>             | <b>2</b>  |
| <b>WORLD</b>                           | <b>293 895</b>            | <b>7</b>  |

253 000 ha per year in the 1990s and gains of 424 000 ha per year in 2010–2020.<sup>12</sup>

In Europe, the area of naturally regenerating forest has increased in each of the last three decades, although the rate of gain slowed by almost half in 2010–2020 compared with 2000–2010, from 155 000 ha per year to 87 400 ha per year. This was due mainly to the Russian Federation, where the average annual increase in area declined from 161 000 ha in 2000–2010 to 90 900 ha in 2010–2020. If the Russian Federation is excluded, Europe experienced small decreases in the area of naturally regenerated forest in 2000–2010 (6 690 ha per year) and 2010–2020 (3 490 ha per year).

<sup>12</sup> Time-series data in Australia's country report to FRA 2020 show a decrease in forest area between 1990 and 2008, followed by a progressive increase to 2016, with a net increase of 3.9 million ha between 2011 and 2016. This reflects real on-the-ground changes in forest area derived from a consistent time series of Landsat satellite data and the uniform application across the time series of a current-area algorithm, as interpreted for Australia's National Greenhouse Gas Inventory. The change in forest area is due to the net effect of forest clearing or re-clearing for agricultural use; the regrowth of forest on areas previously cleared for agricultural use; the expansion of forest into areas not recently containing forest; the establishment of environmental plantings; and changes in the commercial plantation estate.

**TABLE 19. Top ten countries and territories for planted forest as a proportion of total forest area, 2020**

| Ranking | Country  | Planted forest as a proportion of total forest area (%) |
|---------|--|---|
| 1       | Bahrain  | 100   |
| 2       | Egypt  | 100   |
| 3       | Faroe Islands  | 100   |
| 4       | Greenland  | 100   |
| 5       | Kuwait   | 100   |
| 6       | Libya  | 100   |
| 7       | Czechia  | 95  |
| 8       | Netherlands  | 90  |
| 9       | United Kingdom of Great Britain and Northern Ireland | 89  |
| 10      | Ireland  | 86  |

## Planted forest

### STATUS

FRA 2020 received information on the area of planted forests (including in the subcategories “plantation forest” and “other planted forest”) in 2020 from 219 countries and territories. The total area of planted forests globally is estimated at 294 million ha, which is 7 percent of the world forest area.

Among the regions, Asia has the largest area of planted forest, at 135 million ha (Table 18). The largest share of total forest area held by planted forests is also in Asia (22 percent); the proportion is 7 percent in Europe (the second-highest after Asia), although this increases to 30 percent if the Russian Federation is excluded. The lowest share of planted forest is in Africa and South America (each with 2 percent).

Six countries and territories – Bahrain, Egypt, the Faroe Islands, Greenland, Kuwait and Libya – reported that 100 percent of their forest area is composed of planted forests (Table 19). Forty-two countries and territories, of which eight have no forest, reported no areas of planted forest.

### TRENDS

FRA 2020 received information on trends in planted forests from 216 countries and territories representing 99 percent of the world's forest area. Globally, the area of planted forests increased by 123 million ha between 1990 and 2020 (Table 20). The average annual rate of increase was higher in 2000–2010, at 5.13 million ha, than in 1990–2000, at 4.06 million ha, but it dropped to 3.06 million ha in 2010–2020 (Table 21).



**TABLE 20.** Area of planted forest, by region and subregion, 1990–2020

| Region/subregion                       | Area of planted forest (1 000 ha) |                |                |                |
|--|-----------------------------------|----------------|----------------|----------------|
|  | 1990                              | 2000           | 2010           | 2020           |
| Eastern and Southern Africa            | 6 161                             | 6 214          | 6 758          | 7 139          |
| Northern Africa                        | 1 383                             | 1 477          | 1 849          | 1 983          |
| Western and Central Africa             | 956                               | 1 230          | 2 017          | 2 269          |
| <b>Total Africa</b>                    | <b>8 500</b>                      | <b>8 921</b>   | <b>10 624</b>  | <b>11 390</b>  |
| East Asia                              | 57 483                            | 68 298         | 86 882         | 98 139         |
| South and Southeast Asia               | 12 949                            | 21 503         | 27 781         | 31 469         |
| Western and Central Asia               | 3 757                             | 4 206          | 4 976          | 5 621          |
| <b>Total Asia</b>                      | <b>74 188</b>                     | <b>94 007</b>  | <b>119 640</b> | <b>135 230</b> |
| Europe excl. Russian Federation        | 41 743                            | 46 572         | 52 080         | 55 004         |
| <b>Total Europe</b>                    | <b>54 394</b>                     | <b>61 932</b>  | <b>71 693</b>  | <b>73 884</b>  |
| Caribbean                              | 479                               | 501            | 731            | 851            |
| Central America                        | 74                                | 133            | 267            | 391            |
| North America                          | 22 596                            | 31 986         | 39 646         | 45 785         |
| <b>Total North and Central America</b> | <b>23 149</b>                     | <b>32 621</b>  | <b>40 645</b>  | <b>47 027</b>  |
| <b>Total Oceania</b>                   | <b>2 784</b>                      | <b>3 775</b>   | <b>4 491</b>   | <b>4 812</b>   |
| <b>Total South America</b>             | <b>7 046</b>                      | <b>9 406</b>   | <b>14 866</b>  | <b>20 245</b>  |
| <b>WORLD</b>                           | <b>170 061</b>                    | <b>210 662</b> | <b>261 958</b> | <b>292 587</b> |

**TABLE 21.** Annual change in the area of planted forest, by region and subregion, 1990–2020

| Region/subregion                       | Planted forest annual change |             |              |             |              |             |
|--|------------------------------|-------------|--------------|-------------|--------------|-------------|
|  | 1990–2000                    |             | 2000–2010    |             | 2010–2020    |             |
|  | 1 000 ha/yr                  | %           | 1 000 ha/yr  | %           | 1 000 ha/yr  | %           |
| Eastern and Southern Africa            | 5                            | 0.09        | 54           | 0.84        | 38           | 0.55        |
| Northern Africa                        | 9                            | 0.66        | 37           | 2.27        | 13           | 0.70        |
| Western and Central Africa             | 27                           | 2.54        | 79           | 5.07        | 25           | 1.18        |
| <b>Total Africa</b>                    | <b>42</b>                    | <b>0.48</b> | <b>170</b>   | <b>1.76</b> | <b>77</b>    | <b>0.70</b> |
| East Asia                              | 1 082                        | 1.74        | 1 858        | 2.44        | 1 126        | 1.23        |
| South and Southeast Asia               | 855                          | 5.20        | 628          | 2.59        | 369          | 1.25        |
| Western and Central Asia               | 45                           | 1.14        | 77           | 1.70        | 65           | 1.23        |
| <b>Total Asia</b>                      | <b>1 982</b>                 | <b>2.40</b> | <b>2 563</b> | <b>2.44</b> | <b>1 559</b> | <b>1.23</b> |
| Europe excl. Russian Federation        | 483                          | 1.10        | 551          | 1.12        | 292          | 0.55        |
| <b>Total Europe</b>                    | <b>754</b>                   | <b>1.31</b> | <b>976</b>   | <b>1.47</b> | <b>219</b>   | <b>0.30</b> |
| Caribbean                              | 2                            | 0.45        | 23           | 3.84        | 12           | 1.54        |
| Central America                        | 6                            | 6.07        | 13           | 7.21        | 12           | 3.86        |
| North America                          | 939                          | 3.54        | 766          | 2.17        | 614          | 1.45        |
| <b>Total North and Central America</b> | <b>947</b>                   | <b>3.49</b> | <b>802</b>   | <b>2.22</b> | <b>638</b>   | <b>1.47</b> |
| <b>Total Oceania</b>                   | <b>99</b>                    | <b>3.09</b> | <b>72</b>    | <b>1.75</b> | <b>32</b>    | <b>0.69</b> |
| <b>Total South America</b>             | <b>236</b>                   | <b>2.93</b> | <b>546</b>   | <b>4.68</b> | <b>538</b>   | <b>3.14</b> |
| <b>WORLD</b>                           | <b>4 060</b>                 | <b>2.16</b> | <b>5 130</b> | <b>2.20</b> | <b>3 063</b> | <b>1.11</b> |

Note: The rate of change (%) is calculated as the compound annual change rate.

The area of planted forest increased in all regions between 1990 and 2020, including in the most recent decade, at varying rates of annual gain. Most of the increases in 2010–2020 were in Asia, even though the average annual rate of gain was substantially less in that region than in previous decades. This trend mainly reflected a decrease in the rate of gain in East Asia, especially China, which reported an annual increase in planted forest of 1.07 million ha in 1990–2000, 1.85 million ha in 2000–2010 and 1.14 million ha in 2010–2020. There was also a reduction in the rate of gain in South and Southeast Asia; the average annual increase in planted forest area in India, for example, was 365 000 ha in 1990–2000, 341 000 ha in 2000–2010, and only 49 100 ha 2010–2020.

North and Central America had the second-largest increase in planted forest area in 2010–2020, but the average annual rate of gain has been slowing – from 947 000 ha in 1990–2000, to 802 000 ha in 2000–2010, to 638 000 ha in the most recent decade. This reduction in the rate of gain mainly reflects the situation in the United States of America, where the average annual increase in planted forest area more than halved from 462 000 ha in 1990–2000 to 196 000 ha in 2010–2020.

**TABLE 22. Area of plantation forest and other planted forest, by region and subregion, 2020**

| Region/subregion                       | Area (1 000 ha)   |                      |                      |
|--|-------------------|----------------------|----------------------|
|  | Plantation forest | Other planted forest | Total planted forest |
| Eastern and Southern Africa            | 4 968             | 2 171                | 7 139                |
| Northern Africa                        | 1 241             | 741                  | 1 983                |
| Western and Central Africa             | 1 469             | 800                  | 2 269                |
| <b>Total Africa</b>                    | <b>7 678</b>      | <b>3 712</b>         | <b>11 390</b>        |
| East Asia                              | 48 994            | 49 144               | 98 139               |
| South and Southeast Asia               | 26 631            | 4 839                | 31 469               |
| Western and Central Asia               | 3 707             | 1 914                | 5 621                |
| <b>Total Asia</b>                      | <b>79 332</b>     | <b>55 897</b>        | <b>135 230</b>       |
| Europe excl. Russian Federation        | 4 495             | 51 817               | 56 312               |
| <b>Total Europe</b>                    | <b>4 495</b>      | <b>70 697</b>        | <b>75 193</b>        |
| Caribbean                              | 716               | 135                  | 851                  |
| Central America                        | 356               | 35                   | 391                  |
| North America                          | 14 105            | 31 680               | 45 785               |
| <b>Total North and Central America</b> | <b>15 177</b>     | <b>31 850</b>        | <b>47 027</b>        |
| <b>Total Oceania</b>                   | <b>4 356</b>      | <b>456</b>           | <b>4 812</b>         |
| <b>Total South America</b>             | <b>20 099</b>     | <b>145</b>           | <b>20 245</b>        |
| <b>WORLD</b>                           | <b>131 137</b>    | <b>162 758</b>       | <b>293 895</b>       |

The average annual rate of increase in planted forest area slowed slightly in South America, from 546 000 ha in 2000–2010 to 538 000 ha in 2010–2020. The biggest influence on the growth of planted forest area in the region in the last two decades has been Brazil, where the average annual increase was 9 410 ha in 1990–2000, 368 000 ha in 2000–2010 and 390 000 ha in 2010–2020. On the other hand, the rate of increase slowed in the most recent decade in Chile, Colombia, Peru and Uruguay.

The average annual rate of gain in planted forest area was substantially lower in Europe in 2010–2020 than in the previous two decades. This was due mainly to the Russian Federation, which had an average annual gain of 271 000 ha in 1990–2000 and 425 000 ha in 2000–2010 but an average annual loss of 73 300 ha in 2010–2020.

The area of planted forests in Africa increased by an annual average of 76 600 ha in 2010–2020, down from 170 000 ha in 2000–2010. The rate was 42 100 ha in 1990–2000.

The average annual rate of increase in the area of planted forests has trended downward in Oceania in the last three decades, from 99 100 ha in 1990–2000, to 71 600 ha in 2000–2010, to 32 100 ha in 2010–2020. This mainly reflects the situation in New Zealand, where the average annual increase in planted forest area declined from 49 400 ha in 1990–2000 to 6 020 ha in 2010–2020. The average annual increase in planted forest area grew in Australia, from 46 200 ha in 1990–2000 to 68 300 ha in 2000–2010, before dropping to 22 200 ha in 2010–2020.

## Plantation forest and other planted forest

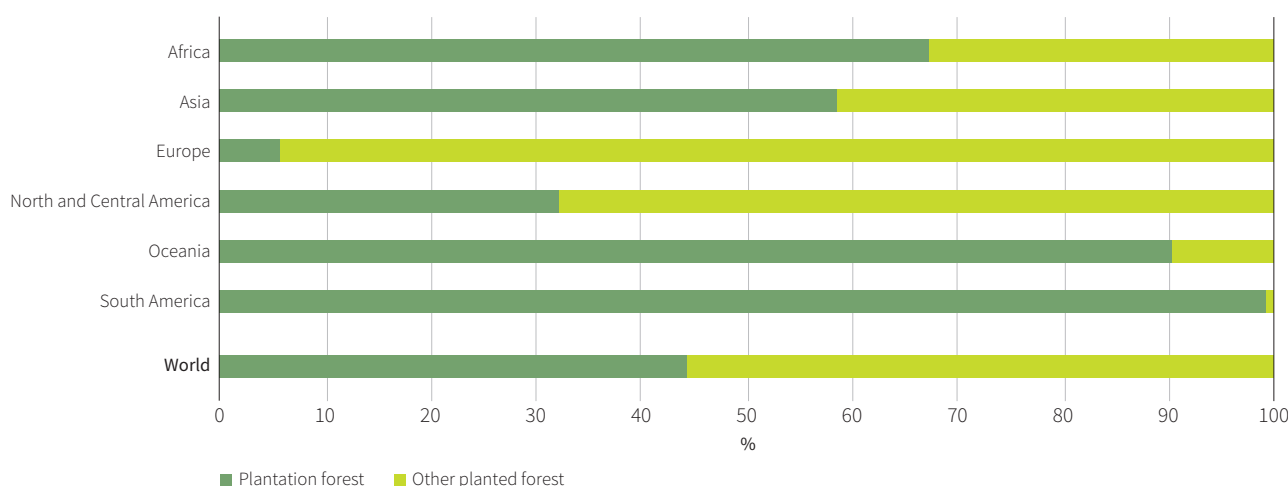
### STATUS

This analysis of the status of plantation forests and other planted forests in 2020 is based on data reported by 219 countries and territories representing nearly 100 percent of the global forest area.

Worldwide, there are 131 million ha of plantation forests, which is 45 percent of the total planted forest area. The remainder (55 percent) is categorized as other planted forest, covering 163 million ha. The highest share of plantation forests is in South America, where this subcategory constitutes about 99 percent of the total area of planted forests. Plantation forests also account for most (91 percent) of the total planted forest area in Oceania, about two-thirds (67 percent) in Africa, and more than half (59 percent) in Asia (Table 22; Figure 11). Plantation forests comprise 100 percent of the planted forest area in six countries and territories (Table 23).

Other planted forests predominate in Europe, accounting for 94 percent of the total planted forest area,

FIGURE 11. Proportion of plantation forest and other planted forest, by region, 2020



and in North and Central America, at 68 percent of the total.

### TRENDS

The area of plantation forests worldwide increased by 55.8 million ha between 1990 and 2020, with the biggest jump (21.2 million ha) occurring between 2000 and 2010. The average annual rate of gain increased from 1.98 million ha in 1990–2000 to 2.12 million ha in 2000–2010 before falling back to 1.48 million ha per year in the most recent decade.

The area of other planted forest increased by 66.8 million ha between 1990 and 2020. The average annual rate of gain increased from 2.08 million ha in 1990–2000 to 3.01 million ha in 2000–2010 before dropping to 1.59 million ha in 2010–2020.

The area of plantation forest has increased substantially in Asia in the last three decades, albeit with a declining average annual rate of increase, from 1.26 million ha in 1990–2000, to 975 000 ha in 2000–2010, to 735 000 ha in 2010–2020. The average annual rate of gain in other planted forest in the region more than doubled from 717 000 ha in 1990–2000 to 1.59 million ha in 2000–2010, before falling back to 824 000 ha in 2010–2020. The big increase in 2000–2010 was due largely to the implementation of large-scale afforestation programmes in China. The proportion of the planted forest area held by plantation forests declined in Asia between 1990 and 2020 (Figure 12).

The area of plantation forest in North and Central America increased at an average annual rate of 164 000 ha in the most recent decade, down from 270 000 ha in 1990–2000 and 420 000 ha in 2000–2010. The area of plantation forest in Europe decreased by an average annual rate of

TABLE 23. Top ten countries and territories for plantation forest as a proportion of total forest area, 2020

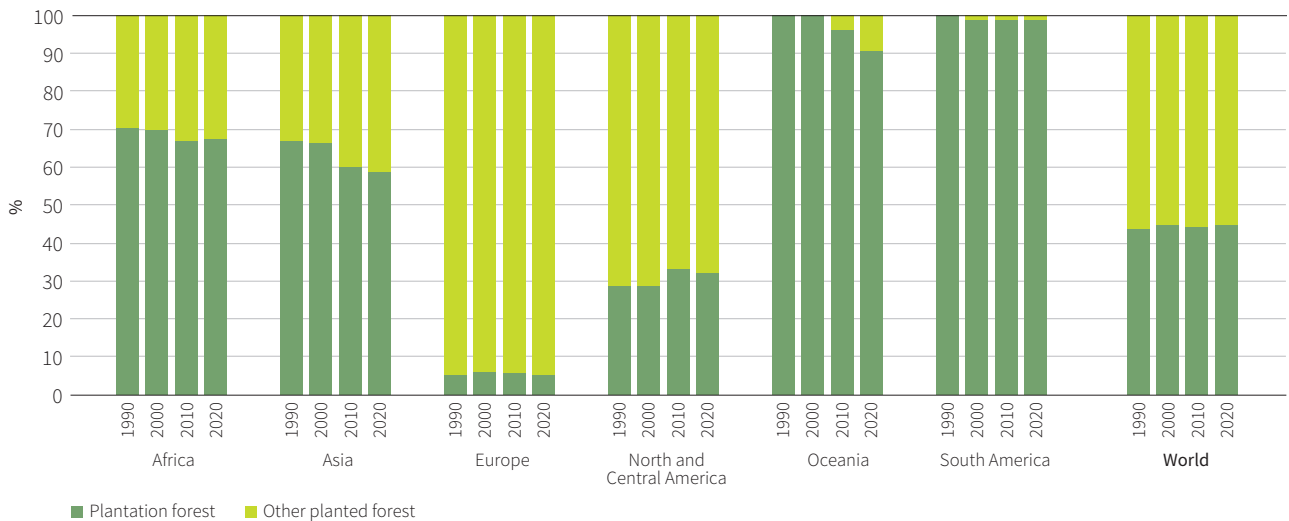
| Ranking | Country       | Proportion of plantation forest (%) |
|---------|---------------|-------------------------------------|
| 1       | Bahrain       | 100                                 |
| 2       | Faroe Islands | 100                                 |
| 3       | Greenland     | 100                                 |
| 4       | Kuwait        | 100                                 |
| 5       | Libya         | 100                                 |
| 6       | Ireland       | 86                                  |
| 7       | Cabo Verde    | 70                                  |
| 8       | Belgium       | 64                                  |
| 9       | Uruguay       | 58                                  |
| 10      | Rwanda        | 54                                  |

17 700 ha in 2010–2020, reversing the previous increasing trend of 94 200 ha in 1990–2000 and 38 200 ha in 2000–2010. The shift from gain to loss was due mainly to Sweden, which experienced an average annual loss of 30 100 ha in 2010–2020.

The average annual rate of increase in the area of plantation forest was lower in Africa in 2010–2020, at 55 300 ha, than in 2000–2010, at 89 800 ha (the rate of increase in 1990–2000 was 25 300 ha). The proportion of the planted forest area held by plantation forest in Africa was 70 percent in 1990, declining slightly to 67 percent in 2020.

Plantation forests accounted for 99.9 percent of the planted forest area in South America in 1990 and for about 99 percent in 2020; in Oceania, they comprised 99.7 percent in 1990 and 90.5 percent in 2020.

FIGURE 12. Plantation forest and other planted forest as a proportion of total planted forest area, by region, 1990–2020



## Plantations of introduced species

### STATUS

Of the 219 countries and territories that reported on the area of planted forests in 2020, 173 – representing 85 percent of the world’s forest area – reported on the area of plantation forest composed of introduced species. Of those, almost half (86) reported that they have no introduced species and that all their plantation forests are composed of native species.

Globally, the area of plantation forest composed of introduced species is 49.7 million ha, which is 1.4 percent of the total forest area of the reporting countries. Introduced species account for 44 percent of the total area of plantation forest in the reporting countries (Table 24).

The largest area of plantation forest composed of introduced species is in Asia, at 20.9 million ha (32 percent of the total area of plantation forest in that region), followed by South America, at 17.8 million ha. The region with the highest proportion of plantation forest composed of introduced species is South America, at 97 percent, followed by Europe and Oceania (both 78 percent), Africa (70 percent) and North and Central America (4 percent). Thirty-nine countries reported that 100 percent of their plantation forest area is composed of introduced species.

### TRENDS

Information on trends in the area of plantation forest composed of introduced species was available for 170 countries representing 85 percent of the world’s forest area.

The area of plantation forest worldwide composed of introduced species increased by 26.7 million ha between

1990 and 2020, and the proportion of the total plantation forest area comprising introduced species increased from 34 percent in 1990 to 44 percent in 2020 (Table 25). This proportion almost doubled over the period in Asia, from 17 percent to 32 percent; it declined, however, in all other regions. Most of the increase in Asia was in East Asia; in China, for example, the area of plantation forest consisting of introduced species grew from 4.39 million ha in 1990 to 14.2 million ha in 2020.

## Primary forest

Primary forests are naturally regenerated forests of native tree species, where there are no clearly visible indications of human activities and ecological processes are not significantly disturbed. Primary forests – especially primary tropical moist forests – are highly species-rich, diverse ecosystems, and their extent is an important environmental indicator.

### STATUS

FRA 2020 received information on the area of primary forest in 2020 from 146 countries and territories representing 81 percent of the world’s forest area. Despite the relatively high percentage of reporting on this variable, the reliability of the data is a cause for concern, with many countries and territories relying for their estimates on proxies such as the area of forest in national parks and other conservation areas.

Based on the provided data, the area of primary forests worldwide is estimated at 1.11 billion ha, or about one-third (34 percent) of the forest area of reporting

**TABLE 24.** Plantation forests composed of introduced species, by region and subregion, 2020

| Region/subregion                       | Data availability          |                        | Plantation forest     |   |              |
|--|----------------------------|------------------------|-----------------------|---|--------------|
|  | No. of reporting countries | % of total forest area | Total area (1 000 ha) | ... of which composed of introduced species | % introduced |
| Eastern and Southern Africa            | 20                         | 95                     | 4 089                 | 3 019                                       | 74           |
| Northern Africa                        | 7                          | 47                     | 894                   | 444   | 50           |
| Western and Central Africa             | 17                         | 78                     | 716                   | 528   | 74           |
| <b>Total Africa</b>                    | <b>44</b>                  | <b>84</b>              | <b>5 699</b>          | <b>3 992</b>                                | <b>70</b>    |
| East Asia                              | 4                          | 98                     | 48 007                | 14 779                                      | 31           |
| South and Southeast Asia               | 9                          | 45                     | 15 107                | 6 043                                       | 40           |
| Western and Central Asia               | 20                         | 79                     | 2 448                 | 116   | 5            |
| <b>Total Asia</b>                      | <b>33</b>                  | <b>71</b>              | <b>65 562</b>         | <b>20 938</b>                               | <b>32</b>    |
| <b>Total Europe</b>                    | <b>39</b>                  | <b>97</b>              | <b>3 978</b>          | <b>3 116</b>                                | <b>78</b>    |
| Caribbean                              | 22                         | 95                     | 684                   | 221   | 32           |
| Central America                        | 4                          | 62                     | 201                   | 36  | 18           |
| North America                          | 4                          | 91                     | 14 029                | 268   | 2            |
| <b>Total North and Central America</b> | <b>30</b>                  | <b>90</b>              | <b>14 915</b>         | <b>525</b>                                  | <b>4</b>     |
| <b>Total Oceania</b>                   | <b>18</b>                  | <b>100</b>             | <b>4 337</b>          | <b>3 392</b>                                | <b>78</b>    |
| <b>Total South America</b>             | <b>9</b>                   | <b>75</b>              | <b>18 278</b>         | <b>17 767</b>                               | <b>97</b>    |
| <b>WORLD</b>                           | <b>173</b>                 | <b>85</b>              | <b>112 769</b>        | <b>49 731</b>                               | <b>44</b>    |

**TABLE 25.** Plantation forests composed of introduced species as a proportion of total plantation forest area, by region and subregion, 1990–2020

| Region/subregion                       | Data availability          |                        | Proportion of plantation forests composed of species (%) |           |           |           |
|--|----------------------------|------------------------|--|-----------|-----------|-----------|
|  | No. of reporting countries | % of total forest area | 1990   | 2000      | 2010      | 2020      |
| Eastern and Southern Africa            | 20                         | 95                     | 72   | 72        | 73        | 74        |
| Northern Africa                        | 7                          | 47                     | 79   | 73        | 57        | 50        |
| Western and Central Africa             | 17                         | 78                     | 91   | 89        | 77        | 74        |
| <b>Total Africa</b>                    | <b>44</b>                  | <b>84</b>              | <b>74</b>  | <b>73</b> | <b>71</b> | <b>70</b> |
| East Asia                              | 4                          | 98                     | 13   | 19        | 24        | 31        |
| South and Southeast Asia               | 9                          | 45                     | 45   | 35        | 37        | 40        |
| Western and Central Asia               | 20                         | 79                     | 4  | 4         | 4         | 5         |
| <b>Total Asia</b>                      | <b>33</b>                  | <b>71</b>              | <b>17</b>  | <b>21</b> | <b>27</b> | <b>32</b> |
| <b>Total Europe</b>                    | <b>36</b>                  | <b>96</b>              | <b>84</b>  | <b>71</b> | <b>72</b> | <b>77</b> |
| Caribbean                              | 22                         | 95                     | 33   | 39        | 33        | 32        |
| Central America                        | 4                          | 62                     | 52   | 40        | 25        | 18        |
| North America                          | 4                          | 91                     | 5  | 4         | 3         | 2         |
| <b>Total North and Central America</b> | <b>30</b>                  | <b>90</b>              | <b>7</b>   | <b>6</b>  | <b>5</b>  | <b>4</b>  |
| <b>Total Oceania</b>                   | <b>18</b>                  | <b>100</b>             | <b>95</b>  | <b>85</b> | <b>76</b> | <b>78</b> |
| <b>Total South America</b>             | <b>9</b>                   | <b>75</b>              | <b>98</b>  | <b>98</b> | <b>98</b> | <b>97</b> |
| <b>WORLD</b>                           | <b>170</b>                 | <b>85</b>              | <b>34</b>  | <b>35</b> | <b>39</b> | <b>44</b> |

countries (Table 26). Among the regions, North and Central America has the largest area of primary forest, at 313 million ha, followed by South America (299 million ha) and Europe (259 million ha) (although, if the Russian Federation is excluded, Europe would have only 4.18 million ha). Africa has an estimated 150 million ha of primary forest, Asia 86.4 million ha and Oceania 2.62 million ha.

Primary forest accounts for 49 percent of the total forest area in South America, 43 percent in North and Central America, 38 percent in Africa, 27 percent in Europe (or 3 percent if the Russian Federation is excluded) and 21 percent in Oceania. Asia has the lowest area of primary forest as a proportion of its total forest area, at 15 percent. Table 27 shows the top five countries for primary forest area in 2020.

Primary forests account for 95 percent or more of the total forest area in three countries and territories: Suriname, Venezuela (Bolivarian Republic of) and French Guyana (Table 28).

## TRENDS

FRA 2020 received information on trends in the area of primary forest from 137 countries and territories, representing 57 percent of the world's forest area. The low number of countries and territories reporting on this parameter, and the use of proxies such as the area of forest in protected areas and other types of forest reserve, reduces the reliability of the trend analysis, and the findings here should be treated with caution. Moreover, the data do not

**TABLE 26.** Area of primary forest, by region and subregion, 2020

| Region/subregion                       | Data availability             |                           | Primary forest<br>(1 000 ha) | % of total forest<br>area of reporting<br>countries | Share of global<br>area of primary<br>forest (%) |
|--|-------------------------------|---------------------------|------------------------------|---|--|
|  | No. of reporting<br>countries | % of total forest<br>area |                              |   |  |
| Eastern and Southern Africa            | 10                            | 49                        | 59 412                       | 41  | 5.4  |
| Northern Africa                        | 5                             | 77                        | 1 284                        | 5   | 0.1  |
| Western and Central Africa             | 16                            | 72                        | 88 891                       | 40  | 8.0  |
| <b>Total Africa</b>                    | <b>31</b>                     | <b>62</b>                 | <b>149 586</b>               | <b>38</b>   | <b>13.5</b>                                      |
| East Asia                              | 3                             | 95                        | 16 799                       | 6   | 1.5  |
| South and Southeast Asia               | 12                            | 87                        | 67 351                       | 26  | 6.1  |
| Western and Central Asia               | 18                            | 95                        | 2 241                        | 4   | 0.2  |
| <b>Total Asia</b>                      | <b>33</b>                     | <b>91</b>                 | <b>86 392</b>                | <b>15</b>   | <b>7.8</b>                                       |
| Europe excl. Russian Federation        | 41                            | 77                        | 4 180                        | 3   | 0.4  |
| <b>Total Europe</b>                    | <b>42</b>                     | <b>95</b>                 | <b>259 392</b>               | <b>27</b>   | <b>23.4</b>                                      |
| Caribbean                              | 13                            | 67                        | 184                          | 3   | 0.0  |
| Central America                        | 1                             | 16                        | 658                          | 19  | 0.1  |
| North America                          | 4                             | 100                       | 312 471                      | 43  | 28.2   |
| <b>Total North and Central America</b> | <b>18</b>                     | <b>97</b>                 | <b>313 313</b>               | <b>43</b>   | <b>28.2</b>                                      |
| <b>Total Oceania</b>                   | <b>14</b>                     | <b>7</b>                  | <b>2 617</b>                 | <b>21</b>   | <b>0.2</b>                                       |
| <b>Total South America</b>             | <b>8</b>                      | <b>72</b>                 | <b>298 698</b>               | <b>49</b>   | <b>26.9</b>                                      |
| <b>WORLD</b>                           | <b>146</b>                    | <b>81</b>                 | <b>1 109 997</b>             | <b>34</b>   | <b>100.0</b>                                     |

**TABLE 27.** Top five countries for primary forest area, 2020

| Ranking | Country                          | Area of primary forest<br>(1 000 ha) | Share of global primary<br>forest area of reporting<br>countries (%) | Cumulative % |
|---------|----------------------------------|--------------------------------------|--|--------------|
| 1       | Russian Federation               | 255 212                              | 23   | 23           |
| 2       | Brazil                           | 216 187                              | 19   | 42           |
| 3       | Canada                           | 205 131                              | 18   | 61           |
| 4       | Democratic Republic of the Congo | 82 752                               | 7  | 68           |
| 5       | United States of America         | 75 300                               | 7  | 75           |

indicate whether decreases in the area of primary forest are due to deforestation or to conversion to another forest type (such as naturally regenerating or planted forest).

Note that the data reported by the Russian Federation have been excluded from the regional and global analysis of trends. The reason for this is that, in the absence of information on primary forest area in that country, the area of intact forest landscapes was used as a proxy; this, in turn, means substantial changes over time, which would have a considerable impact on global and regional trends.

Globally, the area of primary forest decreased by 81.3 million ha between 1990 and 2020. The average annual rate of loss was 3.41 million ha in 1990–2000 and 3.45 million ha in 2000–2010; the rate dropped substantially in the most recent decade, to 1.27 million ha (Table 29).

The biggest average annual loss of primary forest area in 2010–2020 was in Africa, at 849 000 ha, up from 611 000 ha in 1990–2000 and 585 000 ha in 2000–2010. The increase in the most recent decade was due largely to the Democratic Republic of the Congo, where the average annual rate of loss was 723 000 ha in 2010–2020, up from 442 000 ha in 1990–2010.

The average annual rate of loss of primary forest in South America was substantially lower in the most recent

**TABLE 28. Top five countries and territories for primary forest as a proportion of total forest area, 2020**

| Ranking | Country/territory                  | Area of primary forest (1 000 ha) | % of total forest area |
|---------|------------------------------------|-----------------------------------|------------------------|
| 1       | Suriname                           | 14 833                            | 98                     |
| 2       | Venezuela (Bolivarian Republic of) | 44 873                            | 97                     |
| 3       | French Guyana                      | 7 640                             | 95                     |
| 4       | Micronesia (Federated States of)   | 48                                | 75                     |
| 5       | Tajikistan                         | 296                               | 70                     |

decade compared with the previous 20 years. It was 1.75 million ha per year in 1990–2000 and 2.27 million ha per year in 2000–2010 but only 323 000 ha in 2010–2020. The decrease was due mainly to Brazil, where the rate of average annual loss of primary forest was 1.41 million ha in 1990–2000 and 2.08 million ha in 2000–2010 before plummeting to 201 000 ha in the most recent decade.

**TABLE 29. Area of primary forest and annual change, by region and subregion, 1990–2020**

| Region/subregion                       | Data availability          |                        | Primary forest (1 000 ha) |                |                |                | Annual change (1 000 ha/yr) |               |               |
|--|----------------------------|------------------------|---------------------------|----------------|----------------|----------------|-----------------------------|---------------|---------------|
|  | No. of reporting countries | % of total forest area | 1990                      | 2000           | 2010           | 2020           | 1990–2000                   | 2000–2010     | 2010–2020     |
| Eastern and Southern Africa            | 9                          | 27                     | 34 179                    | 33 591         | 32 849         | 32 669         | -59                         | -74           | -18           |
| Northern Africa                        | 5                          | 77                     | 1 650                     | 1 528          | 1 406          | 1 284          | -12                         | -12           | -12           |
| Western and Central Africa             | 16                         | 72                     | 107 463                   | 102 063        | 97 075         | 88 891         | -540                        | -499          | -818          |
| <b>Total Africa</b>                    | <b>30</b>                  | <b>51</b>              | <b>143 291</b>            | <b>137 182</b> | <b>131 329</b> | <b>122 843</b> | <b>-611</b>                 | <b>-585</b>   | <b>-849</b>   |
| East Asia                              | 3                          | 95                     | 15 410                    | 15 507         | 16 223         | 16 799         | 10                          | 72            | 58            |
| South and Southeast Asia               | 11                         | 85                     | 82 716                    | 75 109         | 67 682         | 66 825         | -761                        | -743          | -86           |
| Western and Central Asia               | 18                         | 95                     | 2 139                     | 2 156          | 2 173          | 2 241          | 2                           | 2             | 7             |
| <b>Total Asia</b>                      | <b>32</b>                  | <b>90</b>              | <b>100 265</b>            | <b>92 772</b>  | <b>86 078</b>  | <b>85 866</b>  | <b>-749</b>                 | <b>-669</b>   | <b>-21</b>    |
| <b>Total Europe</b>                    | <b>35</b>                  | <b>44</b>              | <b>853</b>                | <b>988</b>     | <b>1 319</b>   | <b>1 406</b>   | <b>14</b>                   | <b>33</b>     | <b>9</b>      |
| Caribbean                              | 13                         | 67                     | 192                       | 190            | 187            | 184            | 0                           | 0             | 0             |
| Central America                        | 1                          | 16                     | 878                       | 778            | 689            | 658            | -10                         | -9            | -3            |
| North America                          | 4                          | 100                    | 315 701                   | 312 652        | 313 113        | 312 471        | -305                        | 46            | -64           |
| <b>Total North and Central America</b> | <b>18</b>                  | <b>97</b>              | <b>316 772</b>            | <b>313 621</b> | <b>313 989</b> | <b>313 313</b> | <b>-315</b>                 | <b>37</b>     | <b>-68</b>    |
| <b>Total Oceania</b>                   | <b>14</b>                  | <b>7</b>               | <b>2 748</b>              | <b>2 774</b>   | <b>2 801</b>   | <b>2 617</b>   | <b>3</b>                    | <b>3</b>      | <b>-18</b>    |
| <b>Total South America</b>             | <b>8</b>                   | <b>72</b>              | <b>342 109</b>            | <b>324 607</b> | <b>301 926</b> | <b>298 698</b> | <b>-1 750</b>               | <b>-2 268</b> | <b>-323</b>   |
| <b>WORLD</b>                           | <b>137</b>                 | <b>57</b>              | <b>906 038</b>            | <b>871 944</b> | <b>837 442</b> | <b>824 742</b> | <b>-3 409</b>               | <b>-3 450</b> | <b>-1 270</b> |

**TABLE 30. Area of mangroves, by region and subregion, 2020**

| Region/subregion                       | Mangrove area (1 000 ha) |
|--|--------------------------|
| Eastern and Southern Africa            | 905                      |
| Northern Africa                        | 31                       |
| Western and Central Africa             | 2 304                    |
| <b>Total Africa</b>                    | <b>3 240</b>             |
| East Asia                              | 32                       |
| South and Southeast Asia               | 5 331                    |
| Western and Central Asia               | 184                      |
| <b>Total Asia</b>                      | <b>5 547</b>             |
| <b>Total Europe</b>                    | <b>0</b>                 |
| Caribbean                              | 892                      |
| Central America                        | 484                      |
| North America                          | 1 195                    |
| <b>Total North and Central America</b> | <b>2 571</b>             |
| <b>Total Oceania</b>                   | <b>1 298</b>             |
| <b>Total South America</b>             | <b>2 130</b>             |
| <b>WORLD</b>                           | <b>14 786</b>            |

There was a decrease in the average annual rate of primary forest loss in Asia, from 749 000 ha in 1990–2000 and 669 000 ha in 2000–2010 to 21 300 ha in 2010–2020. The decline was due largely to a substantial drop in Indonesia, where the average annual rate of loss declined from 713 000 ha in 2000–2010 to 85 700 ha in 2010–2020.

In North and Central America, the area of primary forest declined at a rate of 315 000 ha per year in 1990–2000, increased by 36 800 ha per year in 2000–2010, and declined again at a rate of 67 600 ha per year in 2010–2020. The shift from loss to gain in 2000–2010 mainly reflected the situation in Mexico, where the rate of loss of primary forest more than halved from 506 000 ha per year in 1990–2000 to 224 000 ha per year in 2000–2010. The trend was also affected by data reported by the United States of America indicating an average annual increase in primary forest area of 229 000 ha per year in 1990–2000, 299 000 ha in 2000–2010 and 600 ha in 2010–2020; in this case, however, estimates of primary forest area are based on the area of reserved forest, and the increase in primary forest area mainly reflects changes in designation status rather than an actual change in primary forest area.

Europe, excluding the Russian Federation, has recorded net gains in primary forest area in each of the last three decades, at an average annual rate of 13 500 ha in 1990–2000, 33 000 ha in 2000–2010 and 8 710 ha in 2010–2020. These increases, however, reflect changes in proxies such as the area of forest in protected areas and

therefore are not necessarily a true indication of primary-forest-area dynamics.

Insufficient data were available for Oceania (with reporting countries representing only 7 percent of the region's forest area) to derive valid regional findings. New Zealand reported a relatively stable primary forest area in 1990–2000 and 2000–2010 and an average annual decrease of 18 100 ha in 2010–2020.

## Mangroves

Mangroves are assemblages of salt-tolerant shrubs and trees that grow in intertidal regions of tropical, subtropical and some temperate coastlines, where they fulfil important environmental and socio-economic functions. For example, mangrove ecosystems produce a wide range of wood and non-wood forest products, help protect coastal areas and coral reefs, perform important functions in the life-cycles of many marine species, and conserve biodiversity.

### STATUS

FRA 2020 received information on mangroves for 2020 from 223 countries and territories, of which 113 indicated that they have areas of mangrove forest (the remaining 110 reported that they have no mangroves). Globally, the area of mangroves is estimated at 14.8 million ha; Asia has the largest area (5.55 million ha), followed by Africa, North and Central America, South America and Oceania (Table 30). Europe reported no mangrove area. More than 40 percent of the global area of mangroves is in four countries: Indonesia (19 percent of the global total), Brazil (9 percent), Nigeria (7 percent) and Mexico (6 percent).

### TRENDS

FRA 2020 received information on trends in mangrove area from 218 countries and territories (of which 108 have mangroves).<sup>13</sup>

Globally, the area of mangroves decreased by 1.04 million ha between 1990 and 2020 (Table 31). The rate of loss more than halved over the three decades, from 46 700 ha per year in 1990–2000, to 36 300 ha per year in 2000–2010, to 21 200 ha per year in the most recent decade.

In Africa, the average annual rate of loss dropped from 6 610 ha in 1990–2000 to 2 330 ha in 2010–2020. There was also a decline in the rate of loss in Oceania, from 29 600 ha per year in 1990–2000 to 5 900 ha per year in the most recent decade.

<sup>13</sup> Note that changes in assessment methodologies in several countries mean that estimates of mangrove area for the various periods may not be directly comparable. These results, therefore, should be treated with caution.



**TABLE 31. Area of mangroves and annual change, by region and subregion, 1990–2020**

| Region/subregion                       | Mangrove area (1 000 ha) |               |               |               | Annual change (1 000 ha/yr) |              |              |
|--|--------------------------|---------------|---------------|---------------|-----------------------------|--------------|--------------|
|  | 1990                     | 2000          | 2010          | 2020          | 1990–2000                   | 2000–2010    | 2010–2020    |
| Eastern and Southern Africa            | 929                      | 902           | 883           | 905           | -2.7                        | -1.9         | 2.2          |
| Northern Africa                        | 34                       | 31            | 32            | 31            | -0.3                        | 0.1          | -0.1         |
| Western and Central Africa             | 2 436                    | 2 400         | 2 349         | 2 304         | -3.6                        | -5.1         | -4.5         |
| <b>Total Africa</b>                    | <b>3 398</b>             | <b>3 332</b>  | <b>3 264</b>  | <b>3 240</b>  | <b>-6.6</b>                 | <b>-6.9</b>  | <b>-2.3</b>  |
| East Asia                              | 24                       | 22            | 25            | 32            | -0.2                        | 0.3          | 0.7          |
| South and Southeast Asia               | 6 117                    | 6 108         | 5 713         | 5 330         | -0.8                        | -39.6        | -38.3        |
| Western and Central Asia               | 190                      | 190           | 190           | 184           | 0.0                         | 0.0          | -0.7         |
| <b>Total Asia</b>                      | <b>6 331</b>             | <b>6 320</b>  | <b>5 928</b>  | <b>5 545</b>  | <b>-1.0</b>                 | <b>-39.3</b> | <b>-38.2</b> |
| <b>Total Europe</b>                    | <b>0</b>                 | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>                    | <b>0</b>     | <b>0</b>     |
| Caribbean                              | 787                      | 789           | 774           | 891           | 0.2                         | -1.6         | 11.7         |
| Central America                        | 492                      | 482           | 483           | 466           | -1.0                        | 0.1          | -1.8         |
| North America                          | 1 152                    | 1 167         | 1 190         | 1 195         | 1.5                         | 2.3          | 0.5          |
| <b>Total North and Central America</b> | <b>2 431</b>             | <b>2 439</b>  | <b>2 447</b>  | <b>2 552</b>  | <b>0.8</b>                  | <b>0.8</b>   | <b>10.5</b>  |
| <b>Total Oceania</b>                   | <b>1 447</b>             | <b>1 150</b>  | <b>1 314</b>  | <b>1 255</b>  | <b>-29.6</b>                | <b>16.4</b>  | <b>-5.9</b>  |
| <b>Total South America</b>             | <b>2 152</b>             | <b>2 050</b>  | <b>1 976</b>  | <b>2 124</b>  | <b>-10.2</b>                | <b>-7.4</b>  | <b>14.8</b>  |
| <b>WORLD</b>                           | <b>15 759</b>            | <b>15 292</b> | <b>14 928</b> | <b>14 717</b> | <b>-46.7</b>                | <b>-36.3</b> | <b>-21.2</b> |

There was an increase in the area of mangroves in South America in 2010–2020 at an average annual rate of 14 800 ha, reversing the declining trend in 1990–2000, when the region lost mangroves at a rate of 10 200 ha per year. This reversal was due mainly to Guyana, which reported an average annual increase in mangrove area of 19 500 ha in 2010–2020, due partly to a mangrove restoration project and partly to improvements in mapping (and therefore the increase does not necessarily reflect actual changes in mangrove area).

There was also an increase in mangrove area in North and Central America in 2010–2020, at an average annual rate of 10 500 ha (there was minimal change between 1990 and 2010). The increase in the region in 2010–2020 was attributable mainly to Cuba, which reported a gain of 12 000 ha per year in that period. As in the case of Guyana, this increase was due partly to improved data collection and partly to restoration programmes and does not necessarily reflect actual changes in mangrove area.

There was a substantial increase in the average annual rate of mangrove loss in Asia, from 1 030 ha in 1990–2000 to 38 200 ha in 2010–2020. The increased rate of loss was due mainly to Indonesia, which reported an average annual loss of 6 800 ha in 1990–2000 and 21 100 ha in the most recent decade.

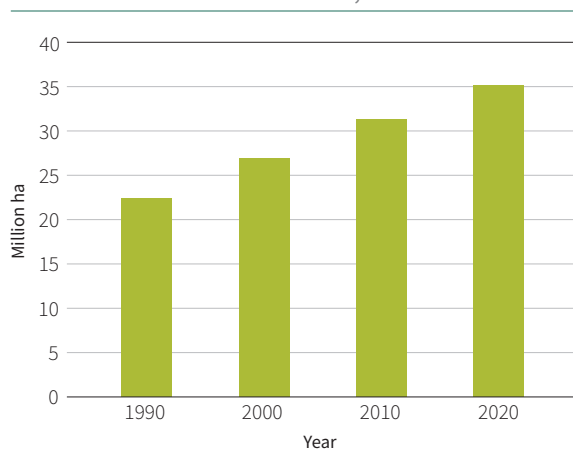
## Bamboo

Bamboo is a widely distributed grass in the tropical, subtropical and temperate climatic domains. It is an

**TABLE 32. Area of bamboo, by region and subregion, 2020**

| Region/subregion                       | Bamboo area (1 000 ha) |
|--|------------------------|
| Eastern and Southern Africa            | 3 984                  |
| Northern Africa                        | 30                     |
| Western and Central Africa             | 634                    |
| <b>Total Africa</b>                    | <b>4 648</b>           |
| East Asia                              | 7 005                  |
| South and Southeast Asia               | 17 872                 |
| Western and Central Asia               | 0                      |
| <b>Total Asia</b>                      | <b>24 877</b>          |
| <b>Total Europe</b>                    | <b>0</b>               |
| Caribbean                              | 125                    |
| Central America                        | 0                      |
| North America                          | 0                      |
| <b>Total North and Central America</b> | <b>125</b>             |
| <b>Total Oceania</b>                   | <b>0</b>               |
| <b>Total South America</b>             | <b>5 389</b>           |
| <b>WORLD</b>                           | <b>35 040</b>          |

FIGURE 13. Total area of bamboo, 1990–2020



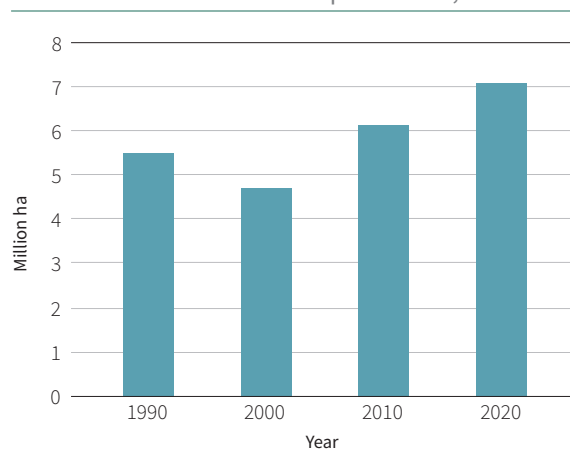
important non-wood forest product with many traditional uses and also an important industrial material for construction and furniture, either in its natural form or as a reconstituted material (e.g. laminated boards and panels). Bamboo shoots are an increasingly mainstream food.

TABLE 33. Area of rubber plantations, by reporting country, 2020

| Ranking      | Country/territory | Area of rubber plantations (1 000 ha) |
|--------------|-------------------|---------------------------------------|
| 1            | Thailand          | 3 537                                 |
| 2            | Malaysia          | 1 073                                 |
| 3            | India             | 882                                   |
| 4            | Cambodia          | 559                                   |
| 5            | Côte d'Ivoire     | 542                                   |
| 6            | Viet Nam          | 500                                   |
| 7            | Guinea**          | 237                                   |
| 8            | Sri Lanka         | 137                                   |
| 9            | Guatemala*        | 82.4                                  |
| 10           | Colombia*         | 58.3                                  |
| 11           | Cameroon          | 54.0                                  |
| 12           | Bangladesh*       | 23.7                                  |
| 13           | Gabon             | 23.0                                  |
| 14           | Papua New Guinea  | 11.7                                  |
| 15           | Ecuador*          | 6.22                                  |
| 16           | Zambia*           | 1.00                                  |
| 17           | Nepal             | 1.00                                  |
| <b>TOTAL</b> |                   | <b>7 728</b>                          |

Note: \* Did not report for 2020; data for 2015 used for 2020. \*\* Did not report for 2020; data for 2010 used for 2020.

FIGURE 14. Total area of rubber plantations, 1990–2020



### STATUS AND TRENDS

Of the 132 countries that reported on bamboo for FRA 2020, 23 indicated that they had bamboo resources. The total estimated bamboo resource in these countries is 35.0 million ha, of which 24.9 million ha (71 percent of the total bamboo area) is in Asia (Table 32).

The total area of bamboo increased by almost 50 percent between 1990 and 2020 (Figure 13), largely because of increases in China and India.

## Rubber plantations

Rubber plantations are important in some regions, especially Asia. Although their main purpose is latex production, they are included in FRA 2020 because rubberwood is an important timber product. Some countries categorize rubber plantations as agricultural tree crops, however, and do not include them in their forest statistics.

### STATUS AND TRENDS

Seventeen of the 167 countries and territories that reported on this parameter for FRA 2020 indicated that they had areas of rubber plantation. Several important rubber-producing countries did not report on their rubber plantation resources and are missing from the totals reported here, which therefore are likely to underestimate the global rubber plantation resource.

The total area of rubber plantations in the 17 reporting countries is estimated at 7.73 million ha, of which 87 percent is in South and Southeast Asia (Table 33). The total area of rubber plantations increased by an estimated 1.99 million ha between 1990 and 2020 (Figure 14).



4

Growing  
stock,  
biomass  
and carbon



# G

rowing stock – the total volume of living trees in a forest – has been assessed in every previous FRA. This parameter provides information on existing wood resources; when expressed as growing stock per unit area, it indicates how well or poorly stocked a forest is. In FRA 2020, information was collected from countries and territories on total growing stock and growing stock per hectare for both naturally regenerating and planted forests and for the total forest resource.

Many countries use growing stock as the basis for estimating biomass and carbon stocks. Forest biomass, expressed in terms of dry weight of living vegetation, is an important indicator of a forest's productivity and its capacity to sequester and store carbon. Forest ecosystems are the largest terrestrial carbon sink, and knowledge on the status of, and trends in, the various forest carbon pools is important for understanding the role of forests in the global carbon cycle.

The United Nations Framework Convention on Climate Change (UNFCCC) requests all countries to periodically assess and report on national greenhouse-gas emissions, including emissions and removals of carbon on forest land. The Intergovernmental Panel on Climate Change (IPCC) has developed guidelines and methodologies for ensuring the consistent reporting of emissions over time.

FRA 2020 uses the same carbon pools and definitions as those in the IPCC guidelines, and it recommended that countries follow the IPCC guidelines for reporting on carbon stocks.<sup>14</sup> Nevertheless, the data reported to FRA 2020 do not always correspond with the data reported to the UNFCCC. There are several possible reasons for this: for example, forest definitions may vary; the UNFCCC requests countries to report on “managed forests”, which may comprise all or only part of a country's forest resource; and FRA-specific methods related to, for example, calibration,

<sup>14</sup> The IPCC recently published an update of its guidelines on national greenhouse-gas inventories (IPCC, 2019), which contains improved conversion factors for carbon estimation; this will help improve estimates for countries lacking national data on biomass and carbon.

reclassification, estimation and forecasting are usually implemented differently in reporting to the UNFCCC.

Data on growing stock, biomass and carbon are improving as more countries conduct national forest inventories as part of their national forest monitoring systems. In many cases, however, historical data are weak, affecting the reliability of trend analyses. Most countries have only one estimate of growing stock per unit area; for those countries, estimates of changes in growing stock are mainly extrapolated from changes in forest area. The same issue also applies to biomass and carbon. Estimates of carbon in dead wood, litter and soil are especially weak, with many countries not reporting on these carbon pools.

FRA 2020 sought information on the composition of growing stock. Information on growing-stock composition and the diversity of tree species in general is crucial not only for managing forests sustainably and developing new tree-based products but also for optimizing the role of forests in mitigating and adapting to climate change. Many countries were unable to report their growing-stock composition, even by the most common native and introduced tree species, and relatively few countries reported full time series for growing-stock composition. Inconsistencies were also found in the taxonomic nomenclature used by countries, which were often not in accordance with globally agreed taxonomic checklists. Increasing the availability and quality of data on growing-stock composition is a formidable task for many countries, especially in the tropics, where the diversity of tree species is very high. Fortunately, tools such as national tree checklists and field identification guides are increasingly available for this purpose. Recently, too, a global checklist of tree species was made available in the GlobalTreeSearch database,<sup>15</sup> which includes data on more than 60 000 tree species worldwide and is continuously updated.

<sup>15</sup> [https://tools.bgci.org/global\\_tree\\_search.php](https://tools.bgci.org/global_tree_search.php)

**TABLE 34. Volume of forest growing stock, by region and subregion, 2020**

| Region/subregion                       | Total growing stock (million m <sup>3</sup> ) | Growing stock per unit area (m <sup>3</sup> /ha) |
|--|---|--|
| Eastern and Southern Africa            | 19 146  | 64.7   |
| Northern Africa                        | 841   | 23.9   |
| Western and Central Africa             | 56 419  | 184.6  |
| <b>Total Africa</b>                    | <b>76 406</b>                                 | <b>120.0</b>                                     |
| East Asia                              | 27 049  | 99.7   |
| South and Southeast Asia               | 31 518  | 106.5  |
| Western and Central Asia               | 3 935   | 71.2   |
| <b>Total Asia</b>                      | <b>62 502</b>                                 | <b>100.4</b>                                     |
| Europe excl. Russian Federation        | 35 158  | 173.9  |
| <b>Total Europe</b>                    | <b>116 230</b>                                | <b>114.2</b>                                     |
| Caribbean                              | 725   | 91.9   |
| Central America                        | 4 233   | 188.9  |
| North America                          | 90 108  | 124.7  |
| <b>Total North and Central America</b> | <b>95 067</b>                                 | <b>126.3</b>                                     |
| <b>Total Oceania</b>                   | <b>18 867</b>                                 | <b>101.8</b>                                     |
| <b>Total South America</b>             | <b>187 455</b>                                | <b>222.1</b>                                     |
| <b>WORLD</b>                           | <b>556 526</b>                                | <b>137.1</b>                                     |

## Growing stock

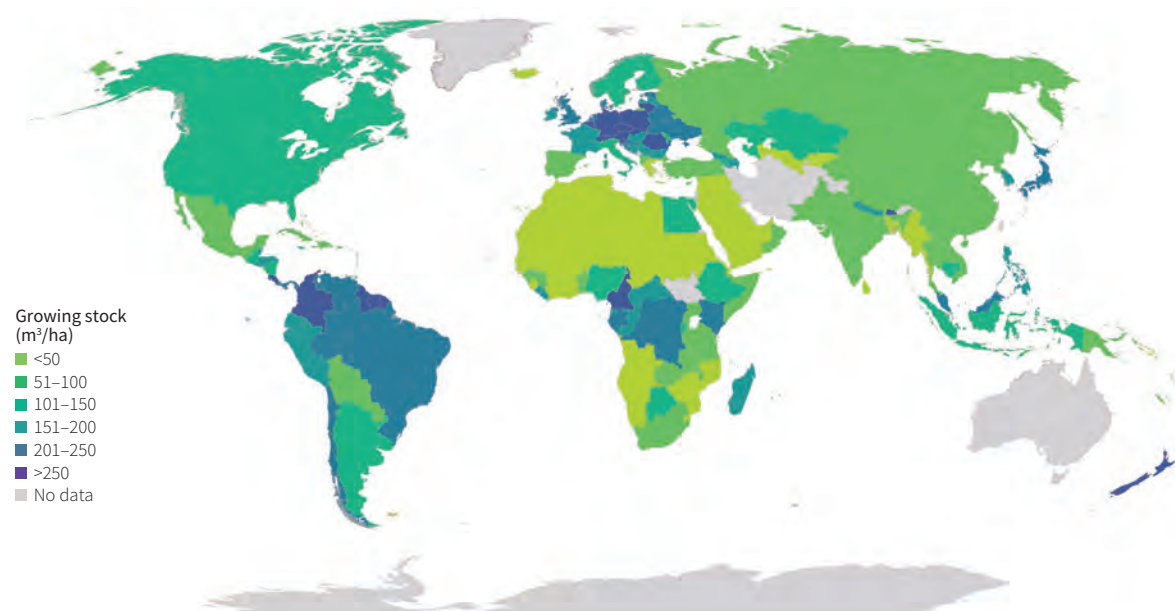
### STATUS

FRA 2020 received information on growing stock in 2020 from 183 countries and territories, representing 95 percent of the world's forests. For countries and territories that provided no information on this parameter, growing stock was estimated by multiplying subregional averages of growing stock per hectare by total forest area.

The world's total forest growing stock is estimated at 557 billion m<sup>3</sup>. Growing stock per unit area is highest in the tropics, led by South America, Central America and Western and Central Africa (in descending order), but it is also high in some regions – such as Europe – with temperate and boreal forests (Table 34; Figure 15). Among countries, Brazil is estimated to have the largest forest growing stock, at 120 billion m<sup>3</sup>; this amounts to almost 22 per cent of the world's total growing stock. The Russian Federation, Canada and the United States of America also have very large volumes of growing stock (Table 35).

FRA 2020 received information on the distribution of growing stock in 2020 from 157 countries and territories representing 92 per cent of the world's total growing stock. Globally, 95 percent of the growing stock is held in naturally regenerating forest, with planted forests accounting for 5 percent. The average growing stock per unit area is higher in naturally regenerating forest (140 m<sup>3</sup> per ha) than in planted forest (110 m<sup>3</sup> per ha). One reason for this is that there has been a large increase in the area of

**FIGURE 15. Forest growing stock per unit area, by country, 2020**



Source: Adapted from United Nations World map, 2020

**TABLE 35. Top ten countries for volume of forest growing stock, 2020**

| Ranking | Country                            | Growing stock (million m <sup>3</sup> ) |
|---------|------------------------------------|---|
| 1       | Brazil                             | 120 358                                 |
| 2       | Russian Federation                 | 81 071                                  |
| 3       | Canada                             | 45 108                                  |
| 4       | United States of America           | 41 269                                  |
| 5       | Democratic Republic of the Congo   | 30 782                                  |
| 6       | China                              | 19 191                                  |
| 7       | Colombia                           | 14 830                                  |
| 8       | Indonesia                          | 12 727                                  |
| 9       | Peru                               | 11 525                                  |
| 10      | Venezuela (Bolivarian Republic of) | 10 254                                  |

planted forests, and recent plantings are yet to achieve high volumes of growing stock. Among the regions, Asia has the highest proportion of growing stock in planted forests and Africa the lowest (Figure 16).

#### TRENDS

FRA 2020 received complete time series on growing stock for 1990–2020 from 182 countries and territories representing 95 percent of the world’s forest area. For countries that did not provide such data, growing stock was estimated by taking subregional averages of growing stock per hectare and multiplying these by forest area (as estimated for each point in the time series). For countries that provided incomplete time series, the missing data were estimated by using the value for growing stock per hectare of the nearest

data point. A complete dataset with no gaps was obtained using this procedure.

Although total growing stock declined slightly between 1990 and 2020 (Table 36), it increased per unit area (Table 37). The latter is true for all regions and subregions and is particularly significant in East Asia and Europe (excluding the Russian Federation). The increase in East Asia is due to significant increases in growing stock in China, Japan and the Republic of Korea, all of which have undertaken major reforestation programmes in recent decades. The increase in Europe follows a long-term trend and is likely due to the widespread use of forest management practices that encourage forest growth.

There was a significant increase in the proportion of total forest growing stock in planted forests between 1990 and 2020 (Figure 17, p. 47) . This finding holds for all regions, with the most significant increases in East Asia, North and Central America, South America and Oceania.

### Growing-stock composition

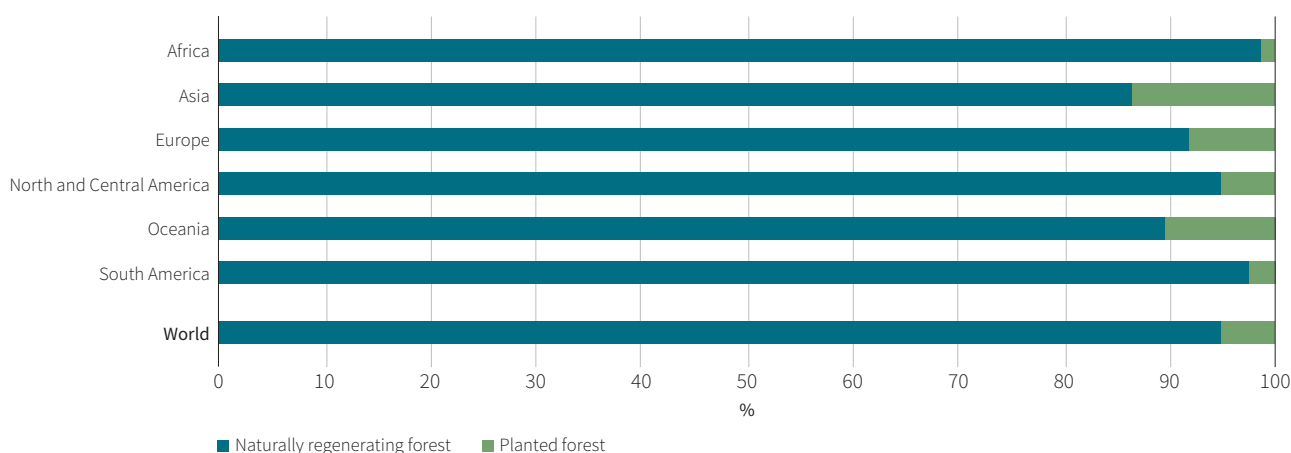
#### STATUS

FRA 2020 received information on the composition of forest growing stock (i.e. whether comprising native or introduced tree species) in 2020 from 75 countries and territories representing 62 percent of the world’s forest area and almost half its growing stock.

It is estimated that, globally, 92 percent of the growing stock consists of native tree species and 8 percent comprises introduced tree species. Native tree species dominate the composition of growing stock in all regions, with the share highest in Asia (98 percent) and lowest in Africa (86 percent).

The most common native and introduced tree species in the growing stock reported for FRA 2020 belong to

**FIGURE 16. Naturally regenerating and planted forest growing stock distribution, by region, 2020**



**TABLE 36. Total volume of forest growing stock, by region and subregion, 1990–2020**

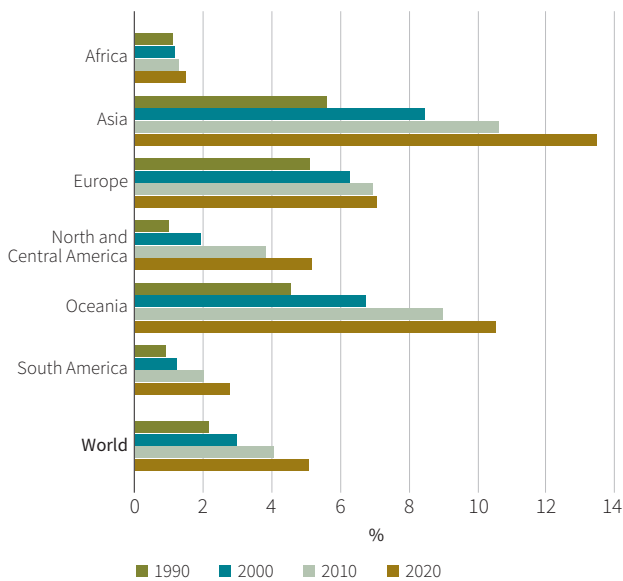
| Region/subregion                       | Forest growing stock (million m <sup>3</sup> ) |                |                |                |
|--|--|----------------|----------------|----------------|
|  | 1990   | 2000           | 2010           | 2020           |
| Eastern and Southern Africa            | 21 915   | 21 273         | 20 337         | 19 146         |
| Northern Africa                        | 891  | 876            | 872            | 841            |
| Western and Central Africa             | 64 835   | 62 213         | 59 780         | 56 419         |
| <b>Total Africa</b>                    | <b>87 640</b>                                  | <b>84 361</b>  | <b>80 989</b>  | <b>76 406</b>  |
| East Asia                              | 15 657   | 18 390         | 22 226         | 27 049         |
| South and Southeast Asia               | 33 288   | 32 815         | 32 506         | 31 518         |
| Western and Central Asia               | 2 646  | 3 085          | 3 464          | 3 935          |
| <b>Total Asia</b>                      | <b>51 591</b>                                  | <b>54 290</b>  | <b>58 196</b>  | <b>62 502</b>  |
| Europe excl. Russian Federation        | 24 245   | 27 817         | 31 539         | 35 158         |
| <b>Total Europe</b>                    | <b>104 285</b>                                 | <b>108 087</b> | <b>113 062</b> | <b>116 230</b> |
| Caribbean                              | 544  | 617            | 683            | 725            |
| Central America                        | 5 118  | 4 762          | 4 429          | 4 233          |
| North America                          | 84 684   | 86 432         | 88 141         | 90 108         |
| <b>Total North and Central America</b> | <b>90 346</b>                                  | <b>91 811</b>  | <b>93 253</b>  | <b>95 067</b>  |
| <b>Total Oceania</b>                   | <b>18 713</b>                                  | <b>18 706</b>  | <b>18 798</b>  | <b>18 867</b>  |
| <b>Total South America</b>             | <b>207 186</b>                                 | <b>199 019</b> | <b>190 753</b> | <b>187 455</b> |
| <b>WORLD</b>                           | <b>559 761</b>                                 | <b>556 276</b> | <b>555 050</b> | <b>556 526</b> |

**TABLE 37. Volume of forest growing stock per hectare, by region and subregion, 1990–2020**

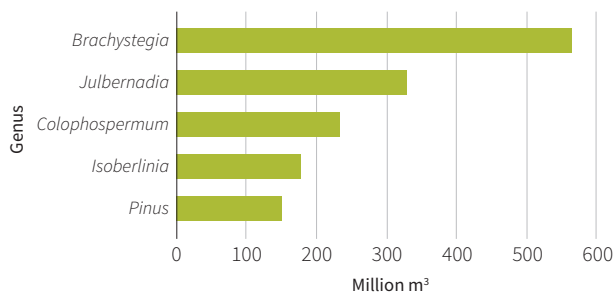
| Region/subregion                       | Forest growing stock (m <sup>3</sup> /ha) |              |              |              |
|--|---|--------------|--------------|--------------|
|  | 1990                                      | 2000         | 2010         | 2020         |
| Eastern and Southern Africa            | 63.3                                      | 64.0         | 64.6         | 64.7         |
| Northern Africa                        | 22.3                                      | 23.0         | 23.7         | 23.9         |
| Western and Central Africa             | 181.7                                     | 183.3        | 184.3        | 184.6        |
| <b>Total Africa</b>                    | <b>118.0</b>                              | <b>118.8</b> | <b>119.8</b> | <b>120.0</b> |
| East Asia                              | 74.6                                      | 80.3         | 88.1         | 99.7         |
| South and Southeast Asia               | 102.0                                     | 106.5        | 106.4        | 106.5        |
| Western and Central Asia               | 54.0                                      | 61.4         | 65.2         | 71.2         |
| <b>Total Asia</b>                      | <b>88.1</b>                               | <b>92.4</b>  | <b>95.3</b>  | <b>100.4</b> |
| Europe excl. Russian Federation        | 130.8                                     | 144.1        | 158.6        | 173.9        |
| <b>Total Europe</b>                    | <b>104.9</b>                              | <b>107.8</b> | <b>111.5</b> | <b>114.2</b> |
| Caribbean                              | 91.3                                      | 90.7         | 91.1         | 91.9         |
| Central America                        | 182.8                                     | 184.4        | 186.8        | 188.9        |
| North America                          | 117.4                                     | 120.1        | 121.9        | 124.7        |
| <b>Total North and Central America</b> | <b>119.6</b>                              | <b>122.0</b> | <b>123.6</b> | <b>126.3</b> |
| <b>Total Oceania</b>                   | <b>101.2</b>                              | <b>102.0</b> | <b>103.8</b> | <b>101.8</b> |
| <b>Total South America</b>             | <b>212.8</b>                              | <b>215.7</b> | <b>219.2</b> | <b>222.1</b> |
| <b>WORLD</b>                           | <b>132.1</b>                              | <b>133.8</b> | <b>135.2</b> | <b>137.1</b> |



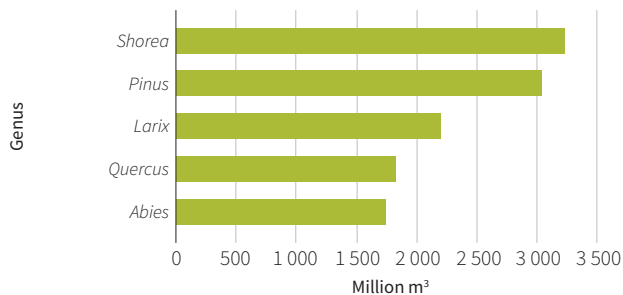
**FIGURE 17.** Proportion of growing stock in planted forest, by region, 1990–2020



**FIGURE 18.** Volume of growing stock for the top five genera, Africa, 2020



**FIGURE 19.** Volume of growing stock for the top five genera, Asia, 2020

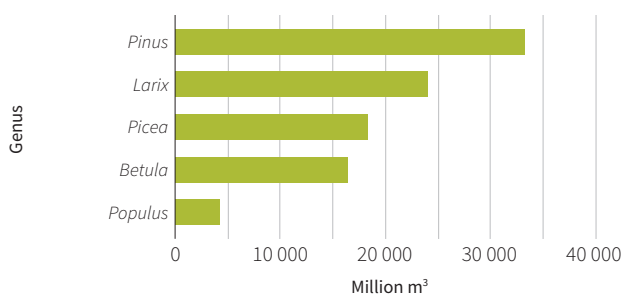


202 genera. Many country reports were incomplete in the information provided on this attribute, however, and several countries that did report could only do so at the genus level. Figures 18 to 21 show the reported top five genera, by volume and region (or subregion in the case of North America), in the forest growing stock of reporting countries (note, however, that reporting was insufficient for some regions and subregions and therefore those are not represented below).

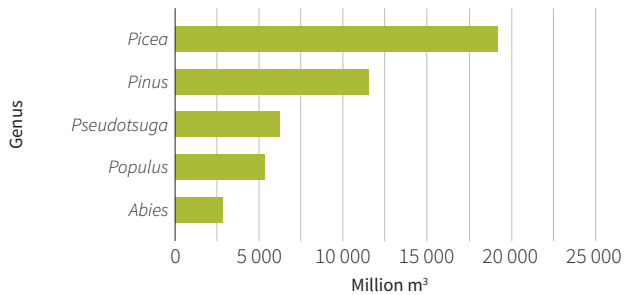
**TRENDS**

Trends in the species composition of forest growing stock cannot be assessed reliably because of the incompleteness of data on this attribute. Nevertheless, the available data suggest that the share of introduced tree species increased between 1990 and 2020 in all regions except Asia and

**FIGURE 20.** Volume of growing stock for the top five genera, Europe, 2020



**FIGURE 21.** Volume of growing stock for the top five genera, North America, 2020



Note: Only North America is shown here because insufficient data were available for Central America and the Caribbean. In this figure, an estimate was made for Canada based on the share of growing-stock composition reported by that country for 2000 multiplied by the total growing stock reported for 2020.

**TABLE 38. Biomass and dead-wood stock, by region and subregion, 2020**

| Region/subregion                       | Biomass        |              | Dead wood      |             |
|--|----------------|--------------|----------------|-------------|
|  | Million tonnes | tonnes/ha    | Million tonnes | tonnes/ha   |
| Eastern and Southern Africa            | 27 855         | 94.2         | 1 577          | 5.3         |
| Northern Africa                        | 2 293          | 65.2         | 17             | 0.5         |
| Western and Central Africa             | 76 837         | 251.3        | 1 851          | 6.1         |
| <b>Total Africa</b>                    | <b>106 985</b> | <b>168.0</b> | <b>3 444</b>   | <b>5.4</b>  |
| East Asia                              | 23 958         | 88.3         | 3 326          | 12.3        |
| South and Southeast Asia               | 49 911         | 168.6        | 320            | 1.1         |
| Western and Central Asia               | 4 885          | 88.4         | 40             | 0.7         |
| <b>Total Asia</b>                      | <b>78 754</b>  | <b>126.5</b> | <b>3 685</b>   | <b>5.9</b>  |
| Europe excl. Russian Federation        | 28 335         | 140.2        | 1 603          | 7.9         |
| <b>Total Europe</b>                    | <b>109 817</b> | <b>107.9</b> | <b>16 263</b>  | <b>16.0</b> |
| Caribbean                              | 1 035          | 131.2        | 69             | 8.8         |
| Central America                        | 3 752          | 167.5        | 248            | 11.1        |
| North America                          | 78 829         | 109.1        | 19 781         | 27.4        |
| <b>Total North and Central America</b> | <b>83 616</b>  | <b>111.1</b> | <b>20 099</b>  | <b>26.7</b> |
| <b>Total Oceania</b>                   | <b>28 264</b>  | <b>152.6</b> | <b>4 699</b>   | <b>25.4</b> |
| <b>Total South America</b>             | <b>198 556</b> | <b>235.2</b> | <b>10 839</b>  | <b>12.8</b> |
| <b>WORLD</b>                           | <b>605 993</b> | <b>149.3</b> | <b>59 029</b>  | <b>14.5</b> |

North America (where it remained at about 2 percent and 4 percent, respectively, over the period). Globally, the share of introduced tree species increased from 6 percent in 1990 to 8 percent in 2020.

## Biomass stock

### STATUS

FRA 2020 received information on forest biomass in 2020 from 193 countries and territories representing 99 percent of the world's forests. Data on dead wood were reported by 78 countries and territories (accounting for 74 percent of the world's forests). For those countries and territories that provided no data, biomass and dead wood were estimated by multiplying subregional averages per hectare by forest area (as estimated for each point in the time series).

The total living biomass in the world's forests amounts to almost 606 gigatonnes (Gt) (Table 38), or about 149 tonnes per ha. The highest biomass stock per hectare was in regions with tropical forests – with values above 200 tonnes per ha in South America and Western and Central Africa. Dead wood in the world's forests is estimated at 59.0 Gt of dry matter (equivalent to 14.5 tonnes per ha).

Many countries used the default conversion factors provided by the IPCC to estimate biomass from growing

stock, although an increasing number of countries are developing estimates based on national data. Table 39 shows the average biomass conversion and expansion factor (BCEF),<sup>16</sup> root-shoot ratio<sup>17</sup> and dead-live ratio,<sup>18</sup> by subregion, based on estimates of growing stock and biomass for 2020. The calculated factors are well within the range of default values presented in the IPCC guidelines.

### TRENDS

FRA 2020 received complete time-series data on above- and below-ground forest biomass from 189 countries and territories representing more than 95 per cent of the global forest area. For non-reporting countries and territories, biomass was estimated by multiplying the subregional averages of biomass per hectare by forest area (as estimated for each point in the time series).

The global biomass stock decreased by about 8 Gt between 1990 and 2020 (Table 40). The largest decreases

<sup>16</sup> The BCEF is calculated as above-ground biomass in tonnes divided by growing stock in m<sup>3</sup>.

<sup>17</sup> The root-shoot ratio is calculated as below-ground biomass divided by above-ground biomass.

<sup>18</sup> The dead-live ratio is calculated as the dry weight of dead wood divided by the total living biomass (above-ground and below-ground).

**TABLE 39. Forest biomass conversion and expansion factor, root–shoot ratio and dead–live ratio, by region and subregion, 2020**

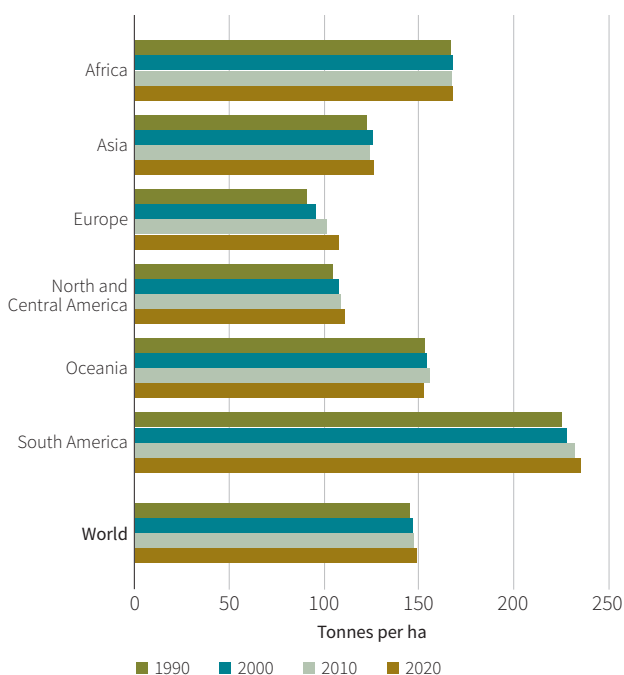
| Region/subregion                       | BCEF        | Root–shoot ratio | Dead–live ratio |
|--|-------------|------------------|-----------------|
| Eastern and Southern Africa            | 1.14        | 0.27             | 0.06            |
| Northern Africa                        | 2.11        | 0.29             | 0.01            |
| Western and Central Africa             | 1.04        | 0.31             | 0.02            |
| <b>Total Africa</b>                    | <b>1.07</b> | <b>0.30</b>      | <b>0.03</b>     |
| East Asia                              | 0.70        | 0.26             | 0.14            |
| South and Southeast Asia               | 1.25        | 0.26             | 0.01            |
| Western and Central Asia               | 0.97        | 0.29             | 0.01            |
| <b>Total Asia</b>                      | <b>1.00</b> | <b>0.26</b>      | <b>0.05</b>     |
| Europe excl. Russian Federation        | 0.65        | 0.25             | 0.06            |
| <b>Total Europe</b>                    | <b>0.74</b> | <b>0.28</b>      | <b>0.15</b>     |
| Caribbean                              | 1.14        | 0.25             | 0.07            |
| Central America                        | 0.70        | 0.27             | 0.07            |
| North America                          | 0.71        | 0.23             | 0.25            |
| <b>Total North and Central America</b> | <b>0.71</b> | <b>0.23</b>      | <b>0.24</b>     |
| <b>Total Oceania</b>                   | <b>1.13</b> | <b>0.33</b>      | <b>0.17</b>     |
| <b>Total South America</b>             | <b>0.85</b> | <b>0.24</b>      | <b>0.05</b>     |
| <b>WORLD</b>                           | <b>0.86</b> | <b>0.26</b>      | <b>0.10</b>     |

*Note:* BCEF = biomass conversion and expansion factor.

**TABLE 40. Total living biomass, by region and subregion, 1990–2020**

| Region/subregion                       | Living biomass (million tonnes) |                |                |                |
|--|---------------------------------|----------------|----------------|----------------|
|  | 1990                            | 2000           | 2010           | 2020           |
| Eastern and Southern Africa            | 32 813                          | 31 391         | 29 718         | 27 855         |
| Northern Africa                        | 2 572                           | 2 485          | 2 408          | 2 293          |
| Western and Central Africa             | 88 929                          | 85 219         | 81 577         | 76 837         |
| <b>Total Africa</b>                    | <b>124 314</b>                  | <b>119 095</b> | <b>113 703</b> | <b>106 985</b> |
| East Asia                              | 14 417                          | 17 031         | 19 717         | 23 958         |
| South and Southeast Asia               | 53 790                          | 52 879         | 51 657         | 49 911         |
| Western and Central Asia               | 3 661                           | 4 015          | 4 567          | 4 885          |
| <b>Total Asia</b>                      | <b>71 868</b>                   | <b>73 924</b>  | <b>75 941</b>  | <b>78 754</b>  |
| Europe excl. Russian Federation        | 19 332                          | 22 042         | 25 085         | 28 335         |
| <b>Total Europe</b>                    | <b>90 713</b>                   | <b>95 629</b>  | <b>102 995</b> | <b>109 817</b> |
| Caribbean                              | 766                             | 874            | 976            | 1 035          |
| Central America                        | 4 514                           | 4 198          | 3 917          | 3 752          |
| North America                          | 73 887                          | 76 010         | 77 282         | 78 829         |
| <b>Total North and Central America</b> | <b>79 166</b>                   | <b>81 082</b>  | <b>82 174</b>  | <b>83 616</b>  |
| <b>Total Oceania</b>                   | <b>28 396</b>                   | <b>28 254</b>  | <b>28 225</b>  | <b>28 264</b>  |
| <b>Total South America</b>             | <b>219 518</b>                  | <b>210 979</b> | <b>202 309</b> | <b>198 556</b> |
| <b>WORLD</b>                           | <b>613 975</b>                  | <b>608 963</b> | <b>605 348</b> | <b>605 993</b> |

FIGURE 22. Regional and global trends in biomass stock per hectare, by region, 1990–2020



were in Africa and South America, mainly because of declines in forest area. In contrast, Asia, Europe and North America all showed increases in total biomass stock.

Biomass stock per hectare increased between 1990 and 2020 in all regions except Africa and Oceania, where this attribute was relatively stable (Figure 22).

Only 72 countries and territories, representing 68 percent of the world's forest area, reported complete time series for dead-wood stock; estimates for this carbon pool, therefore, are less reliable than for living biomass. For non-reporting countries, the dead-wood stock was estimated by multiplying the subregional averages per hectare by forest area (as estimated for each point in the time series). Globally, the stock of dead wood was reasonably stable between 1990 and 2020 (Table 41). There were regional differences, however, with dead-wood stocks decreasing in Africa and South America (due mainly to reductions in forest area) and increasing in Asia, Europe and North America.

TABLE 41. Dead-wood stock, by region and subregion, 1990–2020

| Region/subregion                       | Dead wood (million tonnes) |               |               |               |
|--|----------------------------|---------------|---------------|---------------|
|  | 1990                       | 2000          | 2010          | 2020          |
| Eastern and Southern Africa            | 1 877                      | 1 794         | 1 685         | 1 577         |
| Northern Africa                        | 20                         | 19            | 18            | 17            |
| Western and Central Africa             | 2 738                      | 2 345         | 2 112         | 1 851         |
| <b>Total Africa</b>                    | <b>4 635</b>               | <b>4 158</b>  | <b>3 815</b>  | <b>3 444</b>  |
| East Asia                              | 2 219                      | 2 516         | 2 896         | 3 326         |
| South and Southeast Asia               | 356                        | 334           | 332           | 320           |
| Western and Central Asia               | 28                         | 32            | 36            | 40            |
| <b>Total Asia</b>                      | <b>2 603</b>               | <b>2 882</b>  | <b>3 265</b>  | <b>3 685</b>  |
| Europe excl. Russian Federation        | 1 179                      | 1 273         | 1 526         | 1 603         |
| <b>Total Europe</b>                    | <b>14 831</b>              | <b>14 995</b> | <b>15 804</b> | <b>16 263</b> |
| Caribbean                              | 53                         | 59            | 65            | 69            |
| Central America                        | 302                        | 281           | 260           | 248           |
| North America                          | 19 120                     | 19 026        | 19 736        | 19 781        |
| <b>Total North and Central America</b> | <b>19 475</b>              | <b>19 366</b> | <b>20 061</b> | <b>20 099</b> |
| <b>Total Oceania</b>                   | <b>4 740</b>               | <b>4 710</b>  | <b>4 716</b>  | <b>4 699</b>  |
| <b>Total South America</b>             | <b>12 051</b>              | <b>11 577</b> | <b>11 082</b> | <b>10 839</b> |
| <b>WORLD</b>                           | <b>58 336</b>              | <b>57 689</b> | <b>58 742</b> | <b>59 029</b> |

**TABLE 42. Forest carbon stock in carbon pools, by region and subregion, 2020**

| Region/subregion                       | Carbon in living biomass |              | Carbon in dead wood and litter |             | Carbon in soil |             | Total carbon   |              |
|--|--------------------------|--------------|--------------------------------|-------------|----------------|-------------|----------------|--------------|
|  | Million tonnes           | tonnes/ha    | Million tonnes                 | tonnes/ha   | Million tonnes | tonnes/ha   | Million tonnes | tonnes/ha    |
| Eastern and Southern Africa            | 13 248                   | 44.8         | 1 302                          | 4.4         | 11 700         | 39.6        | 26 250         | 88.7         |
| Northern Africa                        | 1 090                    | 31.0         | 103                            | 2.9         | 897            | 25.5        | 2 090          | 59.5         |
| Western and Central Africa             | 36 229                   | 118.5        | 1 522                          | 5.0         | 14 795         | 48.4        | 52 546         | 171.9        |
| <b>Total Africa</b>                    | <b>50 567</b>            | <b>79.4</b>  | <b>2 927</b>                   | <b>4.6</b>  | <b>27 392</b>  | <b>43.0</b> | <b>80 886</b>  | <b>127.1</b> |
| East Asia                              | 11 767                   | 43.4         | 5 051                          | 18.6        | 21 089         | 77.7        | 37 907         | 139.7        |
| South and Southeast Asia               | 23 393                   | 79.0         | 976                            | 3.3         | 17 100         | 57.8        | 41 468         | 140.1        |
| Western and Central Asia               | 2 388                    | 43.2         | 399                            | 7.2         | 2 571          | 46.5        | 5 358          | 97.0         |
| <b>Total Asia</b>                      | <b>37 547</b>            | <b>60.3</b>  | <b>6 426</b>                   | <b>10.3</b> | <b>40 760</b>  | <b>65.5</b> | <b>84 733</b>  | <b>136.1</b> |
| Europe excl. Russian Federation        | 13 833                   | 68.4         | 3 725                          | 18.4        | 21 635         | 107.0       | 39 192         | 193.9        |
| <b>Total Europe</b>                    | <b>54 574</b>            | <b>53.6</b>  | <b>17 191</b>                  | <b>16.9</b> | <b>100 677</b> | <b>98.9</b> | <b>172 442</b> | <b>169.5</b> |
| Caribbean                              | 493                      | 62.5         | 82                             | 10.4        | 1 522          | 193.0       | 2 098          | 265.9        |
| Central America                        | 1 840                    | 82.1         | 166                            | 7.4         | 2 063          | 92.1        | 4 069          | 181.6        |
| North America                          | 39 301                   | 54.4         | 30 953                         | 42.8        | 69 697         | 96.5        | 139 951        | 193.7        |
| <b>Total North and Central America</b> | <b>41 634</b>            | <b>55.3</b>  | <b>31 201</b>                  | <b>41.5</b> | <b>73 282</b>  | <b>97.4</b> | <b>146 118</b> | <b>194.1</b> |
| <b>Total Oceania</b>                   | <b>13 881</b>            | <b>74.9</b>  | <b>3 247</b>                   | <b>17.5</b> | <b>15 935</b>  | <b>86.0</b> | <b>33 063</b>  | <b>178.5</b> |
| <b>Total South America</b>             | <b>96 331</b>            | <b>114.1</b> | <b>7 057</b>                   | <b>8.4</b>  | <b>41 457</b>  | <b>49.1</b> | <b>144 846</b> | <b>171.6</b> |
| <b>WORLD</b>                           | <b>294 535</b>           | <b>72.6</b>  | <b>68 049</b>                  | <b>16.8</b> | <b>299 504</b> | <b>73.8</b> | <b>662 088</b> | <b>163.1</b> |

## Carbon stock

### STATUS

FRA 2020 received information on forest carbon stock in 2020 from 192 countries and territories (representing 99 percent of the world's forests) for biomass; 79 countries and territories (76 percent) for dead wood; 77 countries and territories (65 percent) for litter carbon; and 76 countries and territories (66 percent) for soil carbon. For non-reporting countries and territories, carbon stock was estimated by multiplying subregional averages for each of the carbon pools by forest area.

The total forest carbon stock (i.e. including all carbon pools) is estimated at 662 Gt (163 tonnes per ha), comprising 300 Gt in soil organic matter, 295 Gt in living biomass and 68.0 Gt in dead wood and litter (Table 42). Soil organic matter constitutes the biggest pool, with 45.2 percent of the total carbon, followed by above-ground biomass, below-ground biomass, litter and dead wood.

### TRENDS

FRA 2020 received complete time-series data from 188 countries and territories (representing 95 percent of the total forest area) for forest biomass (above- and below-ground); 72 countries and territories (70 percent) for dead wood; 73 countries and territories (60 percent) for litter; and 72 countries (51 percent) for soil carbon.

For those countries and territories that did not report, carbon stocks were estimated by multiplying the subregional average stock per hectare by forest area (as estimated for each point in the time series).

The global forest carbon stock decreased between 1990 and 2020 (Figure 23), from 668 Gt to 662 Gt (Table 43), due to an overall decrease in forest area. There were considerable regional and subregional differences in the trend, however: for example, the carbon stock in forest biomass increased significantly in East Asia, Western and Central Asia, Europe and North America (where forest area increased) and decreased considerably in South America and Western and Central Africa (Figure 24, p. 53).

Although total forest carbon stocks decreased globally between 1990 and 2020, carbon stock per hectare increased for all pools (Figure 25, p. 53).

**TABLE 43. Total forest carbon stock, by region and subregion, 1990–2020**

| Region/subregion                       | Forest carbon stock (million tonnes) |                |                |                |
|--|--------------------------------------|----------------|----------------|----------------|
|  | 1990                                 | 2000           | 2010           | 2020           |
| Eastern and Southern Africa            | 30 932                               | 29 642         | 27 978         | 26 250         |
| Northern Africa                        | 2 338                                | 2 242          | 2 190          | 2 090          |
| Western and Central Africa             | 61 005                               | 58 253         | 55 745         | 52 546         |
| <b>Total Africa</b>                    | <b>94 274</b>                        | <b>90 137</b>  | <b>85 913</b>  | <b>80 886</b>  |
| East Asia                              | 27 110                               | 30 261         | 33 908         | 37 907         |
| South and Southeast Asia               | 45 804                               | 43 792         | 43 071         | 41 468         |
| Western and Central Asia               | 4 180                                | 4 511          | 4 959          | 5 358          |
| <b>Total Asia</b>                      | <b>77 093</b>                        | <b>78 564</b>  | <b>81 938</b>  | <b>84 733</b>  |
| Europe excl. Russian Federation        | 31 625                               | 34 260         | 36 833         | 39 192         |
| <b>Total Europe</b>                    | <b>158 744</b>                       | <b>162 457</b> | <b>168 069</b> | <b>172 442</b> |
| Caribbean                              | 1 552                                | 1 783          | 1 977          | 2 098          |
| Central America                        | 4 988                                | 4 617          | 4 270          | 4 069          |
| North America                          | 136 644                              | 137 730        | 139 324        | 139 951        |
| <b>Total North and Central America</b> | <b>143 184</b>                       | <b>144 131</b> | <b>145 572</b> | <b>146 118</b> |
| <b>Total Oceania</b>                   | <b>33 338</b>                        | <b>33 111</b>  | <b>33 077</b>  | <b>33 063</b>  |
| <b>Total South America</b>             | <b>161 765</b>                       | <b>154 917</b> | <b>147 917</b> | <b>144 846</b> |
| <b>WORLD</b>                           | <b>668 399</b>                       | <b>663 316</b> | <b>662 485</b> | <b>662 088</b> |

**FIGURE 23. Trends in total forest carbon stock, by carbon pool, 1990–2020**

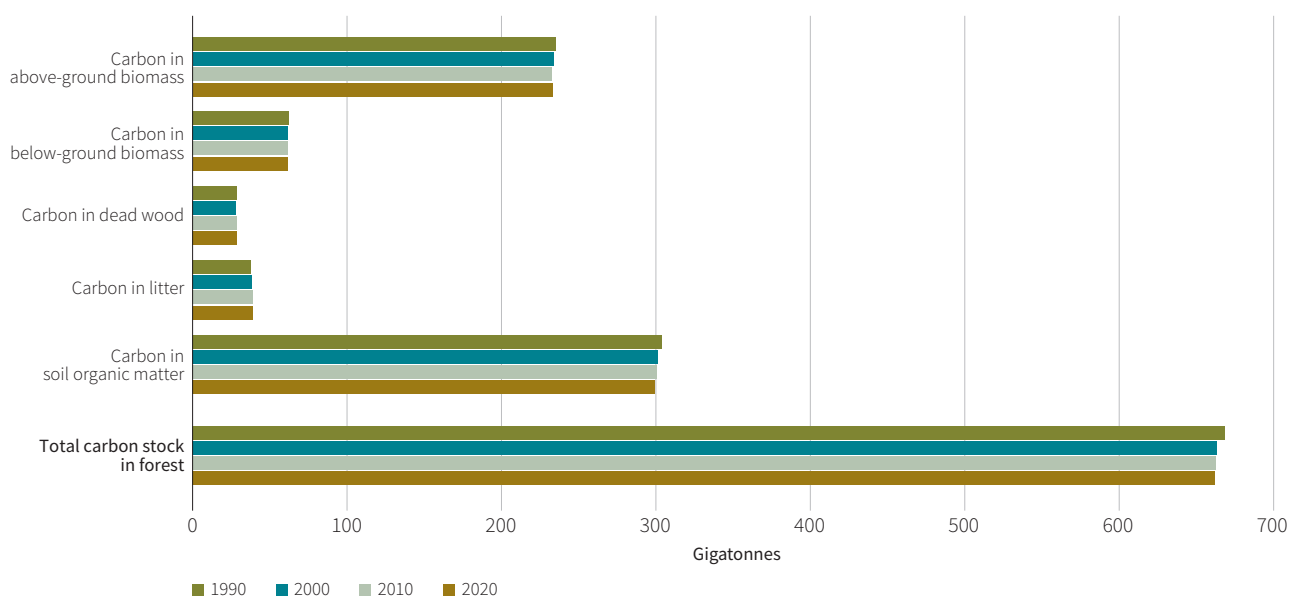


FIGURE 24. Change in forest biomass carbon stock, by region and subregion, 1990–2020

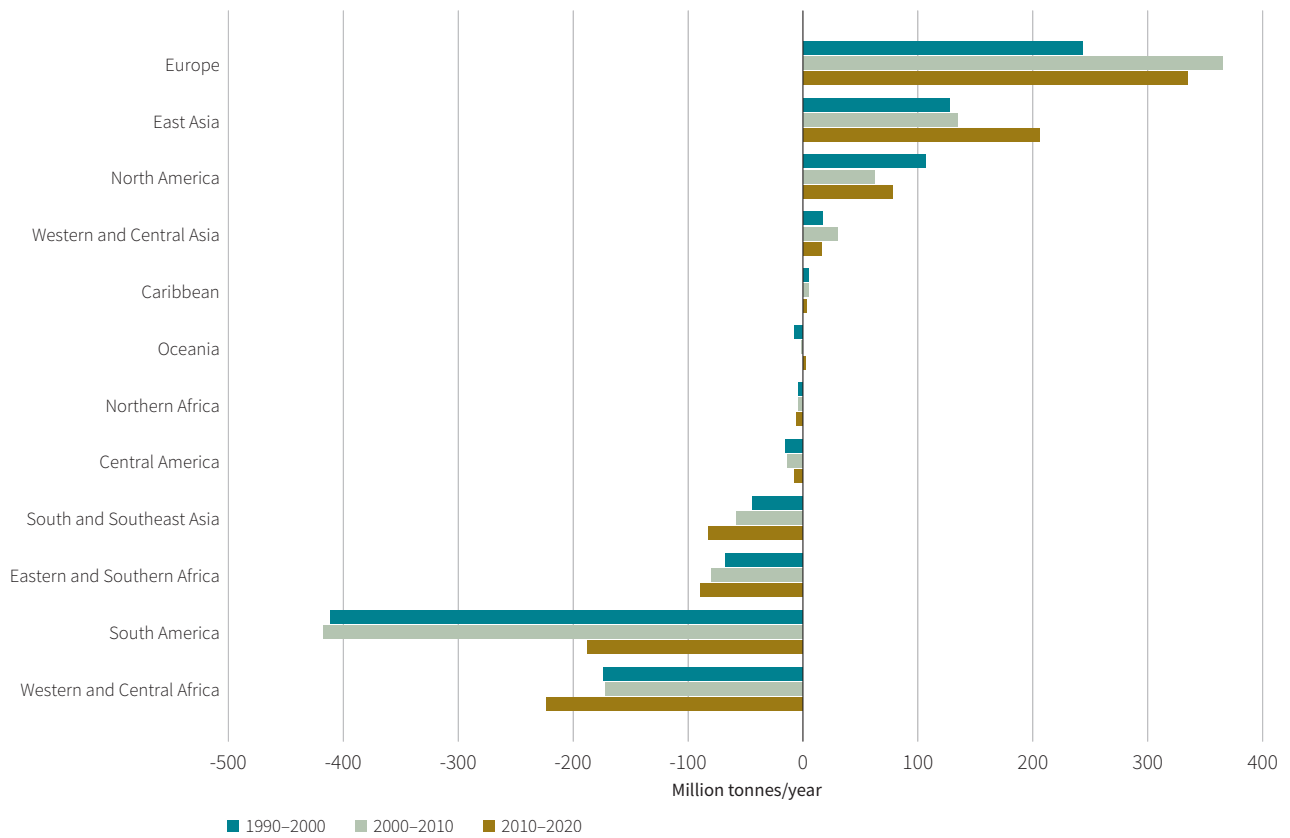
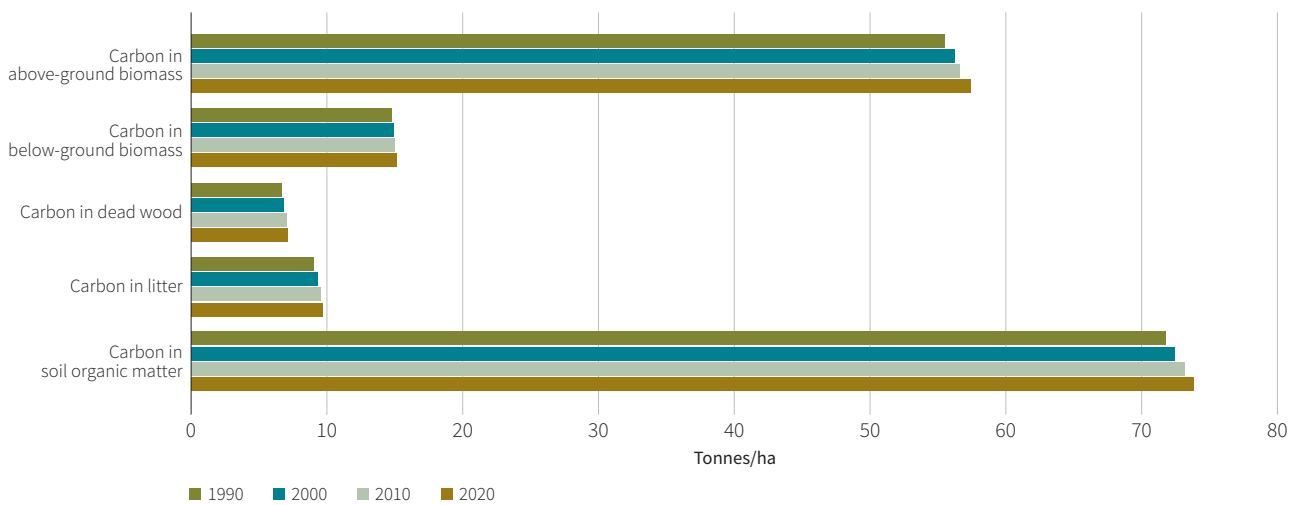


FIGURE 25. Forest carbon stock per hectare, by carbon pool, 1990–2020







# 5 Designation and management



# C

ountries were asked to report in FRA 2020 on the status of, and trends in, their forests according to the primary designated management objective – that is, the main intended purpose for which a forest is managed and used. To be considered “primary”, the management objective must be significantly more important than other management objectives, and the forest area reported under a given primary management objective may not be reported under any other primary management objective. Note, however, that the primary management objective does not exclude provisions for other benefits or values. For example, sustainably managed natural production forests – for which the primary objective might be wood production – typically also contribute to the protection of soil and water, biodiversity conservation and the provision of social services. Similarly, forests managed primarily for the protection of soil and water might also contribute to wood production, biodiversity conservation and other management objectives.

Six broad management objectives were identified for FRA 2020:

1. **Production** – the management objective is the production of timber, fibre, bioenergy and/or non-wood forest products.
2. **Protection of soil and water** – the management objective is the protection of soil and water.
3. **Conservation of biodiversity** – the management objective is biodiversity conservation. This category includes but is not limited to areas designated for biodiversity conservation in protected areas.
4. **Social services** – the management objective is the provision of social services such as recreation, tourism, education, research and the conservation of cultural or spiritual sites.
5. **Multiple use** – the management objective is a combination of several purposes, none of which is significantly more important than another. Thus, a designation of multiple use indicates that the forest is managed for any combination of production, soil and

water protection, biodiversity conservation and the provision of social services.

6. **Other** – the management objective is other than production, the protection of soil and water, biodiversity conservation, social services or multiple use.

In addition to the primary designated management objective, information was collected on the area of forest within protected areas and under long-term management plans.

The area and proportion of forests under formal protection is an indicator of how countries are addressing the need to conserve and protect forest ecosystems and the services those ecosystems provide. In FRA 2020, countries were requested to provide information on the area of forest in formally established protected areas corresponding to International Union for Conservation of Nature (IUCN) protected-area categories I–IV (IUCN, undated).

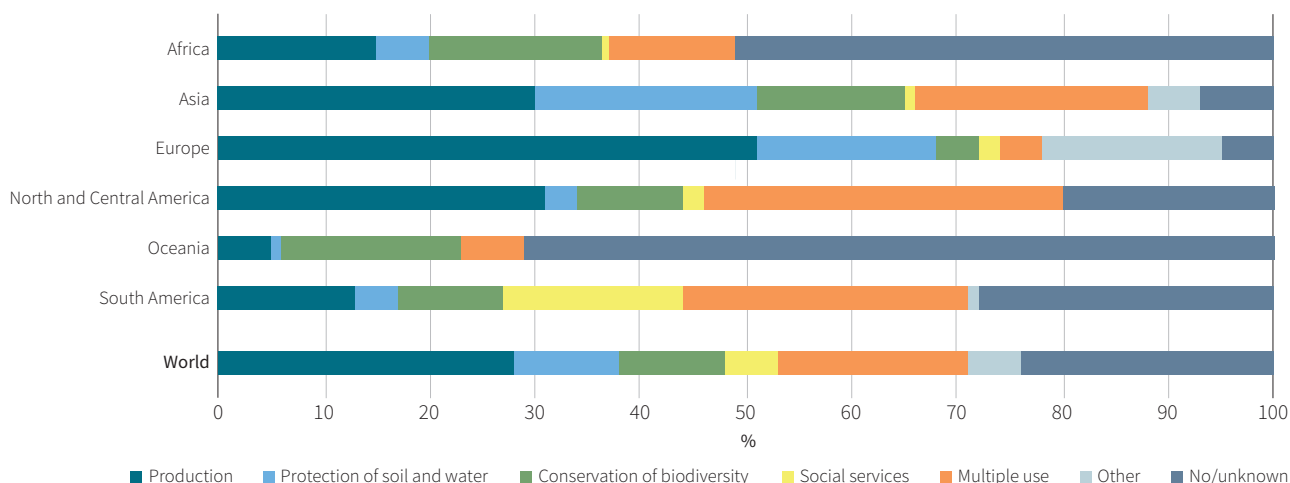
The area and proportion of forests with long-term management plans that are documented and periodically revised is an important indicator of the intention to sustainably manage forest resources. The area of forests in protected areas and the area of forests with long-term management plans are also components of SDG indicator 15.2.1 (“progress towards sustainable forest management”), which is reported annually by FAO to the United Nations Statistics Division.

Many countries provided FRA 2020 with data on the area of forest designated for productive purposes and, in some cases, on the area of forest designated for conservation purposes (albeit often using the proxy of forests in protected areas). Fewer countries provided information on the area of forest designated for social services, multiple use and other purposes.

Many countries have good information on the status of their protected areas and continuously monitor forests in these areas. Others, however, were only able to report information on the total area of protected areas and relied on estimates of the extent to which these are forested.

This chapter provides a global overview of the status of forest management designation in all 236 countries and territories covered by the assessment and an in-depth

**FIGURE 26.** Proportion of total forest area designated for various primary management objectives, by region and globally, 2020



analysis of the status of, and trends in, each designation category. Differences between the two analyses are due to differences in reporting for each designation category (i.e. reporting was not complete for all categories for all countries).

## Global overview

An analysis of the primary designated management objectives of forests, inclusive of all 236 countries and areas covered by the assessment, shows that production is the main designated objective (accounting for 28 percent<sup>19</sup> of the world’s total forest area), followed by multiple use (18 percent). Ten percent of the total forest area is designated primarily for biodiversity conservation and another 10 percent is designated primarily for the protection of soil and water. The provision of social services is the primary designated management objective for 5 percent of the world’s forest area, and “other purposes”, which includes areas of forest managed primarily for scientific research or military and defensive purposes, accounts for another 5 percent. The remaining 23 percent of the world’s forest has no designation or the designation is unknown.

Figure 26 shows the global and regional distribution by designation category.

Of the regions, the largest share of forest area designated for production is in Europe, where more than

half the forest area is designated for this purpose. If the Russian Federation is excluded, however, the proportion is about 30 percent of the forest area, which is similar to the proportion in North and Central America. North and Central America and South America have the largest shares of forest area designated for multiple use, and Asia has the largest share of forest area designated primarily for the protection of soil and water. In all regions, 10–17 percent of the total forest area is designated primarily for biodiversity conservation (if the Russian Federation is excluded from the estimate for Europe, which otherwise would be much lower, at about 4 percent).

## Analysis by designation category

### PRODUCTION

**Status.** FRA 2020 received information on the area of forest designated primarily for production in 2020 from 160 countries representing 93 percent of the world’s forest area. Globally, the area of forest so designated is estimated at 1.15 billion ha, which is equivalent to 31 percent of the forest area of reporting countries (Table 44). This area is larger than any other designation category.

Europe has the largest area of forest designated for production, at 515 million ha (53 percent of the forest area of reporting countries). If the Russian Federation is excluded, an estimated 59.6 million ha (29 percent of the forest area) is designated for production in Europe.

The second-largest area of forest designated primarily for production is in North and Central America, estimated at 231 million ha (31 percent of the forest area), followed by Asia, at 190 million ha (32 percent of the forest area). Only

<sup>19</sup> Note that the percentages given in this global overview may vary from those shown in tables 44, 47, 50, 53, 56 and 59 and in the key findings, which were calculated for reporting countries only. In this global overview, the percentages were calculated for the total world forest area, with non-reporting countries treated as having no or unknown designation.

**TABLE 44. Forest area designated primarily for production, by region and subregion, 2020**

| Region/subregion                       | Data availability          |                        | Forest designated for production |                  |
|--|----------------------------|------------------------|----------------------------------|------------------|
|  | No. of reporting countries | % of total forest area | Area (1 000 ha)                  | % of forest area |
| Eastern and Southern Africa            | 15                         | 70                     | 30 062                           | 15               |
| Northern Africa                        | 5                          | 77                     | 1 579                            | 6                |
| Western and Central Africa             | 18                         | 95                     | 67 693                           | 28               |
| <b>Total Africa</b>                    | <b>38</b>                  | <b>82</b>              | <b>99 333</b>                    | <b>19</b>        |
| East Asia                              | 4                          | 98                     | 73 980                           | 28               |
| South and Southeast Asia               | 14                         | 98                     | 105 231                          | 36               |
| Western and Central Asia               | 14                         | 84                     | 10 614                           | 23               |
| <b>Total Asia</b>                      | <b>32</b>                  | <b>97</b>              | <b>189 825</b>                   | <b>32</b>        |
| Europe excl. Russian Federation        | 37                         | 76                     | 59 603                           | 29               |
| <b>Total Europe</b>                    | <b>38</b>                  | <b>95</b>              | <b>514 895</b>                   | <b>53</b>        |
| Caribbean                              | 15                         | 59                     | 1 149                            | 25               |
| Central America                        | 2                          | 29                     | 3 226                            | 50               |
| North America                          | 5                          | 100                    | 226 643                          | 31               |
| <b>Total North and Central America</b> | <b>22</b>                  | <b>97</b>              | <b>231 017</b>                   | <b>31</b>        |
| <b>Total Oceania</b>                   | <b>18</b>                  | <b>99</b>              | <b>10 051</b>                    | <b>5</b>         |
| <b>Total South America</b>             | <b>12</b>                  | <b>90</b>              | <b>106 348</b>                   | <b>14</b>        |
| <b>WORLD</b>                           | <b>160</b>                 | <b>93</b>              | <b>1 151 470</b>                 | <b>31</b>        |

5 percent of the forest area in Oceania is designated primarily for production.

Three countries – Albania, Denmark and Montenegro – reported that 80 percent or more of their forest area is designated primarily for production. Nine of the top ten countries with the highest share of forest area designated primarily for production are in Europe (Table 45). Thirty-nine countries reported that they have no forest area designated for production.

**Trends.** The analysis of trends in the area of forest designated primarily for production encompasses 151 countries representing 89 percent of the total forest area.

The area of forest designated primarily for production decreased slightly (by 1.33 million ha) between 1990 and 2020, although there were fluctuations over the period (Table 46). The area of forest area so designated decreased at a rate of 2.32 million ha per year in 1990–2000 and 1.55 million ha per year in 2000–2010, before increasing by 3.74 million ha per year in 2010–2020. The shift to an increasing trend was driven mainly by Europe and especially the Russian Federation, which reported an annual increase in the area of forest designated primarily for production of 3.38 million ha in 2010–2020. Overall in Europe, however, the relative share of forest designated primarily for production decreased from 54 percent in 1990 to 53 percent in 2020 (Figure 27). The

**TABLE 45. Top ten countries for share of forest area designated primarily for production, 2020**

| Ranking | Country    | Forest designated for production |                        |
|---------|------------|----------------------------------|------------------------|
|         |            | Area (1 000 ha)                  | % of total forest area |
| 1       | Montenegro | 675                              | 82                     |
| 2       | Denmark    | 504                              | 80                     |
| 3       | Albania    | 628                              | 80                     |
| 4       | Latvia     | 2 603                            | 76                     |
| 5       | Ghana      | 5 908                            | 74                     |
| 6       | Czechia    | 1 975                            | 74                     |
| 7       | Estonia    | 1 776                            | 73                     |
| 8       | Lithuania  | 1 577                            | 72                     |
| 9       | Sweden     | 19 587                           | 70                     |
| 10      | Croatia    | 1 334                            | 69                     |

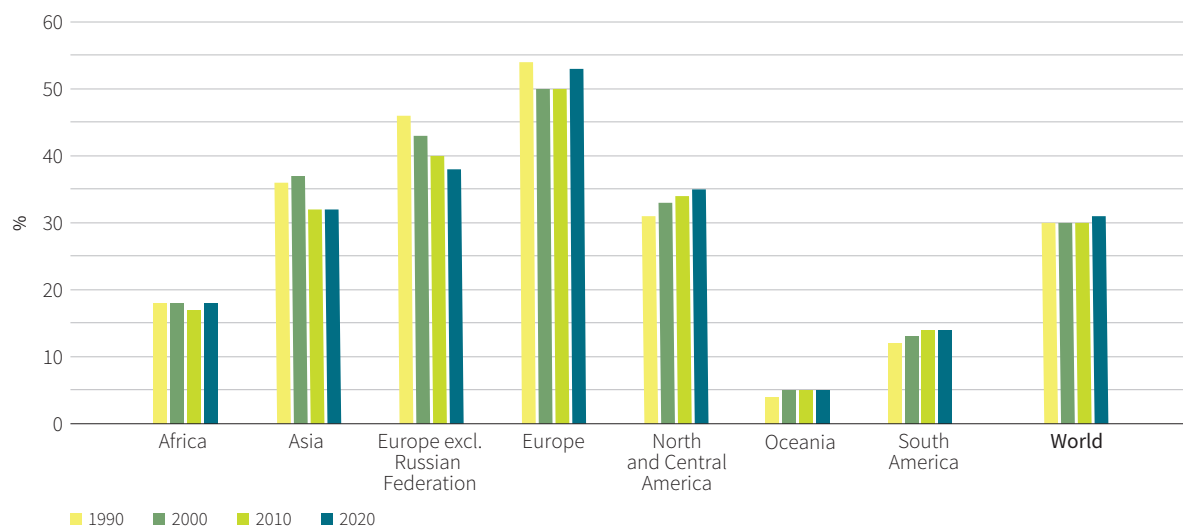
proportion of the total forest area designated primarily for production increased steadily in North and Central America between 1990 and 2020, from 31 percent to 35 percent.

In Africa, the area of forest designated primarily for production decreased in absolute terms between 1990 and 2020, from 109 million ha to 91.4 million ha, but the proportion of the total forest area so designated was steady

**TABLE 46. Forest area designated primarily for production, and annual change, by region and subregion, 1990–2020**

| Region/subregion                       | Data availability          |                        | Forest area designated for production (1 000 ha) |                  |                  |                  | Annual change (1 000 ha/yr) |               |              |
|--|----------------------------|------------------------|--|------------------|------------------|------------------|-----------------------------|---------------|--------------|
|  | No. of reporting countries | % of total forest area | 1990   | 2000             | 2010             | 2020             | 1990–2000                   | 2000–2010     | 2010–2020    |
| Eastern and Southern Africa            | 15                         | 70                     | 39 501   | 37 908           | 36 306           | 30 062           | -159                        | -160          | -624         |
| Northern Africa                        | 5                          | 77                     | 1 520  | 1 506            | 1 520            | 1 579            | -1                          | 1             | 6            |
| Western and Central Africa             | 16                         | 87                     | 68 051   | 64 746           | 53 072           | 59 803           | -330                        | -1 167        | 673          |
| <b>Total Africa</b>                    | <b>36</b>                  | <b>79</b>              | <b>109 072</b>                                   | <b>104 160</b>   | <b>90 899</b>    | <b>91 443</b>    | <b>-491</b>                 | <b>-1 326</b> | <b>54</b>    |
| East Asia                              | 4                          | 98                     | 83 936   | 83 347           | 67 314           | 73 980           | -59                         | -1 603        | 667          |
| South and Southeast Asia               | 14                         | 98                     | 109 326  | 113 918          | 110 835          | 105 231          | 459                         | -308          | -560         |
| Western and Central Asia               | 14                         | 84                     | 9 191  | 9 828            | 10 143           | 10 614           | 64                          | 31            | 47           |
| <b>Total Asia</b>                      | <b>32</b>                  | <b>97</b>              | <b>202 453</b>                                   | <b>207 093</b>   | <b>188 292</b>   | <b>189 825</b>   | <b>464</b>                  | <b>-1 880</b> | <b>153</b>   |
| Europe excl. Russian Federation        | 35                         | 76                     | 63 657   | 61 936           | 60 738           | 58 927           | -172                        | -120          | -181         |
| <b>Total Europe</b>                    | <b>36</b>                  | <b>95</b>              | <b>510 335</b>                                   | <b>473 373</b>   | <b>482 229</b>   | <b>514 219</b>   | <b>-3 696</b>               | <b>886</b>    | <b>3 199</b> |
| Caribbean                              | 15                         | 59                     | 875  | 866              | 1 051            | 1 149            | -1                          | 18            | 10           |
| Central America                        | 1                          | 15                     | 4 352  | 3 672            | 2 848            | 2 317            | -68                         | -82           | -53          |
| North America                          | 4                          | 91                     | 202 172  | 212 796          | 220 848          | 226 302          | 1 062                       | 805           | 545          |
| <b>Total North and Central America</b> | <b>20</b>                  | <b>88</b>              | <b>207 398</b>                                   | <b>217 334</b>   | <b>224 746</b>   | <b>229 768</b>   | <b>994</b>                  | <b>741</b>    | <b>502</b>   |
| <b>Total Oceania</b>                   | <b>16</b>                  | <b>98</b>              | <b>8 035</b>                                     | <b>8 721</b>     | <b>9 293</b>     | <b>9 205</b>     | <b>69</b>                   | <b>57</b>     | <b>-9</b>    |
| <b>Total South America</b>             | <b>11</b>                  | <b>83</b>              | <b>98 533</b>                                    | <b>101 977</b>   | <b>101 666</b>   | <b>100 033</b>   | <b>344</b>                  | <b>-31</b>    | <b>-163</b>  |
| <b>WORLD</b>                           | <b>151</b>                 | <b>89</b>              | <b>1 135 826</b>                                 | <b>1 112 657</b> | <b>1 097 126</b> | <b>1 134 493</b> | <b>-2 317</b>               | <b>-1 553</b> | <b>3 737</b> |

**FIGURE 27. Proportion of total forest area designated primarily for production, by region, 1990–2020**



**TABLE 47. Forest area designated primarily for multiple use, by region and subregion, 2020**

| Region/subregion                       | Data availability          |                        | Forest area designated for multiple use |                  |
|--|----------------------------|------------------------|---|------------------|
|  | No. of reporting countries | % of total forest area | Area (1 000 ha)                         | % of forest area |
| Eastern and Southern Africa            | 11                         | 40                     | 37 059                                  | 31               |
| Northern Africa                        | 3                          | 19                     | 4 298                                   | 64               |
| Western and Central Africa             | 14                         | 77                     | 32 808                                  | 14               |
| <b>Total Africa</b>                    | <b>28</b>                  | <b>57</b>              | <b>74 164</b>                           | <b>21</b>        |
| East Asia                              | 4                          | 98                     | 78 536                                  | 30               |
| South and Southeast Asia               | 14                         | 98                     | 46 819                                  | 16               |
| Western and Central Asia               | 14                         | 84                     | 8 380                                   | 18               |
| <b>Total Asia</b>                      | <b>32</b>                  | <b>97</b>              | <b>133 734</b>                          | <b>22</b>        |
| Europe excl. Russian Federation        | 31                         | 71                     | 42 360                                  | 30               |
| <b>Total Europe</b>                    | <b>32</b>                  | <b>94</b>              | <b>45 923</b>                           | <b>5</b>         |
| Caribbean                              | 11                         | 55                     | 282                                     | 7                |
| Central America                        | 2                          | 29                     | 825                                     | 13               |
| North America                          | 5                          | 100                    | 253 531                                 | 35               |
| <b>Total North and Central America</b> | <b>18</b>                  | <b>97</b>              | <b>254 638</b>                          | <b>35</b>        |
| <b>Total Oceania</b>                   | <b>15</b>                  | <b>99</b>              | <b>13 467</b>                           | <b>7</b>         |
| <b>Total South America</b>             | <b>9</b>                   | <b>74</b>              | <b>226 681</b>                          | <b>36</b>        |
| <b>WORLD</b>                           | <b>134</b>                 | <b>85</b>              | <b>748 606</b>                          | <b>22</b>        |

at 18 percent. Thus, the trend of decreasing area was driven mainly by a decrease in forest area rather than by changes in management designation.

In Asia, the area of forest designated primarily for production decreased from 202 million ha in 1990 to 190 million ha in 2020. The proportion of the total forest area designated for production also declined, from 36 percent in 1990 to 32 percent in 2020.

There were slight increases in the area of forest designated primarily for production in South America and Oceania between 1990 and 2020, as well as in the proportion of the total forest area so designated – from 12 percent to 14 percent in South America and from 4 percent to 5 percent in Oceania.

#### **MULTIPLE USE**

**Status.** FRA 2020 received information on the area of forest designated primarily for multiple use in 2020 from 134 countries and territories representing 85 percent of the world's forest area. The area so designated is estimated at 749 million ha, which is 22 percent of the total forest area of the reporting countries and territories (Table 47).

The largest area of forest designated for multiple use is in North and Central America, at 255 million ha (35 percent of the region's total forest area), followed by South America, at 227 million ha (36 percent).

**TABLE 48. Countries and territories with 100 percent of their total forest area designated primarily for multiple use, 2020**

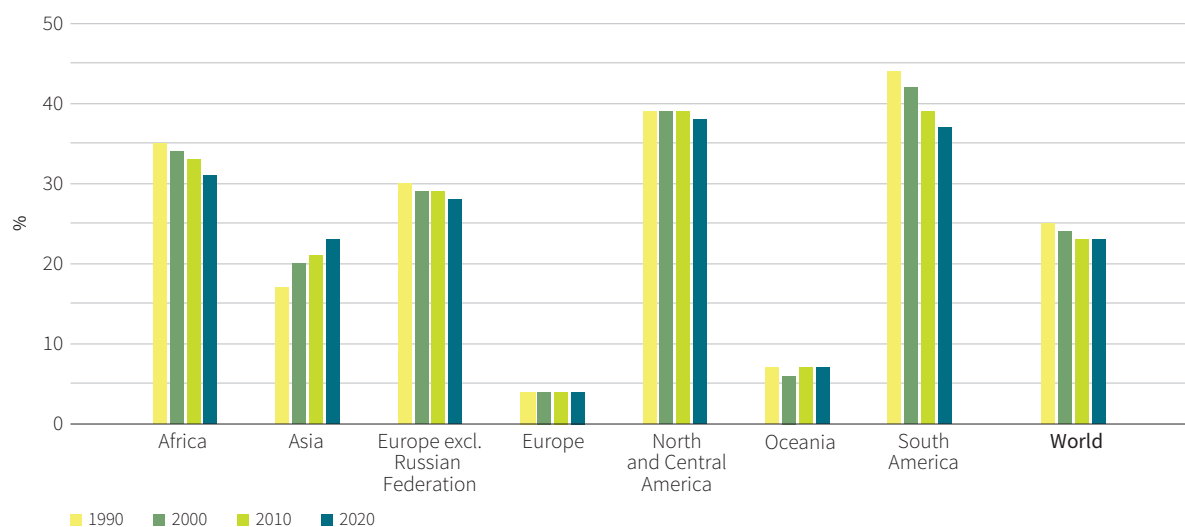
| Country/territory                | Forest area designated for multiple use (1 000 ha) |
|----------------------------------|--|
| France                           | 17 253   |
| Botswana                         | 15 255   |
| French Guyana                    | 8 003  |
| Saudi Arabia                     | 977  |
| Syrian Arab Republic             | 522  |
| United Arab Emirates             | 317  |
| Réunion                          | 98.4   |
| Guadeloupe                       | 71.9   |
| Micronesia (Federated States of) | 64.4   |
| Martinique                       | 52.3   |
| Palau                            | 41.4   |
| Mayotte                          | 13.9   |
| Saint Kitts and Nevis            | 11.0   |
| Marshall Islands                 | 9.40   |
| Djibouti                         | 5.80   |
| Isle of Man                      | 3.46   |
| Montserrat                       | 2.50   |
| Saint Pierre and Miquelon        | 1.22   |
| Faroe Islands                    | 0.08   |

**TABLE 49. Area of forest designated primarily for multiple use, and annual change, by region and subregion, 1990–2020**

| Region/subregion                       | Data availability          |                        | Forest area designated primarily for multiple use (1 000 ha) |                |                |                | Annual change (1 000 ha/yr) |               |               |
|--|----------------------------|------------------------|--|----------------|----------------|----------------|-----------------------------|---------------|---------------|
|  | No. of reporting countries | % of total forest area | 1990   | 2000           | 2010           | 2020           | 1990–2000                   | 2000–2010     | 2010–2020     |
| Eastern and Southern Africa            | 11                         | 40                     | 45 576   | 42 735         | 40 692         | 37 059         | -284                        | -204          | -363          |
| Northern Africa                        | 3                          | 19                     | 4 995  | 4 844          | 4 456          | 4 298          | -15                         | -39           | -16           |
| Western and Central Africa             | 12                         | 35                     | 44 265   | 40 200         | 36 831         | 31 665         | -406                        | -337          | -517          |
| <b>Total Africa</b>                    | <b>26</b>                  | <b>37</b>              | <b>94 835</b>  | <b>87 779</b>  | <b>81 980</b>  | <b>73 021</b>  | <b>-706</b>                 | <b>-580</b>   | <b>-896</b>   |
| East Asia                              | 3                          | 93                     | 46 438   | 57 148         | 68 300         | 78 536         | 1 071                       | 1 115         | 1 024         |
| South and Southeast Asia               | 14                         | 98                     | 43 615   | 46 130         | 44 116         | 46 819         | 251                         | -201          | 270           |
| Western and Central Asia               | 14                         | 84                     | 4 789  | 5 476          | 8 017          | 8 380          | 69                          | 254           | 36            |
| <b>Total Asia</b>                      | <b>31</b>                  | <b>94</b>              | <b>94 843</b>  | <b>108 755</b> | <b>120 433</b> | <b>133 734</b> | <b>1 391</b>                | <b>1 168</b>  | <b>1 330</b>  |
| Europe excl. Russian Federation        | 29                         | 68                     | 37 638   | 37 951         | <b>39 020</b>  | <b>39 136</b>  | <b>31</b>                   | <b>107</b>    | <b>12</b>     |
| <b>Total Europe</b>                    | <b>30</b>                  | <b>94</b>              | <b>37 746</b>  | <b>38 105</b>  | <b>40 724</b>  | <b>42 699</b>  | <b>36</b>                   | <b>262</b>    | <b>198</b>    |
| Caribbean                              | 11                         | 55                     | 302  | 291            | 284            | 282            | -1                          | -1            | n.s.          |
| Central America                        | 1                          | 15                     | 0  | 0              | 0              | 0              | 0                           | 0             | 0             |
| North America                          | 4                          | 91                     | 260 124  | 259 652        | 257 496        | 253 435        | -47                         | -216          | -406          |
| <b>Total North and Central America</b> | <b>16</b>                  | <b>88</b>              | <b>260 426</b>   | <b>259 942</b> | <b>257 780</b> | <b>253 717</b> | <b>-48</b>                  | <b>-216</b>   | <b>-406</b>   |
| <b>Total Oceania</b>                   | <b>13</b>                  | <b>97</b>              | <b>12 677</b>  | <b>10 451</b>  | <b>11 887</b>  | <b>11 846</b>  | <b>-223</b>                 | <b>144</b>    | <b>-4</b>     |
| <b>Total South America</b>             | <b>8</b>                   | <b>71</b>              | <b>308 654</b>   | <b>275 426</b> | <b>237 925</b> | <b>223 446</b> | <b>-3 323</b>               | <b>-3 750</b> | <b>-1 448</b> |
| <b>WORLD</b>                           | <b>124</b>                 | <b>79</b>              | <b>809 181</b>   | <b>780 458</b> | <b>750 728</b> | <b>738 464</b> | <b>-2 872</b>               | <b>-2 973</b> | <b>-1 226</b> |

Note: n.s. = not significant.

**FIGURE 28. Proportion of total forest area designated primarily for multiple use, by region, 1990–2020**





Thirty-one countries and territories reported that more than 50 percent of their total forest area is designated primarily for multiple use, of which 19 indicated that 100 percent of their forests is so designated (Table 48, p. 61).

**Trends.** FRA 2020 received time-series data on the area of forest designated for multiple use from 124 countries representing 79 percent of the total forest area. The area of forest so designated decreased by 70.7 million ha between 1990 and 2020, with the rate of decrease slowing in the most recent decade (Table 49). The average annual rate of decrease was 2.87 million ha in 1990–2000, 2.97 million ha in 2000–2010 and 1.23 million ha in 2010–2020.

The area of forest designated for multiple use declined between 1990 and 2020 in all regions except Asia and Europe. In Asia, the area of forest so designated increased after 1990, including as a proportion of the total forest area (from 17 percent to 23 percent) (Figure 28). The increase was due largely to China, where the area of forest designated primarily for multiple use increased from 45.8 million ha in 1990 to 78.0

million ha in 2020. The area of forest so designated increased in Europe between 1990 and 2020, but there was little change in the proportion (at about 4 percent). If the Russian Federation is excluded, however, the proportion of the total forest area designated primarily for multiple use in Europe decreased from 33 percent in 1990 to 31 percent in 2020.

### PROTECTION OF SOIL AND WATER

**Status.** FRA 2020 received information on the area of forest designated primarily for the protection of soil and water in 2020 from 141 countries and territories representing 82 percent of the world's forest area. The area of forest so designated is estimated at 398 million ha, which is 12 percent of the total forest area of the reporting countries and territories (Table 50).

Europe has the largest area of forest designated primarily for soil and water protection, at 171 million ha (18 percent of the region's total forest area), followed by Asia, at 132 million ha (22 percent – the largest proportion of any region).

**TABLE 50.** Forest area designated primarily for soil and water protection, by region and subregion, 2020

| Region/subregion                       | Data availability          |                        | Forest designated for the protection of soil and water |                  |
|--|----------------------------|------------------------|--|------------------|
|  | No. of reporting countries | % of total forest area | Area (1 000 ha)  | % of forest area |
| Eastern and Southern Africa            | 14                         | 79                     | 26 630   | 11               |
| Northern Africa                        | 4                          | 25                     | 1 689  | 19               |
| Western and Central Africa             | 13                         | 31                     | 7 519  | 8                |
| <b>Total Africa</b>                    | <b>31</b>                  | <b>53</b>              | <b>35 838</b>  | <b>11</b>        |
| East Asia                              | 4                          | 98                     | 56 542   | 21               |
| South and Southeast Asia               | 13                         | 96                     | 54 769   | 19               |
| Western and Central Asia               | 13                         | 84                     | 21 141   | 46               |
| <b>Total Asia</b>                      | <b>30</b>                  | <b>96</b>              | <b>132 452</b>   | <b>22</b>        |
| Europe excl. Russian Federation        | 35                         | 71                     | 21 595   | 15               |
| <b>Total Europe</b>                    | <b>36</b>                  | <b>94</b>              | <b>170 959</b>   | <b>18</b>        |
| Caribbean                              | 11                         | 55                     | 1 567  | 36               |
| Central America                        | 2                          | 29                     | 68   | 1                |
| North America                          | 5                          | 100                    | 18 793   | 3                |
| <b>Total North and Central America</b> | <b>18</b>                  | <b>97</b>              | <b>20 429</b>  | <b>3</b>         |
| <b>Total Oceania</b>                   | <b>17</b>                  | <b>27</b>              | <b>1 217</b>   | <b>2</b>         |
| <b>Total South America</b>             | <b>9</b>                   | <b>78</b>              | <b>37 380</b>  | <b>6</b>         |
| <b>WORLD</b>                           | <b>141</b>                 | <b>82</b>              | <b>398 274</b>   | <b>12</b>        |

**TABLE 51. Top ten countries and territories for the proportion of total forest area designated primarily for soil and water protection, 2020**

| Ranking | Country/territory         | Forest designated for the protection of soil and water |                        |
|---------|---------------------------|--|------------------------|
|         |                           | Area (1 000 ha)  | % of total forest area |
| 1       | Kiribati                  | 1.2  | 100                    |
| 2       | Kuwait                    | 6.3  | 100                    |
| 3       | Cabo Verde                | 44.7   | 98                     |
| 4       | Kyrgyzstan                | 1 212  | 92                     |
| 5       | Tunisia                   | 627  | 89                     |
| 6       | Wallis and Futuna Islands | 5.1  | 87                     |
| 7       | Bahrain                   | 0.6  | 86                     |
| 8       | Uzbekistan                | 2 532  | 69                     |
| 9       | Mongolia                  | 9 192  | 65                     |
| 10      | Kazakhstan                | 2 160  | 63                     |

The proportion of the total forest area designated primarily for soil and water protection is higher than 90 percent in four countries – Kiribati and Kuwait (both 100 percent), Cabo Verde (98 percent) and Kyrgyzstan (92 percent) (Table 51). Fifty-one countries and territories reported no forest designated primarily for soil and water protection (eight of which have no forest area).

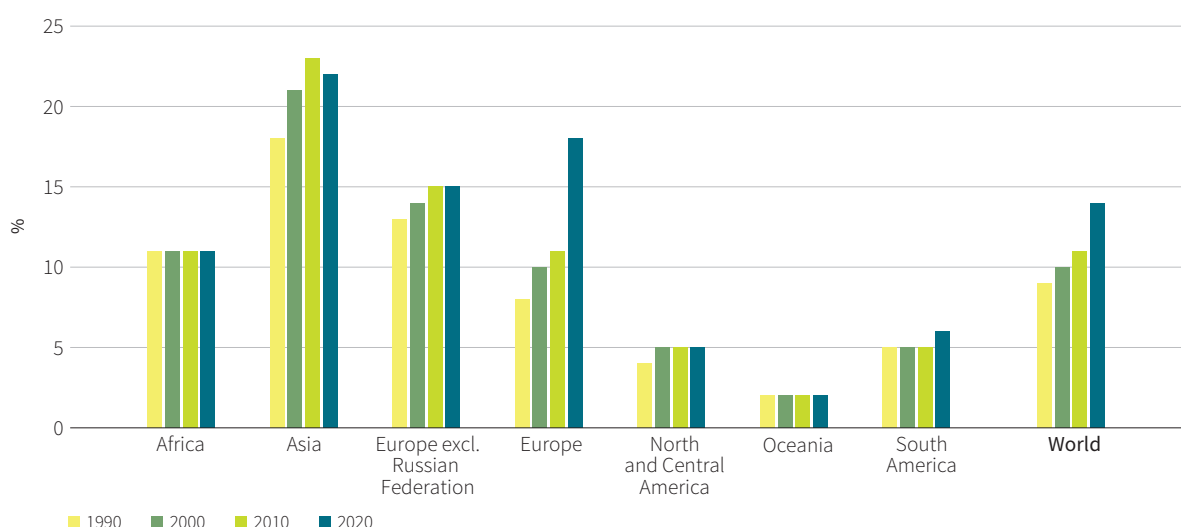
**Trends.** FRA 2020 received time-series data on the area of forest designated primarily for soil and water protection from 131 countries and territories representing 71 percent of the total forest area. The area of forest so designated increased by 119 million ha between 1990 and 2020 (Table 52). The average annual rate of increase grew over

**TABLE 52. Area of forest area designated primarily for soil and water protection, and annual change, by region and subregion, 1990–2020**

| Region/subregion                       | Data availability          |                        | Forest area designated for the protection of soil and water (1 000 ha) |                |                |                | Annual change (1 000 ha/yr) |              |              |
|--|----------------------------|------------------------|--|----------------|----------------|----------------|-----------------------------|--------------|--------------|
|  | No. of reporting countries | % of total forest area | 1990   | 2000           | 2010           | 2020           | 1990–2000                   | 2000–2010    | 2010–2020    |
| Eastern and Southern Africa            | 14                         | 79                     | 29 228   | 28 738         | 27 181         | 26 630         | -49                         | -156         | -55          |
| Northern Africa                        | 4                          | 25                     | 1 536  | 1 553          | 1 527          | 1 689          | 2                           | -3           | 16           |
| Western and Central Africa             | 11                         | 29                     | 12 220   | 10 961         | 9 298          | 7 474          | -126                        | -166         | -182         |
| <b>Total Africa</b>                    | <b>29</b>                  | <b>52</b>              | <b>42 984</b>  | <b>41 252</b>  | <b>38 005</b>  | <b>35 793</b>  | <b>-173</b>                 | <b>-325</b>  | <b>-221</b>  |
| East Asia                              | 4                          | 98                     | 29 016   | 40 317         | 58 363         | 56 542         | 1 130                       | 1 805        | -182         |
| South and Southeast Asia               | 13                         | 96                     | 51 462   | 53 810         | 54 017         | 54 769         | 235                         | 21           | 75           |
| Western and Central Asia               | 13                         | 83                     | 22 069   | 22 478         | 21 655         | 21 129         | 41                          | -82          | -53          |
| <b>Total Asia</b>                      | <b>30</b>                  | <b>96</b>              | <b>102 547</b>   | <b>116 606</b> | <b>134 035</b> | <b>132 440</b> | <b>1 406</b>                | <b>1 743</b> | <b>-160</b>  |
| Europe excl. Russian Federation        | 33                         | 71                     | 16 916   | 19 656         | 20 687         | 21 482         | 274                         | 103          | 80           |
| <b>Total Europe</b>                    | <b>34</b>                  | <b>94</b>              | <b>75 612</b>  | <b>90 044</b>  | <b>105 798</b> | <b>170 846</b> | <b>1 443</b>                | <b>1 575</b> | <b>6 505</b> |
| Caribbean                              | 11                         | 55                     | 884  | 1 124          | 1 467          | 1 567          | 24                          | 34           | 10           |
| Central America                        | 1                          | 15                     | 128  | 108            | 84             | 68             | -2                          | -2           | -2           |
| North America                          | 3                          | 48                     | 15 039   | 15 188         | 15 165         | 15 115         | 15                          | -2           | -5           |
| <b>Total North and Central America</b> | <b>15</b>                  | <b>47</b>              | <b>16 051</b>  | <b>16 420</b>  | <b>16 716</b>  | <b>16 751</b>  | <b>37</b>                   | <b>30</b>    | <b>3</b>     |
| <b>Total Oceania</b>                   | <b>15</b>                  | <b>26</b>              | <b>1 165</b>   | <b>1 163</b>   | <b>1 161</b>   | <b>1 152</b>   | n.s.                        | n.s.         | <b>-1</b>    |
| <b>Total South America</b>             | <b>8</b>                   | <b>71</b>              | <b>33 169</b>  | <b>30 639</b>  | <b>29 660</b>  | <b>33 505</b>  | <b>-253</b>                 | <b>-98</b>   | <b>384</b>   |
| <b>WORLD</b>                           | <b>131</b>                 | <b>71</b>              | <b>271 528</b>   | <b>296 124</b> | <b>325 376</b> | <b>390 487</b> | <b>2 460</b>                | <b>2 925</b> | <b>6 511</b> |

Note: n.s. = not significant.

**FIGURE 29.** Proportion of total forest area designated primarily for the protection of soil and water, by region, 1990–2020



the period, especially in the most recent decade, from 2.46 million ha in 1990–2000, to 2.93 million ha in 2000–2010, to 6.51 million ha in 2010–2020. The steep increase in the ten years to 2020 was due mainly to the Russian Federation, where the average annual increase in the area designated primarily for soil and water protection grew from 1.47 million ha in 2000–2010 to 6.43 million ha in 2010–2020.

All regions except Africa and Oceania reported increases in the area of forest designated primarily for soil and water protection between 1990 and 2020. The proportion of the total forest area so designated was steady over the period in both Africa (at 11 percent) and Oceania (at 2 percent) (Figure 29).

### CONSERVATION OF BIODIVERSITY

**Status.** FRA 2020 received information on the area of forest designated primarily for biodiversity conservation in 2020 from 165 countries representing 91 percent of the world’s forest area. The area so designated is estimated at 424 million ha, which is 11 percent of the forest area of the reporting countries (Table 53).

The largest area of forest designated for biodiversity conservation is in Africa, at 107 million ha; this is 24 percent of the forest area, which is also the highest proportion among the regions. The lowest proportion is in Europe, at 4 percent, although this increases to 12 percent if the Russian Federation is excluded.

Three countries and territories – Saint-Martin (French part), Thailand and Tonga – reported that more than 80 percent of their forest area is designated primarily for biodiversity conservation (Table 54).

**Trends.** FRA 2020 received time-series data on the area of forest designated primarily for biodiversity conservation from 161 countries and territories representing 91 percent of the total forest area. The area of forest so designated increased by 111 million ha between 1990 and 2020, with the largest increase occurring between 2000 and 2010 (Table 55, p. 67). The rate of average annual increase grew from 3.60 million ha in 1990–2000 to 5.13 million ha in 2000–2010, but it dropped by more than half in 2010–2020, to 2.34 million ha. The global trend was evident in all regions except Europe and South America, where the rate of increase decreased in each successive decade between 1990 and 2020.

The biggest increase in the area of forest designated primarily for biodiversity conservation between 1990 and 2020 was in North and Central America, at 27.4 million ha, followed by Asia, at 26.1 million ha, and Europe, at 20.6 million ha.

The biggest increases between 1990 and 2020 in the proportion of total forest area designated primarily for biodiversity conservation were in Africa, from 18 percent to 24 percent, and Oceania, from 11 percent to 17 percent (Figure 30, p. 67).

### SOCIAL SERVICES

**Status.** FRA 2020 received information on the area of forest designated primarily for social services in 2020 from 132 countries and territories representing 77 percent of the world’s forest area. The total area so designated is estimated at 186 million ha – 6 percent of the forest area of the reporting countries (Table 56, p. 68).

**TABLE 53. Forest area designated primarily for biodiversity conservation, by region and subregion, 2020**

| Region/subregion                       | Data availability          |                        | Forest designated for biodiversity conservation |                  |
|--|----------------------------|------------------------|---|------------------|
|  | No. of reporting countries | % of total forest area | Area (1 000 ha)                                 | % of forest area |
| Eastern and Southern Africa            | 14                         | 47                     | 38 192  | 27               |
| Northern Africa                        | 5                          | 77                     | 7 810   | 29               |
| Western and Central Africa             | 21                         | 90                     | 60 583  | 22               |
| <b>Total Africa</b>                    | <b>40</b>                  | <b>69</b>              | <b>106 585</b>                                  | <b>24</b>        |
| East Asia                              | 4                          | 98                     | 16 547  | 6                |
| South and Southeast Asia               | 15                         | 98                     | 69 091  | 24               |
| Western and Central Asia               | 16                         | 94                     | 3 653   | 7                |
| <b>Total Asia</b>                      | <b>35</b>                  | <b>98</b>              | <b>89 292</b>                                   | <b>15</b>        |
| Europe excl. Russian Federation        | 36                         | 87                     | 20 337  | 12               |
| <b>Total Europe</b>                    | <b>37</b>                  | <b>97</b>              | <b>38 919</b>                                   | <b>4</b>         |
| Caribbean                              | 17                         | 59                     | 855   | 18               |
| Central America                        | 2                          | 29                     | 2 324   | 36               |
| North America                          | 5                          | 100                    | 71 760  | 10               |
| <b>Total North and Central America</b> | <b>24</b>                  | <b>97</b>              | <b>74 939</b>                                   | <b>10</b>        |
| <b>Total Oceania</b>                   | <b>17</b>                  | <b>98</b>              | <b>30 752</b>                                   | <b>17</b>        |
| <b>Total South America</b>             | <b>12</b>                  | <b>90</b>              | <b>83 883</b>                                   | <b>11</b>        |
| <b>WORLD</b>                           | <b>165</b>                 | <b>91</b>              | <b>424 370</b>                                  | <b>11</b>        |

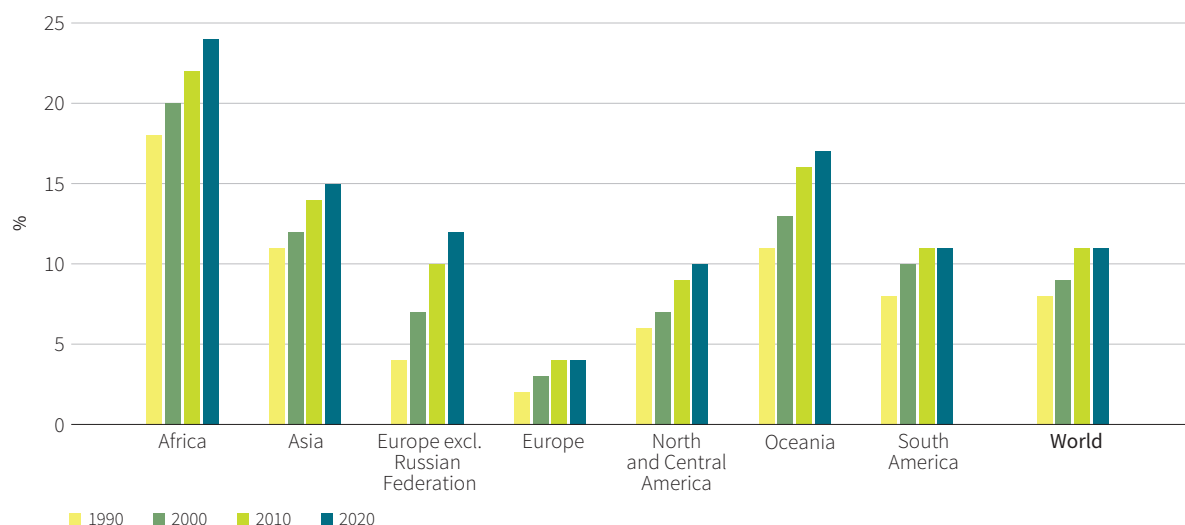
**TABLE 54. Top ten countries and territories for the proportion of total forest area designated primarily for biodiversity conservation, 2020**

| Ranking | Country/territory          | Forest designated for biodiversity conservation |                  |
|---------|----------------------------|---|------------------|
|         |                            | Area (1 000 ha)                                 | % of forest area |
| 1       | Thailand                   | 19 873  | 82               |
| 2       | Tonga                      | 8.95  | 82               |
| 3       | Saint-Martin (French part) | 1.24  | 81               |
| 4       | Norfolk Island             | 0.49  | 76               |
| 5       | Sao Tome and Principe      | 51.9  | 57               |
| 6       | Guinea-Bissau              | 1 980   | 57               |
| 7       | Cameroon                   | 20 340  | 56               |
| 8       | Zambia                     | 44 814  | 54               |
| 9       | New Zealand                | 9 893   | 53               |
| 10      | Guinea                     | 6 189   | 49               |

**TABLE 55.** Area of forest designated primarily for biodiversity conservation, and annual change, by region and subregion, 1990–2020

| Region/subregion                       | Data availability          |                        | Forest area designated for biodiversity conservation<br>(1 000 ha) |                |                |                | Annual change<br>(1 000 ha/yr) |              |              |
|--|----------------------------|------------------------|--|----------------|----------------|----------------|--------------------------------|--------------|--------------|
|  | No. of reporting countries | % of total forest area | 1990   | 2000           | 2010           | 2020           | 1990–2000                      | 2000–2010    | 2010–2020    |
| Eastern and Southern Africa            | 14                         | 47                     | 33 334   | 34 857         | 35 398         | 38 192         | 152                            | 54           | 279          |
| Northern Africa                        | 5                          | 77                     | 4 931  | 4 945          | 7 515          | 7 810          | 1                              | 257          | 30           |
| Western and Central Africa             | 20                         | 90                     | 56 853   | 57 676         | 60 714         | 60 583         | 82                             | 304          | -13          |
| <b>Total Africa</b>                    | <b>39</b>                  | <b>69</b>              | <b>95 119</b>  | <b>97 478</b>  | <b>103 627</b> | <b>106 585</b> | <b>236</b>                     | <b>615</b>   | <b>296</b>   |
| East Asia                              | 4                          | 98                     | 4 481  | 6 238          | 11 697         | 16 547         | 176                            | 546          | 485          |
| South and Southeast Asia               | 15                         | 98                     | 57 669   | 59 140         | 66 149         | 69 091         | 147                            | 701          | 294          |
| Western and Central Asia               | 16                         | 94                     | 1 043  | 1 472          | 2 691          | 3 653          | 43                             | 122          | 96           |
| <b>Total Asia</b>                      | <b>35</b>                  | <b>98</b>              | <b>63 193</b>  | <b>66 850</b>  | <b>80 537</b>  | <b>89 292</b>  | <b>366</b>                     | <b>1 369</b> | <b>875</b>   |
| Europe excl. Russian Federation        | 36                         | 87                     | 6 525  | 11 999         | 17 492         | 20 337         | 547                            | 549          | 284          |
| <b>Total Europe</b>                    | <b>37</b>                  | <b>97</b>              | <b>18 340</b>  | <b>28 189</b>  | <b>35 064</b>  | <b>38 919</b>  | <b>985</b>                     | <b>688</b>   | <b>385</b>   |
| Caribbean                              | 16                         | 59                     | 626  | 677            | 738            | 855            | 5                              | 6            | 12           |
| Central America                        | 1                          | 15                     | 1 920  | 1 620          | 1 256          | 1 022          | -30                            | -36          | -23          |
| North America                          | 5                          | 100                    | 43 686   | 50 544         | 66 541         | 71 760         | 686                            | 1 600        | 522          |
| <b>Total North and Central America</b> | <b>22</b>                  | <b>97</b>              | <b>46 231</b>  | <b>52 841</b>  | <b>68 535</b>  | <b>73 637</b>  | <b>661</b>                     | <b>1 569</b> | <b>510</b>   |
| <b>Total Oceania</b>                   | <b>17</b>                  | <b>98</b>              | <b>20 472</b>  | <b>23 973</b>  | <b>28 981</b>  | <b>30 752</b>  | <b>350</b>                     | <b>501</b>   | <b>177</b>   |
| <b>Total South America</b>             | <b>11</b>                  | <b>86</b>              | <b>68 011</b>  | <b>78 045</b>  | <b>81 897</b>  | <b>82 901</b>  | <b>1 003</b>                   | <b>385</b>   | <b>100</b>   |
| <b>WORLD</b>                           | <b>161</b>                 | <b>91</b>              | <b>311 366</b>   | <b>347 375</b> | <b>398 642</b> | <b>422 086</b> | <b>3 601</b>                   | <b>5 127</b> | <b>2 344</b> |

**FIGURE 30.** Proportion of total forest area designated primarily for biodiversity conservation, by region, 1990–2020



**TABLE 56. Forest area designated primarily for social services, by region and subregion, 2020**

| Region/subregion                       | Data availability          |                        | Forest designated for social services |                  |
|--|----------------------------|------------------------|---------------------------------------|------------------|
|  | No. of reporting countries | % of total forest area | Area (1 000 ha)                       | % of forest area |
| Eastern and Southern Africa            | 11                         | 27                     | 1 551                                 | 2                |
| Northern Africa                        | 4                          | 25                     | 165                                   | 2                |
| Western and Central Africa             | 11                         | 29                     | 1 286                                 | 1                |
| <b>Total Africa</b>                    | <b>26</b>                  | <b>28</b>              | <b>3 002</b>                          | <b>2</b>         |
| East Asia                              | 4                          | 98                     | 3 591                                 | 1                |
| South and Southeast Asia               | 14                         | 98                     | 203                                   | n.s.             |
| Western and Central Asia               | 13                         | 65                     | 1 864                                 | 5                |
| <b>Total Asia</b>                      | <b>31</b>                  | <b>95</b>              | <b>5 658</b>                          | <b>1</b>         |
| Europe excl. Russian Federation        | 34                         | 82                     | 5 269                                 | 3                |
| <b>Total Europe</b>                    | <b>35</b>                  | <b>96</b>              | <b>18 874</b>                         | <b>2</b>         |
| Caribbean                              | 11                         | 55                     | 23                                    | 1                |
| Central America                        | 2                          | 29                     | 0                                     | 0                |
| North America                          | 5                          | 100                    | 18 001                                | 2                |
| <b>Total North and Central America</b> | <b>18</b>                  | <b>97</b>              | <b>18 024</b>                         | <b>2</b>         |
| <b>Total Oceania</b>                   | <b>13</b>                  | <b>7</b>               | <b>54</b>                             | <b>n.s.</b>      |
| <b>Total South America</b>             | <b>9</b>                   | <b>74</b>              | <b>140 023</b>                        | <b>22</b>        |
| <b>WORLD</b>                           | <b>132</b>                 | <b>77</b>              | <b>185 634</b>                        | <b>6</b>         |

Note: n.s. = not significant.

**TABLE 57. Top ten countries for the proportion of total forest area designated primarily for social services, 2020**

| Ranking | Country             | Forest designated primarily for social services |                  |
|---------|---------------------|---|------------------|
|         |                     | % of total forest area                          | % of forest area |
| 1       | Singapore           | 12.2  | 78               |
| 2       | Brazil              | 139 394   | 28               |
| 3       | Republic of Moldova | 76  | 20               |
| 4       | Ukraine             | 1 450   | 15               |
| 5       | Belarus             | 1 290   | 15               |
| 6       | Brunei Darussalam   | 50.8  | 13               |
| 7       | Senegal             | 1 044   | 13               |
| 8       | Iceland             | 6.67  | 13               |
| 9       | Georgia             | 348   | 12               |
| 10      | Poland              | 1 021   | 11               |

South America has both the largest absolute area of forest designated primarily for social services, at 140 million ha, and the largest proportion of total forest area so designated, at 22 percent. This area is composed almost entirely of forests reported by Brazil for the protection of the culture and way of life of forest-dependent people, at 139 million ha (almost one-third of that country's total forest area).

More than 10 percent of the total forest area is designated primarily for social services in ten countries and territories, led by Singapore at 78 percent, Brazil at 28 percent and the Republic of Moldova at 20 percent (Table 57). Seventy-eight countries and territories (of which eight have no forest) reported no area designated primarily for social services.

**Trends.** FRA 2020 received time-series data on the area of forest designated primarily for social services from 122 countries and territories representing 66 percent of the total forest area. The area so designated decreased by 6.06 million ha between 1990 and 2020, although there was a slight increase (of 186 000 ha per year) in the most recent decade (Table 58).

The area of forest designated primarily for social services declined in Europe and South America between 1990 and 2020 and increased slightly in the other regions.

**TABLE 58. Area of forest designated primarily for social services, and annual change, by region and subregion, 1990–2020**

| Region/subregion                       | Data availability          |                        | Forest area designated for social services<br>(1 000 ha) |                |                |                | Annual change (1 000 ha/yr) |             |             |
|--|----------------------------|------------------------|--|----------------|----------------|----------------|-----------------------------|-------------|-------------|
|  | No. of reporting countries | % of total forest area | 1990   | 2000           | 2010           | 2020           | 1990–2000                   | 2000–2010   | 2010–2020   |
| Eastern and Southern Africa            | 11                         | 27                     | 19   | 20             | 21             | 1551           | n.s.                        | n.s.        | 153         |
| Northern Africa                        | 4                          | 25                     | 3  | 2              | 165            | 165            | n.s.                        | 16          | n.s.        |
| Western and Central Africa             | 10                         | 29                     | 1 960  | 1 740          | 1 552          | 1286           | -22                         | -19         | -27         |
| <b>Total Africa</b>                    | <b>25</b>                  | <b>28</b>              | <b>1 983</b>   | <b>1 762</b>   | <b>1 738</b>   | <b>3002</b>    | <b>-22</b>                  | <b>-2</b>   | <b>126</b>  |
| East Asia                              | 4                          | 98                     | 1 078  | 1 583          | 2 679          | 3591           | 51                          | 110         | 91          |
| South and Southeast Asia               | 12                         | 91                     | 175  | 188            | 200            | 200            | 1                           | 1           | n.s.        |
| Western and Central Asia               | 13                         | 64                     | 2 399  | 1 737          | 1 784          | 1861           | -66                         | 5           | 8           |
| <b>Total Asia</b>                      | <b>29</b>                  | <b>92</b>              | <b>3 652</b>   | <b>3 509</b>   | <b>4 663</b>   | <b>5652</b>    | <b>-14</b>                  | <b>115</b>  | <b>99</b>   |
| Europe excl. Russian Federation        | 33                         | 82                     | 6 169  | 6 023          | 5 673          | 5 267          | -15                         | -35         | -41         |
| <b>Total Europe</b>                    | <b>34</b>                  | <b>96</b>              | <b>23 545</b>  | <b>17 356</b>  | <b>18 041</b>  | <b>18 872</b>  | <b>-619</b>                 | <b>69</b>   | <b>83</b>   |
| Caribbean                              | 11                         | 55                     | 5  | 5              | 23             | 23             | 0                           | 2           | 0           |
| Central America                        | 1                          | 15                     | 0  | 0              | 0              | 0              | 0                           | 0           | 0           |
| North America                          | 3                          | 48                     | 14 643   | 14 694         | 14 682         | 14 700         | 5                           | -1          | 2           |
| <b>Total North and Central America</b> | <b>15</b>                  | <b>47</b>              | <b>14 648</b>  | <b>14 699</b>  | <b>14 705</b>  | <b>14 723</b>  | <b>5</b>                    | <b>1</b>    | <b>2</b>    |
| <b>Total Oceania</b>                   | <b>11</b>                  | <b>5</b>               | <b>0</b>   | <b>0</b>       | <b>0</b>       | <b>0</b>       | <b>0</b>                    | <b>0</b>    | <b>0</b>    |
| <b>Total South America</b>             | <b>8</b>                   | <b>71</b>              | <b>144 499</b>   | <b>143 143</b> | <b>141 259</b> | <b>140 019</b> | <b>-136</b>                 | <b>-188</b> | <b>-124</b> |
| <b>WORLD</b>                           | <b>122</b>                 | <b>66</b>              | <b>188 327</b>   | <b>180 468</b> | <b>180 405</b> | <b>182 269</b> | <b>-786</b>                 | <b>-6</b>   | <b>186</b>  |

Note: n.s. = not significant.

Nevertheless, the proportion of the total forest area so designated increased in South America over the period (from 21 percent to 23 percent) and was relatively steady in the other regions (Figure 31).

### OTHER MANAGEMENT OBJECTIVES

**Status.** FRA 2020 received information on the area of forest designated primarily for other purposes (most commonly forest managed primarily for scientific research or for military and defensive purposes) in 2020 from 122 countries and territories representing 72 percent of the world’s forest area. Worldwide, the area of forest so designated is estimated at 218 million ha (7 percent of the forest area of reporting countries) (Table 59).

Of the regions, the largest area of forest designated primarily for other purposes is in Europe, at 178 million ha (18 percent of the total forest area). This forest is almost entirely in the Russian Federation, where 175 million ha is designated primarily for other uses, including “remote

forests”, which are forests designated to remain untouched for 20 or more years.

**Trends.** FRA 2020 received time-series data on the area of forest designated primarily for other purposes from 112 countries and territories representing 68 percent of the total forest area. The area of forest so designated decreased by 112 million ha between 1990 and 2020, due mostly to Europe and especially the Russian Federation, where the area declined by 99.4 million ha over the period (Figure 32, p. 71).

### FOREST IN PROTECTED AREAS

**Status.** FRA 2020 received information on the area of forest in protected areas in 2020 from 173 countries and territories accounting for 97 percent of the global forest area. The total area of forest in legally protected areas is estimated at 726 million ha (18 percent of the total forest area in reporting countries and territories) (Table 60, p. 71).

FIGURE 31. Proportion of total forest area designated primarily for social services, by region, 1990–2020

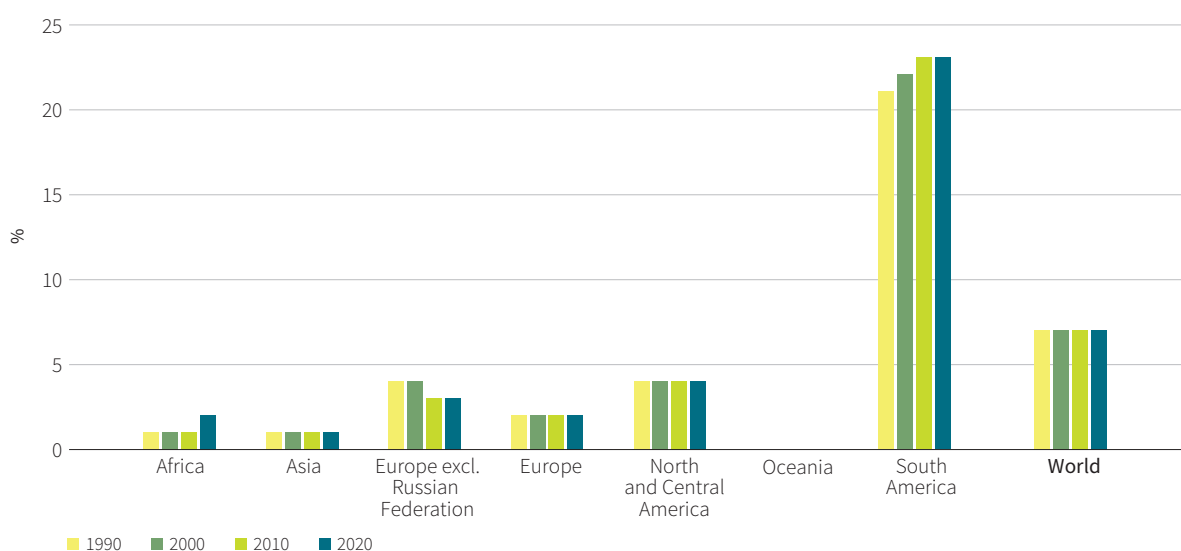


TABLE 59. Forest area designated primarily for other management objectives, by region and subregion, 2020

| Region/subregion                       | Data availability          |                        | Forest designated for other management objectives |                  |
|--|----------------------------|------------------------|---|------------------|
|  | No. of reporting countries | % of total forest area | Area (1 000 ha)                                   | % of forest area |
| Eastern and Southern Africa            | 9                          | 21                     | 0   | 0                |
| Northern Africa                        | 3                          | 19                     | 0   | 0                |
| Western and Central Africa             | 10                         | 27                     | 0   | 0                |
| <b>Total Africa</b>                    | <b>22</b>                  | <b>24</b>              | <b>0</b>  | <b>0</b>         |
| East Asia                              | 4                          | 98                     | 27 509  | 10               |
| South and Southeast Asia               | 13                         | 98                     | 956   | n.s.             |
| Western and Central Asia               | 11                         | 64                     | 173   | n.s.             |
| <b>Total Asia</b>                      | <b>28</b>                  | <b>95</b>              | <b>28 638</b>                                     | <b>5</b>         |
| Europe excl. Russian Federation        | 34                         | 80                     | 2 699   | 2                |
| <b>Total Europe</b>                    | <b>32</b>                  | <b>96</b>              | <b>177 604</b>                                    | <b>18</b>        |
| Caribbean                              | 11                         | 55                     | 0   | 0                |
| Central America                        | 2                          | 29                     | 0   | 0                |
| North America                          | 3                          | 48                     | 945   | n.s.             |
| <b>Total North and Central America</b> | <b>16</b>                  | <b>48</b>              | <b>945</b>  | <b>n.s.</b>      |
| <b>Total Oceania</b>                   | <b>14</b>                  | <b>79</b>              | <b>67</b>   | <b>n.s.</b>      |
| <b>Total South America</b>             | <b>10</b>                  | <b>81</b>              | <b>10 609</b>                                     | <b>2</b>         |
| <b>WORLD</b>                           | <b>122</b>                 | <b>72</b>              | <b>217 864</b>                                    | <b>7</b>         |

Note: n.s. = not significant.



FIGURE 32. Proportion of total forest area designated primarily for other management objectives, by region, 1990–2020

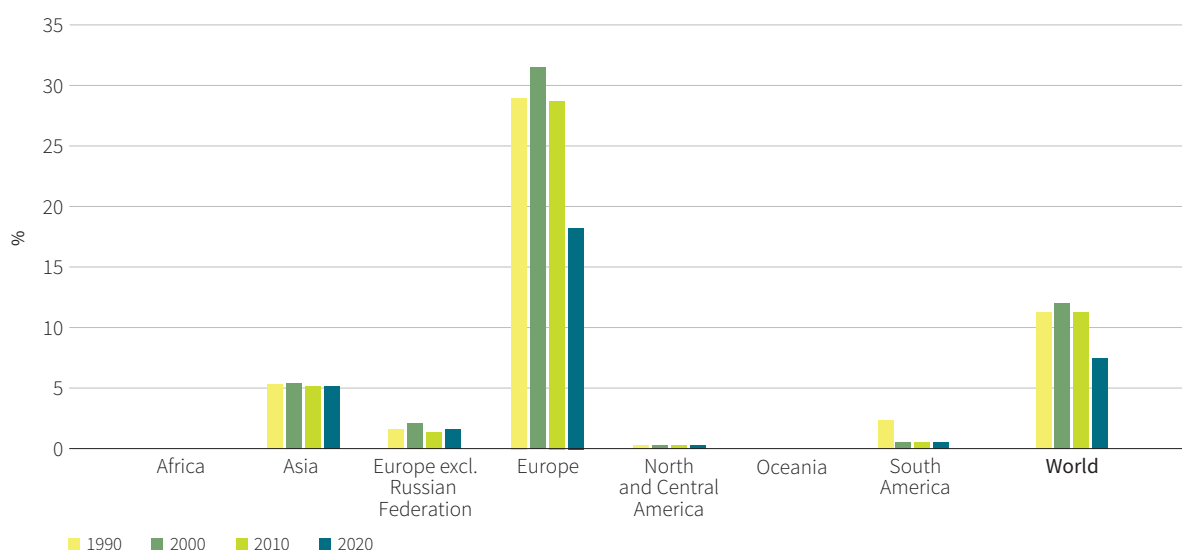


TABLE 60. Forest in protected areas, by region and subregion, 2020

| Region/subregion                       | Data availability          |                        | Forest in protected areas |                  |
|--|----------------------------|------------------------|---------------------------|------------------|
|  | No. of reporting countries | % of total forest area | Area (1 000 ha)           | % of forest area |
| Eastern and Southern Africa            | 19                         | 91                     | 91 251                    | 34               |
| Northern Africa                        | 5                          | 77                     | 5 214                     | 19               |
| Western and Central Africa             | 24                         | 98                     | 61 365                    | 21               |
| <b>Total Africa</b>                    | <b>48</b>                  | <b>94</b>              | <b>157 829</b>            | <b>27</b>        |
| East Asia                              | 4                          | 98                     | 38 233                    | 14               |
| South and Southeast Asia               | 14                         | 92                     | 91 495                    | 34               |
| Western and Central Asia               | 13                         | 87                     | 14 469                    | 30               |
| <b>Total Asia</b>                      | <b>31</b>                  | <b>94</b>              | <b>144 197</b>            | <b>25</b>        |
| Europe excl. Russian Federation        | 40                         | 96                     | 39 198                    | 20               |
| <b>Total Europe</b>                    | <b>41</b>                  | <b>99</b>              | <b>57 780</b>             | <b>6</b>         |
| Caribbean                              | 18                         | 66                     | 984                       | 19               |
| Central America                        | 7                          | 100                    | 9 336                     | 42               |
| North America                          | 5                          | 100                    | 69 267                    | 10               |
| <b>Total North and Central America</b> | <b>30</b>                  | <b>100</b>             | <b>79 587</b>             | <b>11</b>        |
| <b>Total Oceania</b>                   | <b>10</b>                  | <b>98</b>              | <b>29 120</b>             | <b>16</b>        |
| <b>Total South America</b>             | <b>13</b>                  | <b>98</b>              | <b>257 293</b>            | <b>31</b>        |
| <b>WORLD</b>                           | <b>173</b>                 | <b>97</b>              | <b>725 807</b>            | <b>18</b>        |

**TABLE 61. Top ten countries for forest in protected areas, 2020**

| Ranking | Country                            | Forest in protected areas |                           |              |
|---------|------------------------------------|---------------------------|---------------------------|--------------|
|         |                                    | Area (1 000 ha)           | Share of global total (%) | Cumulative % |
| 1       | Brazil                             | 149 577                   | 21                        | 21           |
| 2       | Indonesia                          | 51 770                    | 7                         | 28           |
| 3       | Venezuela (Bolivarian Republic of) | 45 605                    | 6                         | 34           |
| 4       | Zambia                             | 31 831                    | 4                         | 38           |
| 5       | United States of America           | 31 735                    | 4                         | 43           |
| 6       | China                              | 30 350                    | 4                         | 47           |
| 7       | Canada                             | 29 507                    | 4                         | 51           |
| 8       | United Republic of Tanzania        | 28 508                    | 4                         | 55           |
| 9       | Democratic Republic of the Congo   | 24 297                    | 3                         | 58           |
| 10      | Australia                          | 24 072                    | 3                         | 62           |

**TABLE 62. Forest in protected areas, and annual change, by region and subregion, 1990–2020**

| Region/subregion                       | Data availability          |                        | Forest in protected areas (1 000 ha) |                |                |                | Annual change (1 000 ha) |               |              |
|--|----------------------------|------------------------|--------------------------------------|----------------|----------------|----------------|--------------------------|---------------|--------------|
|  | No. of reporting countries | % of total forest area | 1990                                 | 2000           | 2010           | 2020           | 1990–2000                | 2000–2010     | 2010–2020    |
| Eastern and Southern Africa            | 15                         | 89                     | 85 171                               | 85 671         | 86 705         | 89 452         | 49.9                     | 103           | 275          |
| Northern Africa                        | 5                          | 77                     | 3 477                                | 3 491          | 5 211          | 5 214          | 1.4                      | 172           | 0.3          |
| Western and Central Africa             | 21                         | 55                     | 35 794                               | 35 811         | 37 517         | 36 771         | 1.7                      | 171           | -74.5        |
| <b>Total Africa</b>                    | <b>41</b>                  | <b>72</b>              | <b>124 442</b>                       | <b>124 973</b> | <b>129 433</b> | <b>131 437</b> | <b>53.0</b>              | <b>446</b>    | <b>200</b>   |
| East Asia                              | 3                          | 89                     | 4 900                                | 19 159         | 30 300         | 33 761         | 1 426                    | 1 114         | 346          |
| South and Southeast Asia               | 13                         | 86                     | 71 200                               | 73 474         | 86 245         | 88 233         | 227                      | 1 277         | 199          |
| Western and Central Asia               | 10                         | 65                     | 8 507                                | 9 778          | 11 320         | 12 925         | 127                      | 154           | 160          |
| <b>Total Asia</b>                      | <b>26</b>                  | <b>85</b>              | <b>84 607</b>                        | <b>102 411</b> | <b>127 865</b> | <b>134 919</b> | <b>1 780</b>             | <b>2 545</b>  | <b>705</b>   |
| Europe excl. Russian Federation        | 26                         | 69                     | 6 494                                | 12 440         | 22 944         | 27 388         | 595                      | 1 050         | 444          |
| <b>Total Europe</b>                    | <b>27</b>                  | <b>94</b>              | <b>18 309</b>                        | <b>28 631</b>  | <b>40 516</b>  | <b>45 970</b>  | <b>1 032</b>             | <b>1 189</b>  | <b>545</b>   |
| Caribbean                              | 16                         | 59                     | 582                                  | 653            | 837            | 917            | 7.1                      | 18.4          | 8.0          |
| Central America                        | 2                          | 31                     | 4 977                                | 4 304          | 3 577          | 3 184          | -67.3                    | -72.8         | -39.2        |
| North America                          | 5                          | 100                    | 36 922                               | 46 194         | 66 463         | 69 267         | 927                      | 2 027         | 280          |
| <b>Total North and Central America</b> | <b>23</b>                  | <b>98</b>              | <b>42 482</b>                        | <b>51 151</b>  | <b>70 877</b>  | <b>73 368</b>  | <b>867</b>               | <b>1 973</b>  | <b>249</b>   |
| <b>Total Oceania</b>                   | <b>8</b>                   | <b>78</b>              | <b>17 734</b>                        | <b>21 106</b>  | <b>26 022</b>  | <b>27 741</b>  | <b>337</b>               | <b>492</b>    | <b>172</b>   |
| <b>Total South America</b>             | <b>8</b>                   | <b>80</b>              | <b>150 247</b>                       | <b>171 581</b> | <b>206 132</b> | <b>215 703</b> | <b>2 133</b>             | <b>3 455</b>  | <b>957</b>   |
| <b>WORLD</b>                           | <b>133</b>                 | <b>86</b>              | <b>437 821</b>                       | <b>499 853</b> | <b>600 845</b> | <b>629 139</b> | <b>6 203</b>             | <b>10 099</b> | <b>2 829</b> |

The proportion of forest in protected areas is more than 30 percent in South America, where particularly Brazil, Peru and Venezuela (Bolivarian Republic of) have large areas of protected forests; 11 percent in North and Central America; and 6 percent in Europe. The relatively low proportion of forest in protected areas in Europe is influenced heavily by the Russian Federation, which reported that 2.3 percent of its forest area is protected; if the Russian Federation is excluded, the figure for Europe rises to about 20 percent.

The ten countries with the largest areas of formally protected forest account for about 60 percent of all forests in protected areas worldwide (Table 61). Fifteen countries reported that more than 50 percent of their forest area is under formal protection.

**Trends.** FRA 2020 received time-series data on the area of forest in protected areas from 133 countries and territories

accounting for 86 percent of the global forest area. This area increased between 1990 and 2020, although the average annual rate of increase slowed from 10.1 million ha in 2000–2010 to 2.83 million ha in 2010–2020 (Table 62). In their reports, some countries mentioned reductions in protected-forest area, due mainly to illegal activities and encroachment for agriculture.

#### FOREST AREA WITH LONG-TERM MANAGEMENT PLANS

**Status.** FRA 2020 received information on the area of forest subject to long-term management plans in 2020 from 135 countries and territories representing 94 percent of the global forest area. More than 2 billion ha of forest is subject to management plans in those countries and territories (about 54 percent of their total forest area), with considerable differences between regions (Table 63).

**TABLE 63.** Area of forest with long-term management plans, by region and subregion, 2020

| Region/subregion                       | Data availability          |                        | Forest with management plans |                  |
|--|----------------------------|------------------------|------------------------------|------------------|
|  | No. of reporting countries | % of total forest area | Area (1 000 ha)              | % of forest area |
| Eastern and Southern Africa            | 14                         | 80                     | 59 156                       | 25               |
| Northern Africa                        | 5                          | 77                     | 9 202                        | 34               |
| Western and Central Africa             | 17                         | 91                     | 61 853                       | 22               |
| <b>Total Africa</b>                    | <b>36</b>                  | <b>85</b>              | <b>130 211</b>               | <b>24</b>        |
| East Asia                              | 4                          | 98                     | 195 586                      | 74               |
| South and Southeast Asia               | 9                          | 83                     | 123 983                      | 51               |
| Western and Central Asia               | 11                         | 84                     | 33 915                       | 73               |
| <b>Total Asia</b>                      | <b>24</b>                  | <b>89</b>              | <b>353 484</b>               | <b>64</b>        |
| Europe excl. Russian Federation        | 36                         | 82                     | 128 591                      | 77               |
| <b>Total Europe</b>                    | <b>37</b>                  | <b>96</b>              | <b>943 836</b>               | <b>96</b>        |
| Caribbean                              | 8                          | 51                     | 2 759                        | 68               |
| Central America                        | 4                          | 47                     | 1 133                        | 11               |
| North America                          | 5                          | 100                    | 428 803                      | 59               |
| <b>Total North and Central America</b> | <b>17</b>                  | <b>98</b>              | <b>432 695</b>               | <b>59</b>        |
| <b>Total Oceania</b>                   | <b>9</b>                   | <b>97</b>              | <b>55 713</b>                | <b>31</b>        |
| <b>Total South America</b>             | <b>12</b>                  | <b>95</b>              | <b>133 879</b>               | <b>17</b>        |
| <b>WORLD</b>                           | <b>135</b>                 | <b>94</b>              | <b>2 049 817</b>             | <b>54</b>        |

**TABLE 64. Forest area with long-term management plans, and annual change, by region and subregion, 2000–2020**

| Region/subregion                       | Data availability          |                        | Forest area with management plans (1 000 ha) |                  |                  | Annual change (1 000 ha/yr) |               |
|--|----------------------------|------------------------|--|------------------|------------------|-----------------------------|---------------|
|  | No. of reporting countries | % of total forest area | 2000   | 2010             | 2020             | 2000–2010                   | 2010–2020     |
| Eastern and Southern Africa            | 12                         | 80                     | 41 149                                       | 44 651           | 59 151           | 350                         | 1 450         |
| Northern Africa                        | 4                          | 71                     | 5 234  | 7 851            | 8 938            | 262                         | 109           |
| Western and Central Africa             | 12                         | 47                     | 32 971                                       | 38 707           | 49 551           | 574                         | 1 084         |
| <b>Total Africa</b>                    | <b>28</b>                  | <b>64</b>              | <b>79 354</b>                                | <b>91 210</b>    | <b>117 639</b>   | <b>1 186</b>                | <b>2 643</b>  |
| East Asia                              | 4                          | 98                     | 140 231                                      | 162 691          | 195 586          | 2 246                       | 3 289         |
| South and Southeast Asia               | 9                          | 83                     | 112 875                                      | 120 986          | 123 983          | 811                         | 300           |
| Western and Central Asia               | 8                          | 77                     | 27 292                                       | 30 502           | 33 403           | 321                         | 290           |
| <b>Total Asia</b>                      | <b>21</b>                  | <b>89</b>              | <b>280 397</b>                               | <b>314 178</b>   | <b>352 973</b>   | <b>3 378</b>                | <b>3 879</b>  |
| Europe excl. Russian Federation        | 31                         | 80                     | 124 767                                      | 122 417          | 127 091          | -235                        | 467           |
| <b>Total Europe</b>                    | <b>32</b>                  | <b>96</b>              | <b>934 036</b>                               | <b>937 552</b>   | <b>942 337</b>   | <b>352</b>                  | <b>478</b>    |
| Caribbean                              | 8                          | 51                     | 1 471  | 1 972            | 2 759            | 50                          | 79            |
| Central America                        | 2                          | 31                     | 26   | 19               | 23               | -1                          | n.s.          |
| North America                          | 5                          | 100                    | 385 531                                      | 399 391          | 428 803          | 1 386                       | 2 941         |
| <b>Total North and Central America</b> | <b>15</b>                  | <b>97</b>              | <b>387 029</b>                               | <b>401 382</b>   | <b>431 585</b>   | <b>1 435</b>                | <b>3 020</b>  |
| <b>Total Oceania</b>                   | <b>8</b>                   | <b>25</b>              | <b>12 044</b>                                | <b>12 458</b>    | <b>12 453</b>    | <b>41</b>                   | <b>-1</b>     |
| <b>Total South America</b>             | <b>12</b>                  | <b>95</b>              | <b>64 970</b>                                | <b>98 758</b>    | <b>133 879</b>   | <b>3 379</b>                | <b>3 512</b>  |
| <b>WORLD</b>                           | <b>116</b>                 | <b>87</b>              | <b>1 757 831</b>                             | <b>1 855 538</b> | <b>1 990 865</b> | <b>9 771</b>                | <b>13 533</b> |

Note: n.s. = not significant.

Almost half the total area is in Europe and particularly the Russian Federation. Less than 25 percent of the forest area in Africa and South America is under management plans.

**Trends.** The availability of information on the area of forest under management plans is improving, but many countries

lack data for 1990. Therefore, the analysis of trends presented here is based on information for 2000–2020 provided by 116 countries and territories representing 87 percent of the world's forest area. According to these data, the area of forest subject to management plans increased by 233 million ha between 2000 and 2020 (Table 64).

### Box 6. Forest certification

The concept of independently certifying the quality of forest management was developed in the 1990s as a voluntary tool for promoting sustainable forest management and the trade of products originating in sustainably managed forests. Two major international certification schemes prevail today: the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC); the latter scheme endorses national forest certification schemes that demonstrate compliance with its globally established sustainability benchmarks.

The forest area under independently verified forest management certification is a subindicator of Sustainable

Development Goal indicator 15.2.1 (“progress towards sustainable forest management”). FAO reports on this subindicator annually based on data provided by the secretariats of the FSC and the PEFC. As part of this process, the two secretariats have undertaken a joint analysis of areas certified under both schemes, thereby making it possible to estimate the total certified forest area without bias due to double certification.

FSC certification started in 1993 in Costa Rica and the United States of America; it gained momentum in the late 1990s, and the area of FSC certification has increased

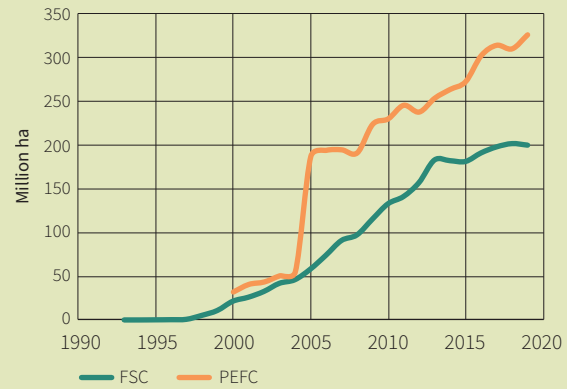
(Continued)

Box 6. (Continued)

steadily since. The first PEFC certification occurred in Austria, Finland, Germany, Norway and Sweden in 2000, increased slowly in Europe for a few years, and almost quadrupled in 2005 with the endorsement of two North American certification schemes (those of the Sustainable Forestry Initiative and the Canadian Standards Association) (Figure 33).

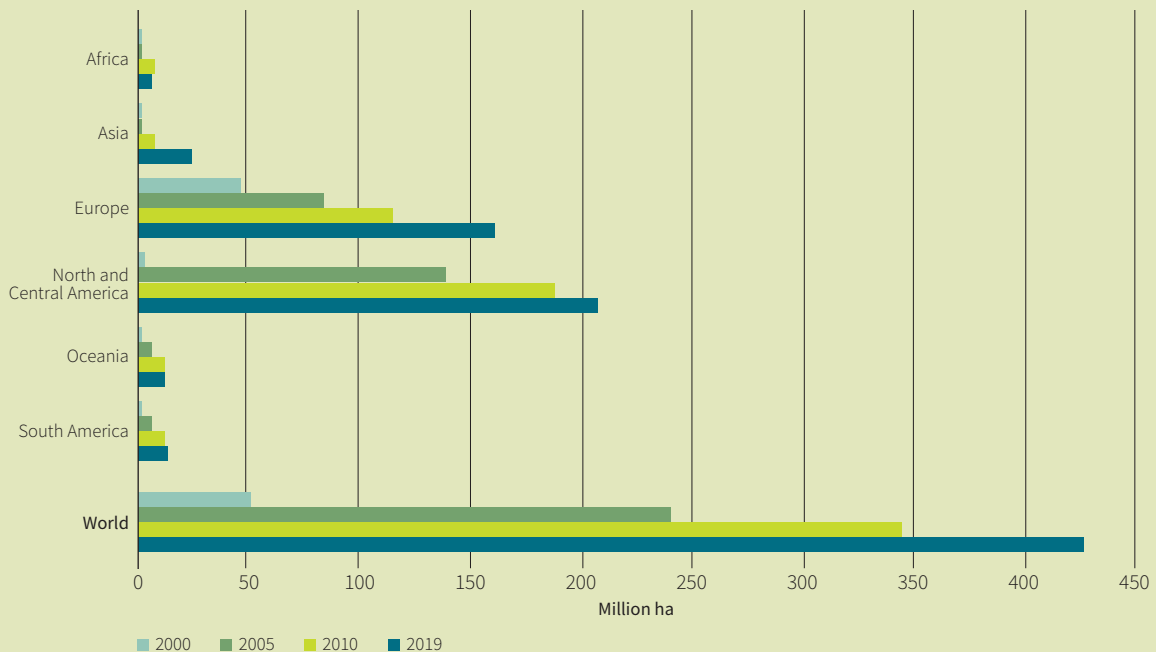
A total of 200 million ha of forest was certified under the FSC in 2019 and 319 million ha was certified under the PEFC. Of these areas, 93 million ha was certified under both systems; thus, the total net certified forest area in 2019 was 426 million ha. Figure 34 shows that the majority of the certified area was in Europe and North America. Canada had by far the most, at 167 million ha, followed by the Russian Federation (54.1 million ha) and the United States of America (38.1 million ha). These three countries together accounted for more than 60 percent of the world's certified forest area in 2019.

Figure 33. Forest area certified under the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification, 1990–2019



Note: FSC = Forest Stewardship Council; PEFC = Programme for the Endorsement of Forest Certification.

Figure 34. Total area of certified forest after adjustment for double certification, by region, 2000–2019





6

Ownership  
and management  
rights







Information on the ownership of, and management rights to, forests is crucial for governments in formulating effective forest policies. Clear and secure forest ownership and management rights are important for encouraging public and private investment in forests and for alleviating the poverty of people who depend directly or indirectly on forests for their livelihoods.

FRA 2020 collected information on ownership and management rights for 1990, 2000, 2010 and 2015; 2015, therefore, is the reference year for status analysis.

Three main forest ownership categories were assessed: 1) public ownership; 2) private ownership; and 3) unknown/other.

Three subcategories were specified for private ownership: 1) forest owned by individuals; 2) forest owned by business entities or institutions; and 3) forest owned by local, tribal or indigenous communities.

FRA 2020 also collected information on who holds management rights in public forests, defined as the right to manage and use publicly owned forests for a specified period. Five main categories of management rights holders were identified: 1) public administrations; 2) individuals; 3) private business entities and institutions; 4) local, tribal and indigenous communities; and 5) unknown/other.

## Forest ownership

### STATUS

FRA 2020 received information on forest ownership in 2015 for the main categories (i.e. public, private and unknown/other) from 180 countries and territories representing 97 percent of the world's forests. Figure 35 shows the proportion of the total forest area in these three categories in 2015.

Public ownership was predominant in 2015 in all regions and subregions except Central America, where private ownership accounted for 51 percent of the forest area (Table 65). The largest share of public ownership was in Europe, where it accounted for 90 percent – although if

the Russian Federation is excluded, the share decreases to 46 percent.

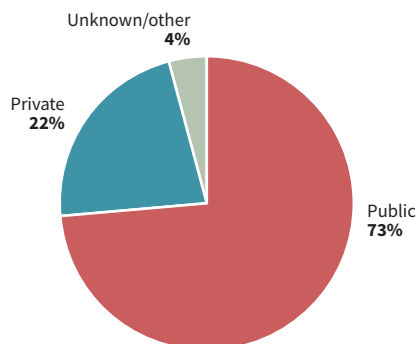
The largest share of public ownership at the subregional level was in Western and Central Asia, at 99 percent. The regions with the largest shares of privately owned forests were Oceania, at 47 percent, and North and Central America, at 36 percent.

In Europe, private forest accounted for 9 percent of the forest area; if the Russian Federation is excluded, the share increases to 52 percent.

Seventy-three countries reported that more than 90 percent of their forests was publicly owned in 2015. The share was 100 percent in 48 of those countries, of which 23 were in Asia (mostly Western and Central Asia) and 16 were in Africa (mostly Western and Central Africa).

Public ownership was below 10 percent in 15 countries; five countries and territories, all in Oceania, reported that 100 percent of their forest area was owned privately (and therefore no forest was publicly owned). Table 66 shows the top ten countries and territories for the proportion of forest area under private ownership in 2015.

FIGURE 35. Proportion of total forest area, by three ownership categories, 2015



Note: "Other" applies mainly to forest areas with disputed ownership or with ownership in transition, and to forest areas in which there are discrepancies between national forest inventory datasets and public registers.

**TABLE 65. Forest ownership, by region and subregion, 2015**

| Region/subregion                       | Data availability          |                        | Forest area (1 000 ha) |                  |                | % of forest area |           |               |
|--|----------------------------|------------------------|------------------------|------------------|----------------|------------------|-----------|---------------|
|  | No. of reporting countries | % of total forest area | Private                | Public           | Unknown/other  | Private          | Public    | Unknown/other |
| Eastern and Southern Africa            | 17                         | 92                     | 22 634                 | 161 327          | 98 017         | 8                | 57        | 35            |
| Northern Africa                        | 5                          | 77                     | 7 492                  | 20 328           | 66             | 27               | 73        | n.s.          |
| Western and Central Africa             | 21                         | 96                     | 5 881                  | 281 155          | 16 229         | 2                | 93        | 5             |
| <b>Total Africa</b>                    | <b>43</b>                  | <b>93</b>              | <b>36 007</b>          | <b>462 810</b>   | <b>114 312</b> | <b>6</b>         | <b>75</b> | <b>19</b>     |
| East Asia                              | 5                          | 100                    | 105 815                | 156 074          | 0              | 40               | 60        | 0             |
| South and Southeast Asia               | 17                         | 100                    | 26 688                 | 264 512          | 7 883          | 9                | 88        | 3             |
| Western and Central Asia               | 21                         | 99                     | 760                    | 52 675           | 0              | 1                | 99        | 0             |
| <b>Total Asia</b>                      | <b>43</b>                  | <b>100</b>             | <b>133 263</b>         | <b>473 262</b>   | <b>7 883</b>   | <b>22</b>        | <b>77</b> | <b>1</b>      |
| Europe excl. Russian Federation        | 41                         | 87                     | 92 056                 | 80 519           | 2 943          | 52               | 46        | 2             |
| <b>Total Europe</b>                    | <b>42</b>                  | <b>97</b>              | <b>92 056</b>          | <b>895 449</b>   | <b>2 943</b>   | <b>9</b>         | <b>90</b> | n.s.          |
| Caribbean                              | 14                         | 72                     | 996                    | 4 535            | 81             | 18               | 81        | 1             |
| Central America                        | 3                          | 32                     | 3 668                  | 2 675            | 802            | 51               | 37        | 11            |
| North America                          | 5                          | 100                    | 261 163                | 449 605          | 12 775         | 36               | 62        | 2             |
| <b>Total North and Central America</b> | <b>22</b>                  | <b>98</b>              | <b>265 827</b>         | <b>456 815</b>   | <b>13 658</b>  | <b>36</b>        | <b>62</b> | <b>2</b>      |
| <b>Total Oceania</b>                   | <b>17</b>                  | <b>100</b>             | <b>86 986</b>          | <b>96 241</b>    | <b>1 051</b>   | <b>47</b>        | <b>52</b> | <b>1</b>      |
| <b>Total South America</b>             | <b>13</b>                  | <b>98</b>              | <b>273 581</b>         | <b>527 702</b>   | <b>37 806</b>  | <b>33</b>        | <b>63</b> | <b>5</b>      |
| <b>WORLD</b>                           | <b>180</b>                 | <b>97</b>              | <b>887 721</b>         | <b>2 912 280</b> | <b>177 653</b> | <b>22</b>        | <b>73</b> | <b>4</b>      |

Note: n.s. = not significant.

**TABLE 66. Top ten countries and territories for the proportion of privately owned forest, 2015**

| Ranking | Country/territory | Forest under private ownership |                        |
|---------|-------------------|--------------------------------|------------------------|
|         |                   | Area (1 000 ha)                | % of total forest area |
| 1       | American Samoa    | 17                             | 100                    |
| 2       | Marshall Islands  | 9                              | 100                    |
| 3       | Niue              | 19                             | 100                    |
| 4       | Papua New Guinea  | 35 974                         | 100                    |
| 5       | Vanuatu           | 442                            | 100                    |
| 6       | Uruguay           | 1 906                          | 99                     |
| 7       | Portugal          | 3 215                          | 97                     |
| 8       | Yemen             | 522                            | 95                     |
| 9       | El Salvador       | 548                            | 90                     |
| 10      | Samoa             | 148                            | 90                     |

## TRENDS

FRA 2020 received information on trends in forest ownership from 166 countries and territories representing 95 percent of the world's forest.

The area of forest under public ownership decreased by 116 million ha between 1990 and 2015 and the area of privately owned forest increased by 29 million ha (Table 67). The proportion of the total forest area that is privately owned increased from 21 percent to 22 percent over the period, and the share of publicly owned forests decreased from 74 percent to 73 percent.

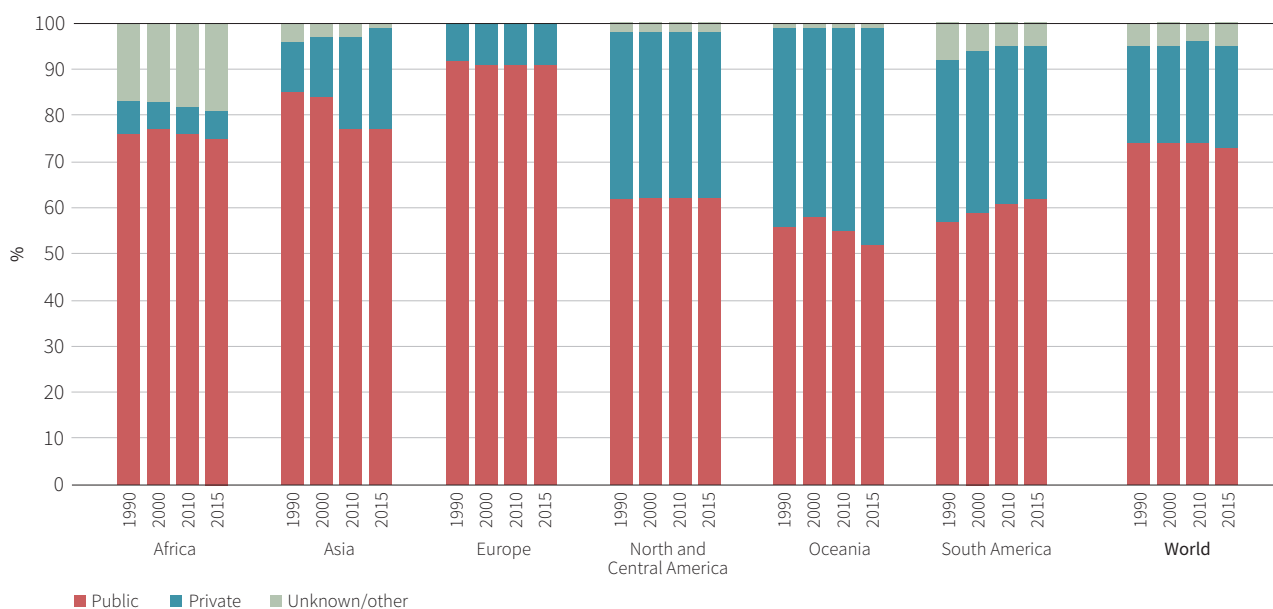
Asia had the highest gain in the area of private forest between 1990 and 2015, at about 69 million ha. This mainly reflects the trend in East Asia, where China reported an increase of just over 53 million ha of private forest since 1990. The share of private forest increased in China from 17 percent in 1990 to 41 percent in 2015.

The biggest decrease in the area of privately owned forest between 1990 and 2015 was in South America, where it declined by about 53 million ha, due mainly to a reduction of 85 million ha in Brazil. The proportion of privately owned forest in Brazil decreased from 47 percent of the total forest area in 1990 to 44 percent in 2015.

**TABLE 67. Forest ownership, by region and subregion, 1990–2015**

| Region/subregion                       | Data availability          |                        | Forest ownership (1 000 ha) |                |                  |                  |                |                |
|--|----------------------------|------------------------|-----------------------------|----------------|------------------|------------------|----------------|----------------|
|  | No. of reporting countries | % of total forest area | Private                     |                | Public           |                  | Unknown/other  |                |
|  |                            |                        | 1990                        | 2015           | 1990             | 2015             | 1990           | 2015           |
| Eastern and Southern Africa            | 16                         | 92                     | 25 860                      | 22 630         | 180 525          | 161 318          | 112 076        | 98 016         |
| Northern Africa                        | 5                          | 77                     | 7 153                       | 7 492          | 24 629           | 20 328           | 61             | 66             |
| Western and Central Africa             | 21                         | 96                     | 13 017                      | 5 881          | 320 427          | 281 155          | 9 304          | 16 229         |
| <b>Total Africa</b>                    | <b>42</b>                  | <b>93</b>              | <b>46 029</b>               | <b>36 002</b>  | <b>525 580</b>   | <b>462 801</b>   | <b>121 441</b> | <b>114 312</b> |
| East Asia                              | 5                          | 100                    | 46 809                      | 105 815        | 163 098          | 156 074          | 0              | 0              |
| South and Southeast Asia               | 15                         | 96                     | 16 474                      | 26 029         | 279 164          | 255 277          | 19 251         | 7 883          |
| Western and Central Asia               | 20                         | 98                     | 598                         | 631            | 47 627           | 52 639           | 0              | 0              |
| <b>Total Asia</b>                      | <b>40</b>                  | <b>98</b>              | <b>63 882</b>               | <b>132 475</b> | <b>489 889</b>   | <b>463 991</b>   | <b>19 250</b>  | <b>7 883</b>   |
| Europe excl. Russian Federation        | 39                         | 87                     | 74 443                      | 91 614         | 84 961           | 80 045           | 2 214          | 2 943          |
| <b>Total Europe</b>                    | <b>40</b>                  | <b>97</b>              | <b>74 443</b>               | <b>91 614</b>  | <b>893 911</b>   | <b>894 976</b>   | <b>2 214</b>   | <b>2 943</b>   |
| Caribbean                              | 14                         | 72                     | 752                         | 996            | 3 404            | 4 535            | 137            | 81             |
| Central America                        | 1                          | 16                     | 2 244                       | 1 717          | 1 741            | 1 351            | 796            | 518            |
| North America                          | 5                          | 100                    | 261 085                     | 261 163        | 444 909          | 449 605          | 15 323         | 12 775         |
| <b>Total North and Central America</b> | <b>20</b>                  | <b>97</b>              | <b>264 081</b>              | <b>263 876</b> | <b>450 054</b>   | <b>455 491</b>   | <b>16 257</b>  | <b>13 373</b>  |
| <b>Total Oceania</b>                   | <b>13</b>                  | <b>98</b>              | <b>77 539</b>               | <b>84 340</b>  | <b>102 707</b>   | <b>95 351</b>    | <b>1 022</b>   | <b>1 043</b>   |
| <b>Total South America</b>             | <b>11</b>                  | <b>87</b>              | <b>301 571</b>              | <b>248 280</b> | <b>488 356</b>   | <b>462 213</b>   | <b>66 499</b>  | <b>37 806</b>  |
| <b>WORLD</b>                           | <b>166</b>                 | <b>95</b>              | <b>827 546</b>              | <b>856 588</b> | <b>2 950 498</b> | <b>2 834 823</b> | <b>226 683</b> | <b>177 359</b> |

**FIGURE 36. Proportion of total forest area, by ownership type and region, 1990–2015**



There were substantial declines in the area of both publicly owned and privately owned forests in Africa between 1990 and 2015. This apparently reflected losses in the total forest area rather than trends in ownership categories, with the share of the total forest area of each staying relatively steady over the period (Figure 36).

There was an increase in the proportion of the forest area owned privately in Oceania between 1990 and 2015, from 43 percent to 47 percent. Correspondingly, the proportion of forest owned publicly declined from 57 percent to 53 percent.

In Europe (excluding the Russian Federation, where all forests were 100 percent publicly owned in 2015), private ownership has become the region's predominant form of ownership, increasing in proportion from 46 percent of the total forest area in 1990 to 52 percent in 2015.

The proportion of the total forest area in private and public ownership in North and Central America was steady between 1990 and 2015, at 36 percent and 62 percent, respectively.

## Private ownership, by type of owner

### STATUS

FRA 2020 received information on the forest area owned by different types of private owner in 2015 from 115 countries and territories representing 50 percent of the world's forest area. Given the low coverage, the analysis presented here provides only a partial picture of this parameter at the global and regional levels.

Of the total area of privately owned forest in reporting countries and territories in 2015, individuals accounted for 51 percent, local, tribal and indigenous communities for 29 percent and business entities and institutions for 20 percent (Table 68).

Ownership by individuals was the predominant private-ownership type in Europe (78 percent of the total forest area owned privately) and North and Central America (55 percent). In Africa, in contrast, local, tribal and indigenous communities accounted for 85 percent of the total privately owned forest area. Insufficient data were available to derive findings for the other regions. It is worth mentioning, however, that three countries and territories in Oceania – American Samoa, Niue and Vanuatu – reported that 100 percent of their forest area was owned privately; the share owned by local, tribal and indigenous communities amounted to 100 percent in Niue and Vanuatu and 99 percent in American Samoa.

### TRENDS

FRA 2020 received complete time-series data on the area of forest in the three types of private ownership from 109 countries and territories representing 50 percent of the world's forest. For these countries and territories, the share of forest area by private-ownership category was reasonably stable over the period. Globally, the proportion of privately owned forest declined between 1990 and 2015, from 55 percent to 54 percent for individuals and from 27 percent to 26 percent for local, tribal and indigenous communities, but it increased over the period for business entities and institutions, from 18 percent to 20 percent (Figure 37).

**TABLE 68.** Area of forest in three types of private ownership, by region, 2015

| Region                    | Data availability          |                        | Forest ownership (1 000 ha) |           |                                    |           |  |           |
|---------------------------|----------------------------|------------------------|-----------------------------|-----------|------------------------------------|-----------|--|-----------|
|                           | No. of reporting countries | % of total forest area | Individuals                 |           | Business entities and institutions |           | Local, tribal and indigenous communities |           |
|                           |                            |                        | 1 000 ha                    | %         | 1 000 ha                           | %         | 1 000 ha                                 | %         |
| Africa                    | 32                         | 71                     | 824                         | 4         | 1 978                              | 11        | 15 599                                   | 85        |
| Asia                      | 31                         | 29                     | 7 196                       | 56        | 1 742                              | 14        | 3 900                                    | 30        |
| Europe                    | 28                         | 92                     | 50 946                      | 78        | 11 691                             | 18        | 2 535                                    | 4         |
| North and Central America | 12                         | 51                     | 129 468                     | 55        | 59 723                             | 25        | 45 579                                   | 19        |
| Oceania                   | 9                          | 21                     | 160                         | 0         | 0                                  | 0         | 37 551                                   | 100       |
| South America             | 3                          | 8                      | 0                           | 0         | 144                                | 4         | 3 491                                    | 96        |
| <b>WORLD</b>              | <b>115</b>                 | <b>50</b>              | <b>188 592</b>              | <b>51</b> | <b>75 279</b>                      | <b>20</b> | <b>108 655</b>                           | <b>29</b> |

The situation in North and Central America mirrored the global trend. In Africa, the proportion of the private forest area held by individuals increased from 3 percent in 1990 to 4 percent in 2015, and the proportion owned by business entities and institutions increased from 9 percent to 11 percent. Ownership by local, indigenous and tribal communities decreased from 88 percent to 85 percent over the period.

In Europe, the share of privately owned forest area decreased between 1990 and 2015, from 79 percent to 78 percent for individuals and from 19 percent to 18 percent for business entities and institutions, but it increased for local, tribal and indigenous communities, from 3 percent to 4 percent.

Insufficient data were available to derive findings for the other regions.

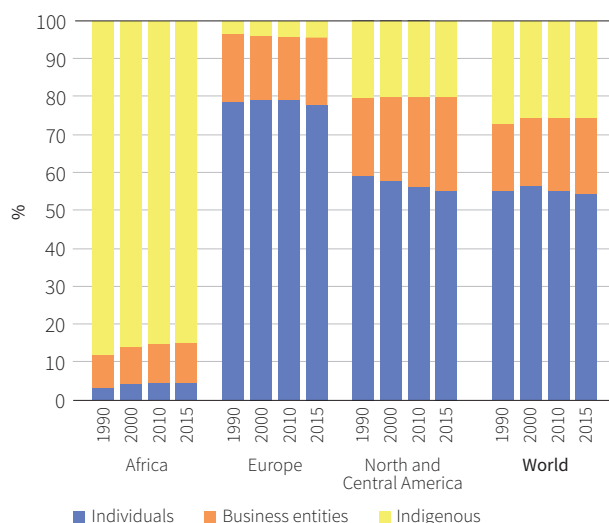
## Holders of management rights in publicly owned forests

### STATUS

FRA 2020 received information on the holders of management rights in public forests in 2015 from 147 countries and territories accounting for 85 percent of the total forest area.

Globally, public administrations held 83 percent of management rights in publicly owned forests in 2015, business entities and institutions held 13 percent, and local, tribal and indigenous communities held 2 percent (Table 69).

FIGURE 37. Proportion of total private forest area, by ownership type and region, 1990–2015



The share of public forest managed by individuals was only 0.1 percent, and the identity of the holders of management rights was unknown or “other” for the remaining 1.7 percent. Public administrations were the predominant rights holders in all regions (Figure 38); they were especially larger holders in South America and Europe, where they accounted for 97 percent and 72 percent of the public forest area, respectively.

Business entities and institutions held management rights in 27 percent of the publicly owned forest area in Europe in 2015, the highest proportion of any of the regions. Management rights were more commonly held by local, tribal and indigenous communities than by business

TABLE 69. Holders of management rights to public forests, by region, 2015

| Region                    | Data availability          |                        | Management rights (1 000 ha) |           |              |      |                   |           |               |            |               |          |
|---------------------------|----------------------------|------------------------|------------------------------|-----------|--------------|------|-------------------|-----------|---------------|------------|---------------|----------|
|                           | No. of reporting countries | % of total forest area | Public administration        |           | Individuals  |      | Business entities |           | Indigenous    |            | Unknown/other |          |
|                           |                            |                        | 1 000 ha                     | %         | 1 000 ha     | %    | 1 000 ha          | %         | 1 000 ha      | %          | 1 000 ha      | %        |
| Africa                    | 37                         | 81                     | 378 849                      | 88        | 0            | 0    | 41 485            | 10        | 7 104         | 1.7        | 844           | n.s.     |
| Asia                      | 33                         | 87                     | 323 232                      | 82        | 45           | n.s. | 1 275             | n.s.      | 30 245        | 7.7        | 40 052        | 10       |
| Europe                    | 35                         | 95                     | 641 273                      | 72        | 1            | n.s. | 244 003           | 27        | 1 324         | 0.1        | 809           | n.s.     |
| North and Central America | 17                         | 88                     | 389 302                      | 86        | 202          | n.s. | 54 882            | 12        | 5 570         | 1.2        | 2 956         | 1        |
| Oceania                   | 15                         | 28                     | 6 728                        | 96        | 0            | 0    | 278               | 4         | 0             | 0.0        | 0             | 0        |
| South America             | 10                         | 84                     | 435 192                      | 97        | 2 014        | n.s. | 5 925             | 1         | 7 173         | 1.6        | 3             | n.s.     |
| <b>WORLD</b>              | <b>147</b>                 | <b>85</b>              | <b>2 174 576</b>             | <b>83</b> | <b>2 263</b> | n.s. | <b>347 848</b>    | <b>13</b> | <b>51 416</b> | <b>2.0</b> | <b>44 664</b> | <b>2</b> |

Note: n.s. = not significant.

FIGURE 38. Proportion of total publicly owned forest area, by holder of management rights and region, 2015

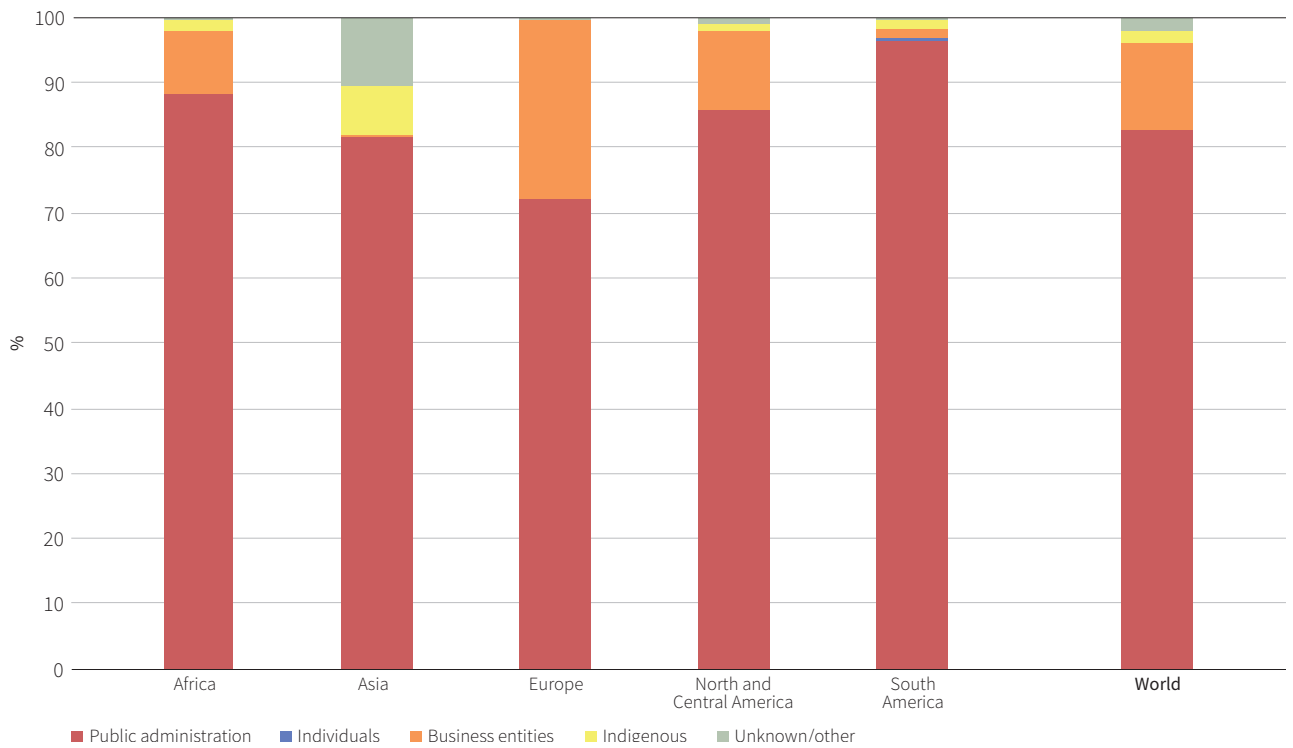
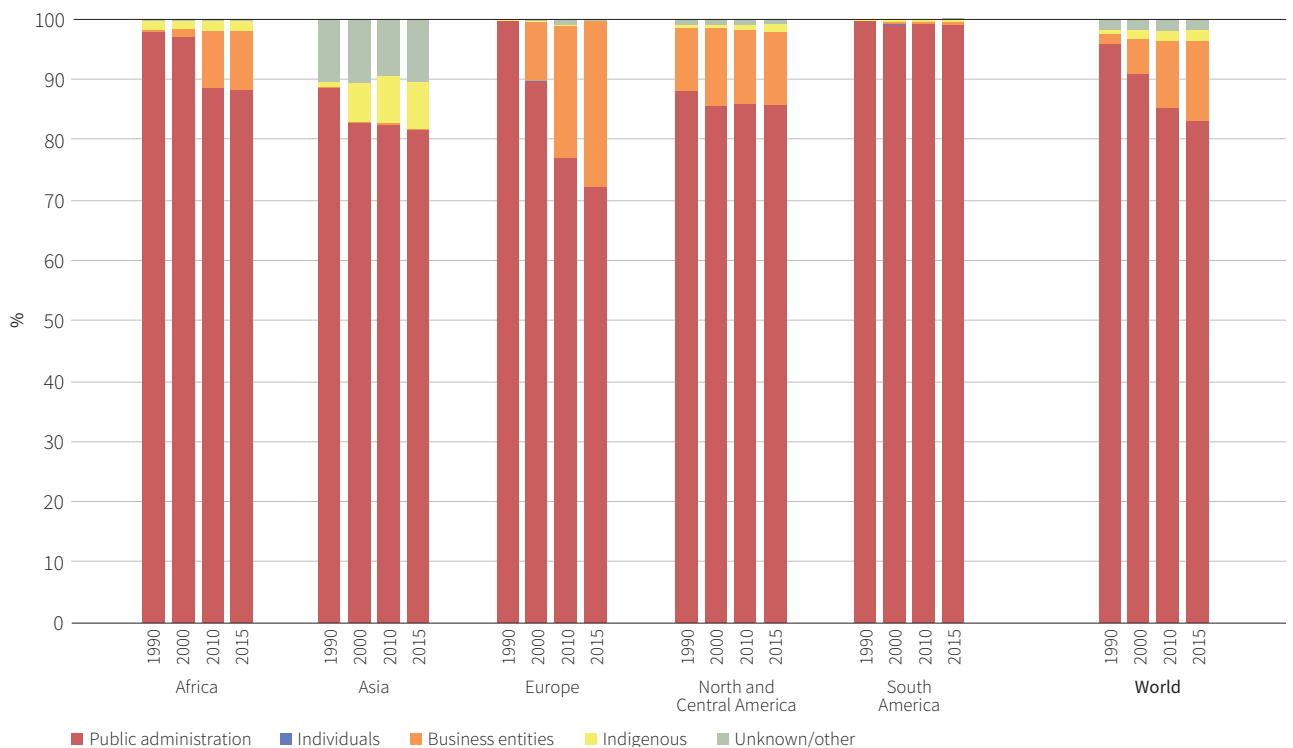


FIGURE 39. Proportion of total area of publicly owned forests, by holder of management rights and region, 1990–2015



entities and institutions in Asia and South America, at 8 percent and 2 percent, respectively. Insufficient data were available to derive meaningful findings for Oceania.

## TRENDS

FRA 2020 received time-series data on the allocation of management rights in public forests from 136 countries and territories representing 83 percent of the world's forest area.

The proportion of management rights to publicly owned forest held by public administrations globally decreased from 96 percent in 1990 to 83 percent in 2015, and the proportion held by business entities and institutions grew from 2 percent to 13 percent. The share held by local, tribal and indigenous communities increased from 1 percent to 2 percent (Figure 39).

The share of publicly owned forest managed by public administrations decreased in all regions between 1990 and 2015 and particularly in Europe, where the share dropped from 100 percent in 1990 to 72 percent in 2015. There was an increase in the allocation of public-forest management rights to business entities and institutions, from 0 percent in 1990 to 28 percent in 2015. This shift was due largely to the Russian Federation, where the area of publicly owned forest managed by the private sector increased from zero in 1990 to 244 million ha in 2015.

In Oceania, there was only a minor decrease in the share of public forest managed by public administrations between 1990 and 2015. In Africa, the proportion of publicly owned forest managed by public administrations declined from 98 percent in 1990 to 88 percent in 2015. There was a corresponding increase in the proportion managed by business entities and institutions, from 0 percent to 10 percent.

In Asia, the area of public forest managed by public administrations decreased and the area managed by local, tribal and indigenous communities increased, due largely to India and the implementation of joint forest management (a participatory management regime involving the government and local communities in the regeneration and management of degraded forests). The forest area managed by local, tribal and indigenous communities in India increased from zero in 1990 to about 25 million ha in 2015.

In North and Central America, there was a decrease in the area of forest managed by public administrations, and there were slight increases in the area managed by business entities and institutions and by local, tribal and indigenous communities.











# F

orests are subject to many disturbances that can adversely affect their health and vitality, reduce their capacity to provide a full range of goods and services, and cause tree mortality.

For FRA 2020, countries were requested to report on the forest area affected annually by disturbances, defined as any biotic or abiotic factor adversely affecting the vigour and productivity of the forest that is not a direct result of human activities. Specifically, countries were asked to report on the area of forest affected by insects, disease (caused by bacteria, fungi, phytoplasma or viruses) and severe weather events (e.g. snow, storms or drought) in the period 2000–2017. Reporting on the various categories of disturbances was exclusive and required that only the additional area of forest affected in a given year was reported (and not the cumulative total).

The baseline for reporting status was 2015, for which most data were available. The periods used for the analysis

of trends varied depending on the availability of data for the given disturbance category. Overall, however, relatively few data were available for this parameter and it was not possible, therefore, to accurately estimate the total forest area affected by disturbances globally (e.g. some countries that reported on one category of disturbance did not necessarily report on others). Moreover, although it may be easiest to report on this parameter on an annual basis, this approach has the disadvantage of not fully reflecting the magnitude of an outbreak (in the case of pests and diseases). For future FRAs, therefore, further discussion is warranted on how best to obtain and analyse data and whether more information is needed to properly assess this parameter.

In addition to the disturbances listed above, FRA 2020 includes analyses of forest fire (Box 7) and forest degradation (Box 8, p. 95).

## Box 7. Fire

Humans have used fire as a management tool for millennia, for example to improve hunting conditions, favour plants used for food or fibre, clear vegetation for agriculture and grazing, facilitate travel and control pests. Fires contribute to the maintenance of some ecosystems, such as savannas, and less-frequent fires in temperate and boreal ecosystems help create habitat mosaics of various ages and stages of regeneration. More or less fire in an ecosystem may change the species mix, habitat structure and biodiversity.<sup>20</sup>

Nearly all disastrous wildfires are associated with extreme fire-danger conditions driven by meteorological factors such

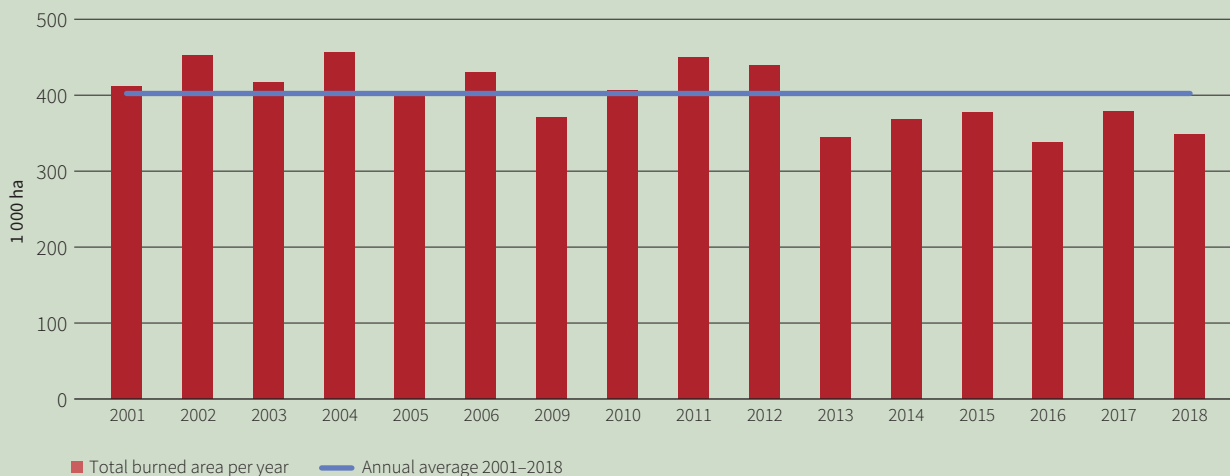
as a lack of precipitation, high wind speeds, low humidity and high temperatures.

Wildfires continue to have significant impacts globally, causing the loss of, among other things, human life, built assets, biodiversity, habitat, production and productivity; the degradation of landscapes; and the disruption of livelihoods. Recent damaging fire events associated with heat waves and droughts include those in the Amazon (where weather conditions hastened fire spread) and the Arctic in 2019; Australia in 2009 and 2019/20; Canada in 2016; Chile in 2017;

(Continued)

<sup>20</sup> The findings on fire presented in this box are based mainly on the Global Wildfire Information System (Artes *et al.*, 2019) prepared by the Joint Research Centre of the European Commission, the Moderate-Resolution Imaging Spectroradiometer (MODIS) Collection 6 burned-area product (Giglio *et al.*, 2018) and the Global Forest Change product (Hansen *et al.*, 2013). Data on fire from FRA country reports, which were insufficient to produce global statistics, were used to estimate the proportion of burned area by ecological domain and compared with some of the results obtained from the aforementioned remote sensing products.

Figure 40. Global total land area burned per year, 2001–2018



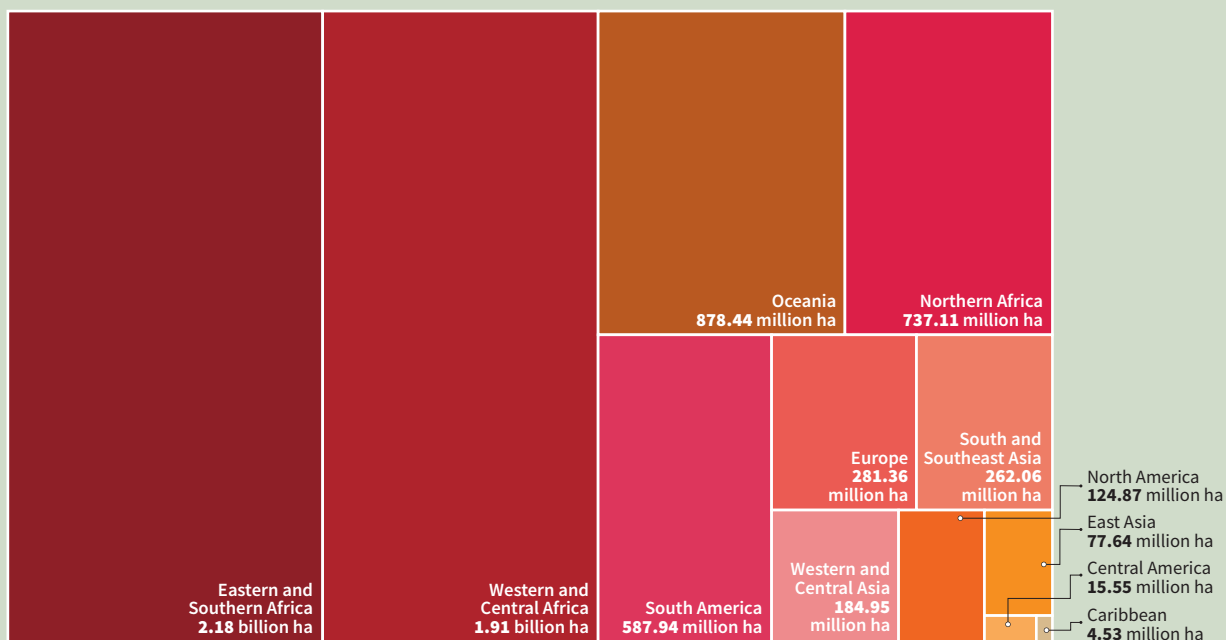
Greece in 2007 and 2018; Indonesia in 2019; Portugal in 2003, 2005 and 2017; the Russian Federation in 2010; and the United States of America in 2013, 2017, 2018 and 2019.

An estimated 90 percent of fires are readily contained and contribute to 10 percent or less of the total area burned. The other approximately 90 percent of the area affected by fire is burned by 5–10 percent of fires. Some wildfires

exceed the limits of suppression and are therefore uncontrollable.

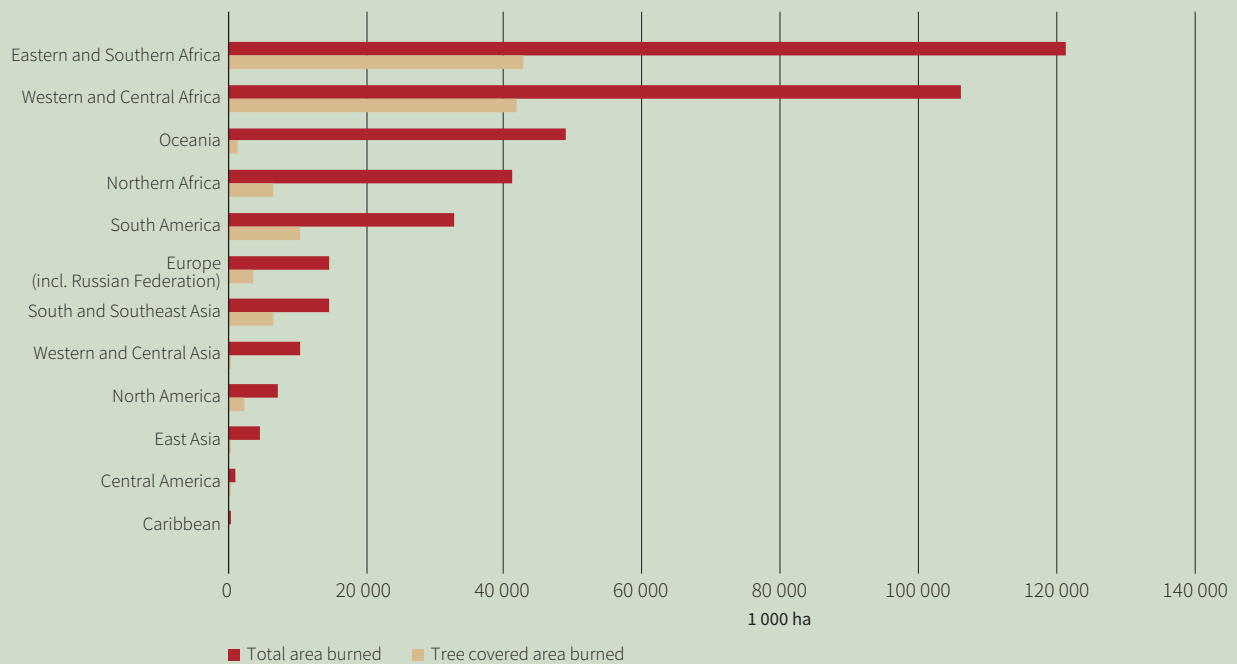
An estimated 7.20 billion ha of land (i.e. not limited to forests) was burned in 2001–2018 at an average of just more than 400 million ha per year, according to data prepared by the Joint Research Centre of the European Commission (Artes *et al.*, 2019). There was no clear overall trend, although Figure 40

Figure 41. Total land area burned in 2001–2018, by region or subregion



(Continued)

Figure 42. Annual average land area burned between 2001 and 2018, by region or subregion



shows that the land area burned between 2013 and 2018 was less than the long-term average.

More than two-thirds of the wildfires in 2001–2018 were in Africa. Globally, the largest areas burned were in the subregions of Eastern and Southern Africa, Western and Central Africa, Oceania (mainly Australia), Northern Africa and South America, all exceeding 500 million ha over the period (Figure 41). Notably, Western and Central Africa and Eastern and Southern Africa both averaged more than 100 million ha per year over the period (Figure 42).

The area burned does not always reflect damage or loss, particularly in forests. South America, Northern Africa, Oceania (mainly Australia), Western and Central Africa and Eastern and Southern Africa all have large areas of savanna and grassland, much of which burns cyclically and where fire is an ecological influence.

FAO analysed wildfires in tree-covered areas to obtain a better understanding of global fire dynamics. The analysis, which spanned 2001–2019, used a combination of Moderate-Resolution Imaging Spectroradiometer (MODIS) “burned area collection 6” product and tree-cover information (using a tree-cover threshold of 30 percent) from the Global Forest Change product (Hansen *et al.*, 2013). Note, however, that this analysis is subject to the issues described in Box 4 and Box 5 and should be interpreted with caution.

According to the analysis, 78 percent of burned areas in tree-covered areas between 2001 and 2019 were in Africa (only 5 percent of this area was in Northern Africa).

On average, tree-covered areas accounted for about 29 percent of the total area burned by wildfires between 2001 and 2018 (Table 70), ranging from a low of 23 percent to a high of 34 percent. The largest area of tree-covered land as a proportion of the total wildfire area was in Central America (47 percent), followed by South and Southeast Asia (44 percent). These findings are comparable with data collected for FRA 2020 indicating that 98 million ha of forest, or 3 percent of global forest area, was affected by fire in 2015, which was 26 percent of the total burned area reported by Artes *et al.* (2019) in that year. The fires occurred mainly in the tropics, where they affected about 4 percent of the forest area (Table 71).

Many scientists, fire managers and fire management agencies consider that wildlands face increasingly difficult fire weather conditions, extended fire seasons and larger fires influenced by climate change (e.g. Bowman *et al.*, 2017; IUFRO, 2018; Jolly *et al.*, 2015; Sankey, 2018; San Miguel *et al.*, 2017). Estimates for Europe indicate a potential increase of annual burned area of 120–270 percent above the average in 2000–2010 by 2090 (IUFRO, 2018). Ongoing changes in global fire activity in terms of location, intensity, severity and

(Continued)

## Box 7. (Continued)

**TABLE 70.** Proportion of tree-covered burned area in total wildfire area, by region or subregion, 2001–2018

| Region/subregion            | Share of tree-covered burned area in total wildfire (%) |
|-----------------------------|---|
| Eastern and Southern Africa | 35  |
| Northern Africa             | 16  |
| Western and Central Africa  | 39  |
| East Asia                   | 8   |
| South and Southeast Asia    | 44  |
| Western and Central Asia    | 0   |
| Europe                      | 25  |
| Caribbean                   | 19  |
| Central America             | 47  |
| North America               | 31  |
| South America               | 30  |
| Oceania                     | 2   |
| <b>WORLD</b>                | <b>29</b>   |

**TABLE 71.** Country-reported burned area, by ecological domain, 2015

| Ecological domain | Forest area affected by fire in 2015 (1 000 ha) | % of forest area |
|-------------------|---|------------------|
| Tropical          | 72 860  | 4                |
| Subtropical       | 9 760   | 2                |
| Temperate         | 9 390   | 1                |
| Boreal            | 6 030   | 1                |
| <b>TOTAL</b>      | <b>98 040</b>                                   | <b>3</b>         |

frequency will likely have immense costs in terms of biodiversity, ecosystem services, human well-being, livelihoods and national economies.

Reliable time-series data on the area of forest burned are needed to better understand trends in wildland and forest fires. Systems for monitoring the area subject to fire could be a starting point for more intensive analyses leading to appropriate intersections with other datasets such as forest cover and their validation at the country level for future FRAs.

## Insects

### STATUS

Sixty-two countries representing 52 percent of the world's forest area reported on the area of forest affected by insects in 2015. The total area affected was 30.2 million ha, which was 1.4 percent of the total forest area of the reporting countries (Table 72). The most comprehensive reporting was in North and Central America (98 percent of the region's forest area), followed by Europe (95 percent) and Asia (47 percent).

The region with the largest forest area affected by insects in 2015 was North and Central America, at 20.4 million ha. The largest proportion of forest area disturbed by insects was in Asia: the 8.74 million ha affected in that region accounted for 3.0 percent of the total forest area of the reporting countries.

An estimated 524 000 ha of forest was disturbed by insects in Europe in 2015, which was 0.1 percent of the forest area of reporting countries.

On average, the forest area affected by insects in reporting countries was less than 2 percent in 2015. Nevertheless, ten countries reported that more than 2 percent of their forest area was so affected; the highest percentages were in the Republic of Moldova, at 19 percent,

Uruguay, at 7 percent (although data were available only for planted forests) and Honduras, at 6 percent.

### TRENDS

Thirty-six countries and territories, accounting for 25 percent of the world's forest area, reported complete time-series data for the forest area disturbed annually by insects in 2000–2017. Given the low reporting and limited representativeness of the sample, the analysis of trends was confined to 2002–2016, a period with a relatively high percentage of reporting.

The average annual area affected by insects over the period was 29.1 million ha (in 44 countries representing 47 percent of the world's forest area (Table 73). The lowest area affected in any given year was 23.7 million ha in 2011 and the highest was 35.3 million ha in 2013.

In the analysed period, reporting was highest in North and Central America (with reporting countries representing 98 percent of the region's total forest area), followed by Europe (86 percent) and Asia (45 percent). Oceania and Africa had the lowest reporting, at 5 percent and 4 percent, respectively, and no complete time series was available for any of the countries in South America.

Of the three regions with the most comprehensive reporting, there was greater variability in the area affected

**TABLE 72. Forest area affected by insects, by region, 2015**

| Region                    | Data availability          |                        | Forest affected by insects |                  |
|---------------------------|----------------------------|------------------------|----------------------------|------------------|
|                           | No. of reporting countries | % of total forest area | Area (1 000 ha)            | % of forest area |
| Africa                    | 6                          | 7                      | 436                        | 1.0              |
| Asia                      | 11                         | 47                     | 8 743                      | 3.0              |
| Europe                    | 30                         | 95                     | 524                        | 0.1              |
| North and Central America | 9                          | 98                     | 20 381                     | 2.7              |
| Oceania                   | 3                          | 5                      | 1.0                        | n.s.             |
| South America             | 3                          | 7                      | 130                        | 0.2              |
| <b>WORLD</b>              | <b>62</b>                  | <b>52</b>              | <b>30 215</b>              | <b>1.4</b>       |

Note: n.s. = not significant.

**TABLE 73. Forest area disturbed by insects annually, by region, 2002–2016**

| Region                    | Data availability          |                        | Forest area affected annually (1 000 ha) |               |               |
|---------------------------|----------------------------|------------------------|--|---------------|---------------|
|                           | No. of reporting countries | % of total forest area | Maximum                                  | Minimum       | Average       |
| Africa                    | 5                          | 4                      | 50                                       | 16            | 37            |
| Asia                      | 8                          | 45                     | 9 244                                    | 7 162         | 8 419         |
| Europe                    | 20                         | 86                     | 1 385                                    | 256           | 506           |
| North and Central America | 7                          | 98                     | 25 903                                   | 14 656        | 20 146        |
| Oceania                   | 3                          | 5                      | 40                                       | 1.0           | 12            |
| <b>WORLD</b>              | <b>44</b>                  | <b>47</b>              | <b>35 277</b>                            | <b>23 736</b> | <b>29 119</b> |

Note: No countries or territories in South America provided complete time series for the analysed period.

by insects in North and Central America, where an average of 20.1 million ha was affected annually, ranging from 14.7 million ha in 2011 to 25.9 million ha in 2013. The peak in 2013 was due to a massive attack in Canada of defoliator insects, mainly the forest tent caterpillar. According to Canada's country report, forest tent caterpillar outbreaks follow a well-established pattern of occurrence about every 11 years; comparable peaks in the area defoliated by this insect were observed in 1990–1991 and 2000–2001. The average area affected by insects in Europe in 2002–2016 was 506 000 ha per year and the average in Asia was 8.42 million ha per year.

## Diseases

### STATUS

Fifty-one countries representing 42 percent of the total forest area reported data on the area of forest affected by disease in 2015. The total area so affected was 6.60 million ha, which was 0.4 percent of the forest area of the reporting countries (Table 74). The most data on this parameter was for Europe, where the reporting countries represented 96

percent of the region's forest area, followed by North and Central America (50 percent) and Asia (38 percent).

North and Central America reported the largest area of forest affected by disease in 2015, at 3.75 million ha (1 percent of the forest area of the region's reporting countries), followed by Asia and Europe.

### TRENDS

Thirty countries and territories, representing 24 percent of the forest area, reported complete time-series data for the forest area affected by disease in 2000–2017. More comprehensive reporting was available for 2002–2017, with data provided by 33 countries representing 37 percent of the world's forest area. Coverage in this period was highest in Europe, with reporting countries accounting for 86 percent of the region's forest area, followed by North and Central America (50 percent), Asia (38 percent), Oceania (5 percent) and Africa (3 percent); no countries or territories in South America provided complete time series for the analysed period.

The average forest area affected by disease in reporting countries in 2002–2017 was 4.76 million ha, with a low of

**TABLE 74. Forest area affected by disease, by region, 2015**

| Region                    | Data availability          |                        | Forest affected by disease |                  |
|---------------------------|----------------------------|------------------------|----------------------------|------------------|
|                           | No. of reporting countries | % of total forest area | Area (1 000 ha)            | % of forest area |
| Africa                    | 4                          | 6                      | 301                        | 0.8              |
| Asia                      | 5                          | 38                     | 1 409                      | 0.6              |
| Europe                    | 32                         | 96                     | 821                        | 0.1              |
| North and Central America | 4                          | 50                     | 3 751                      | 1.0              |
| Oceania                   | 3                          | 5                      | 62                         | 0.6              |
| South America             | 3                          | 7                      | 259                        | 0.4              |
| <b>WORLD</b>              | <b>51</b>                  | <b>42</b>              | <b>6 603</b>               | <b>0.4</b>       |

**TABLE 75. Forest area affected annually by disease, by region, 2002–2017**

| Region                    | Data availability          |                        | Forest area affected annually (1 000 ha) |              |              |
|---------------------------|----------------------------|------------------------|--|--------------|--------------|
|                           | No. of reporting countries | % of total forest area | Maximum                                  | Minimum      | Average      |
| Africa                    | 2                          | 3                      | 1.1                                      | 0.1          | 0.4          |
| Asia                      | 4                          | 38                     | 1 393                                    | 763          | 1 152        |
| Europe                    | 19                         | 86                     | 383                                      | 153          | 250          |
| North and Central America | 4                          | 50                     | 5 129                                    | 877          | 3 257        |
| Oceania                   | 3                          | 5                      | 335                                      | 1.0          | 97           |
| <b>WORLD</b>              | <b>33</b>                  | <b>37</b>              | <b>6 629</b>                             | <b>2 177</b> | <b>4 757</b> |

*Note:* No countries or territories in South America provided complete time series for the analysed period.

2.18 million ha in 2002 and a high of 6.63 million ha in 2011 (Table 75).

Of the three regions with the highest reporting, North and Central America had the highest variability in the area affected by disease, with a low of 877 000 ha in 2002, a high of 5.13 million ha in 2011 and an average of 3.26 million ha. The area of forest affected by disease was relatively stable over the period in Asia and Europe.

## Severe weather events

### STATUS

Forty-eight countries and territories representing 37 percent of the total forest area reported data on the area of forest affected by severe weather events in 2015. The total area affected was 3.83 million ha, which was 0.3 percent of the forest area of the reporting countries.

The most comprehensive reporting of the forest area disturbed by severe weather events was in Europe (95 percent of the region's forest area), followed by North and Central America (50 percent); reporting was below 10 percent in the other regions.

Among the regions, North and Central America reported the largest area of forest affected by severe weather events in 2015, at 2.08 million ha (0.5 percent of the forest area of reporting countries in the region). The second-largest area was in Europe, at 866 000 ha (0.1 percent) (Table 76).

### TRENDS

Thirty-two countries and territories representing 24 percent of the world's forest area reported annual data on the area of forest affected by severe weather events in 2000–2017. The analysis presented here is for 2002–2015, with data for 37 countries and territories representing 33 percent of the world's forest area. Reporting was highest in Europe, with reporting countries accounting for 87 percent of the region's forest area, followed by North and Central America (50 percent), Asia (8 percent) Oceania (5 percent) and Africa (3 percent). No countries or territories in South America provided complete time series for the analysed period.

The average forest area affected by severe weather events globally over the period was 5.96 million ha, with a high of 9.38 million ha in 2006 and a low of 2.79 million ha in 2015 (Table 77).



**TABLE 76. Forest area affected by severe weather events, by region, 2015**

| Region                    | Data availability          |                        | Forest affected by severe weather events |            |
|---------------------------|----------------------------|------------------------|--|------------|
|                           | No. of reporting countries | % of total forest area | Area (1 000 ha)                          | %          |
| Africa                    | 6                          | 6                      | 415                                      | 1.1        |
| Asia                      | 4                          | 8                      | 310                                      | 0.6        |
| Europe                    | 28                         | 95                     | 866                                      | 0.1        |
| North and Central America | 4                          | 50                     | 2 076                                    | 0.5        |
| Oceania                   | 3                          | 5                      | n.s.                                     | n.s.       |
| South America             | 3                          | 7                      | 160                                      | 0.3        |
| <b>WORLD</b>              | <b>48</b>                  | <b>37</b>              | <b>3 828</b>                             | <b>0.3</b> |

Note: n.s. = not significant.

**TABLE 77. Forest area affected by severe weather events, by region, 2002–2015**

| Region                    | Data availability          |                        | Forest area affected severe weather events (1 000 ha) |              |              |
|---------------------------|----------------------------|------------------------|---|--------------|--------------|
|                           | No. of reporting countries | % of total forest area | Maximum   | Minimum      | Average      |
| Africa                    | 5                          | 3                      | 22  | 1.1          | 6.6          |
| Asia                      | 4                          | 8                      | 461   | 23           | 139          |
| Europe                    | 20                         | 87                     | 784   | 230          | 332          |
| North and Central America | 4                          | 50                     | 9 081   | 2 076        | 5 481        |
| Oceania                   | 3                          | 5                      | 43  | 0.0          | 4.0          |
| <b>WORLD</b>              | <b>37</b>                  | <b>33</b>              | <b>9 381</b>  | <b>2 790</b> | <b>5 962</b> |

Note: No countries or territories in South America provided complete time series for the analysed period.

The area affected varied considerably over time, especially in North and Central America, where it ranged from a high of 9.08 million ha in 2006 to a low of 2.08 million ha in 2015; the annual average in that region was 5.48

million ha. In Europe, the highest yearly value was 784 000 ha in 2005, the lowest was 230 000 ha in 2006, and the annual average was 332 000 ha.

### Box 8. Forest degradation

Human activities, severe climatic events, fire, pests, diseases and other environmental disturbances may degrade forests and thereby reduce the provision of forest goods and services, biodiversity values, productivity and health. Forest degradation may also negatively affect other land uses (e.g. by causing a loss of downstream water quality) and cause the emission of greenhouse gases. Monitoring changes in forest quality, therefore, is an essential part of sustainable forest management.

The Global Forest Resources Assessment (FRA) 2020 collected information on degraded forests as part of

the reporting process. For the first time, FRA requested countries to indicate whether they monitored forest degradation and, if so, to provide the definition of degraded forest they used and a brief description of the monitoring process and results.

Fifty-eight countries, representing 38 percent of the global forest area, reported that they monitor the area of degraded forest (Table 78). Almost one-third of the reporting countries were in Africa, and they represented 28 percent of that region's forest area. Reporting was most comprehensive in South America, where the

(Continued)

Box 8. (Continued)

reporting countries accounted for 79 percent of the region's forest area. Seventy-two percent of the forest area of reporting countries was in the tropical climatic domain; the boreal forest domain, in contrast, accounted for only 4 percent (Figure 43).

Countries use various definitions of degraded forest and it is infeasible, therefore, to aggregate and compare data on forest area at the regional and global levels. Most definitions are based mainly on the presence of forest disturbances. Some countries specify the type of disturbance (mostly anthropogenic factors such as logging and fire) and others are more generic.

Other criteria commonly used by countries in their definitions of degraded forest include change in forest structure (including decrease in forest canopy) and loss of productivity and forest goods (Figure 44). Few countries apply quantitative criteria in their definitions.

Field inventories and observations are the most commonly used methods for monitoring and assessing the area of degraded forest, followed by remote sensing and mapping (Figure 45). The low number of reporting countries and the overall lack of data on degraded forests is explained partly by the difficulty of assessing degraded forest areas and a lack of available tools and methods. Nevertheless, many countries have started monitoring forest degradation in recent years.

Figure 43. Proportion of total forest area of countries reporting on forest degradation, by climatic domain

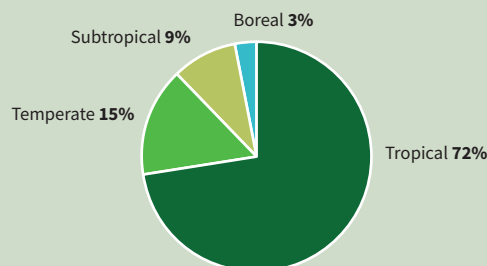
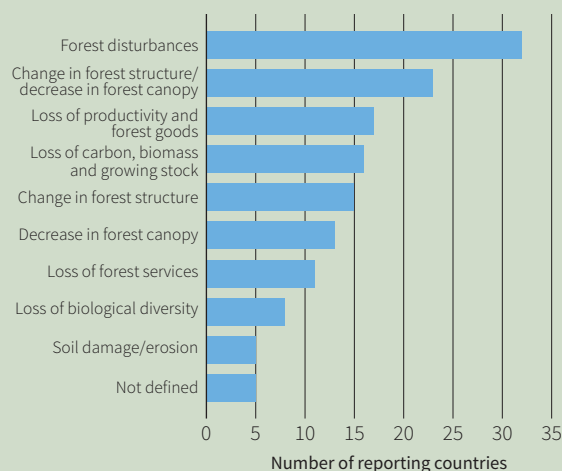


Figure 44. Criteria used in national definitions of degraded forest

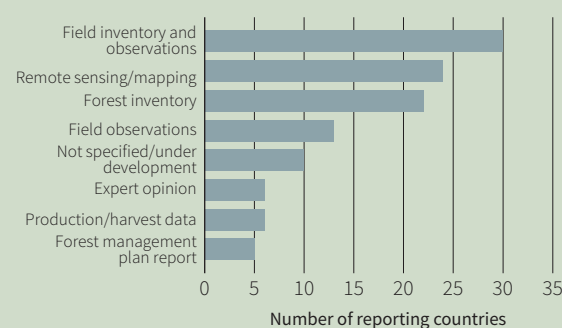


Note: Many countries use several criteria in their definitions of degraded forest.

TABLE 78. Number and forest area of countries reporting on forest degradation, by region

| Region                    | No. of reporting countries | Forest area of reporting countries (1000 ha) | % of total forest area |
|---------------------------|----------------------------|--|------------------------|
| Africa                    | 18                         | 178 226                                      | 28                     |
| Asia                      | 16                         | 271 887                                      | 44                     |
| Europe                    | 7                          | 18 063                                       | 2                      |
| North and Central America | 6                          | 383 297                                      | 51                     |
| Oceania                   | 3                          | 39 519                                       | 21                     |
| South America             | 8                          | 663 849                                      | 79                     |
| <b>WORLD</b>              | <b>58</b>                  | <b>1 554 841</b>                             | <b>38</b>              |

Figure 45. Methods applied by countries for monitoring degraded forest



Note: Some countries use a combination of methods to monitor their degraded forests.



# 8 Policies and legislation



# M

any countries have developed policies and laws designed to promote the sustainable and multipurpose use of forests and trees.

Such policies and laws serve as a foundation for sustainable forest management by, for example, promoting legal timber trade, involving stakeholders in forest management, addressing forest tenure and providing incentives.

The findings of FRA 2020 presented in this chapter show that most countries – encompassing the large majority of the world’s forests – have formalized the principles of sustainable forest management in forest-related policies and laws. The existence of such policies and basic legislation, however, does not, on its own, ensure sustainable forest management; other possible indicators include the existence of specialized legislation on forest use; systems for ensuring the legality of timber trade; traceability systems for wood products; appropriate capacities in relevant institutions; and mechanisms for involving stakeholders in forest-related decision-making processes and supervision.

## Findings

FRA 2020 received information on forest policies in 2020 from 187 countries and territories representing 99 percent of the total forest area. Of these, 164 countries and territories (also representing about 99 percent of the total forest area) indicated that they have national forest policies. The large majority reported that they have national-level policy statements; only three countries reported that they have subnational statements but no national forest policy statement (or they did not report on the latter). Twenty-three countries and territories reported that they had no forest policy statement.

One hundred and seventy-two countries and territories representing 99 percent of the total forest area indicated that they have forest legislation. The other 64 countries and territories (representing 1 percent of the total forest area) did not report on this aspect or did not provide an

affirmative response on the presence of forest legislation. All but one of the countries that responded in the affirmative (i.e. 171 countries) indicated that they have specific forest-targeted legislation at the national level. Belgium reported that its forests are regulated through subnational but not national legislation.

A total of 142 countries and territories representing 95 percent of the total forest area reported that they have platforms to enable the participation of stakeholders in forest policy development; 40 countries and territories indicated that they do not have such a platform and 54 did not report. Of the 142 countries with platforms, 44 are in Africa, 29 are in Asia, 32 are in Europe and 17 are in North and Central America, and there are ten each in Oceania and South America. Only three countries (all in Europe) reported having subnational rather than national platforms to enable stakeholder participation in forest policy development.

Ninety-four countries and territories reported the existence of traceability systems for wood products<sup>21</sup> at the national level and another three (including the United States of America) reported that such systems exist at the subnational level; in total, these 97 countries and territories represent 84 percent of the total forest area. In South America, 13 of the 14 countries and territories that reported on this aspect indicated the existence of traceability systems for wood products. Wood-product traceability systems exist in 25 countries and territories in Europe (accounting for nearly 95 percent of the region’s forest area), 11 in North and Central America (91 percent), 32 in Africa (79 percent), 2 (Australia and Niue) in Oceania (72 percent), and 14 in Asia (48 percent).



<sup>21</sup> Traceability systems for wood products are defined here as systems that provide the ability to trace the origin, location and movement of wood products by means of recorded identifications. This involves two main aspects: 1) identification of the product by marking; and 2) the recording of data on the movement and location of a product all the way along the production, processing and distribution chain.



# 9 Employment and education





# E

mployment in the forest sector is an important indicator of the impact of forests on people, and it helps quantify the contribution of the sector to broader economic objectives. Employment provides income; because most forest activities occur in rural areas that are often poorer than average, this indicator helps in measuring the contribution of the forest sector to poverty alleviation. Data on forest-related education can indicate a country's capacity for, and commitment to, managing, conserving and enhancing forests and building institutional frameworks to promote sustainable forest management.

## Employment

FRA 2020 collected data on full-time-equivalent employment in the forestry and logging sector, as defined by the Industrial Classification of all Economic Activities (United Nations Statistics Division, 2008, p. 75):

**This division includes the production of roundwood for the forest-based manufacturing industries (ISIC [International Standard Industrial Classification] divisions 16 and 17) as well as the extraction and gathering of wild growing non-wood forest products. Besides the production of timber, forestry activities result in products that undergo little processing, such as fire wood, charcoal, wood chips and roundwood used in an unprocessed form (e.g. pit-props, pulpwood etc.). These activities can be carried out in natural or planted forests. It excludes employment in forest-based manufacturing industries (ISIC divisions 16 and 17).**

Countries were requested to report disaggregated data by gender, where available, for four reference years, based on the average of the following three-year periods: 1989–1991 for 1990; 1999–2001 for 2000; 2009–2011 for 2010; and 2014–2016 for 2015. Overall, the outcomes confirmed the need to improve the quality of employment data. Data collection on this indicator presents challenges in terms of definitions and methodologies; nevertheless, the data collected for FRA

2020 suggest an ongoing decreasing trend in employment in the forestry and logging sector.

An in-depth revision of the data-collection process, and collaboration with other global data providers such as the International Labour Organization, would help improve employment statistics.

### STATUS

FRA 2020 received information on employment in forestry and logging in 2015 from 136 countries representing 91 percent of the world's forests. Total employment in the forest sector was estimated at 12.5 million people (full-time equivalent) in 2015, almost 90 percent of whom were in Asia and Africa (Table 79). Asia accounted for more than 70 percent (8.90 million people employed) of total employment globally, led by India (6.23 million people employed) and China (1.15 million people).

Seventy-one countries representing 38 percent of the world's forests reported gender-disaggregated data. The total number of employees in forestry and logging in these countries in 2015 was estimated at 3.88 million, of whom 58 percent were male and 42 percent were female.

**TABLE 79. Number of people employed in forestry and logging, by region, 2015**

| Region                    | Data availability          |                        | No. of people employed (1 000 full-time equivalent) |
|---------------------------|----------------------------|------------------------|---|
|                           | No. of reporting countries | % of total forest area |   |
| Africa                    | 34                         | 62                     | 2 135   |
| Asia                      | 29                         | 94                     | 8 896   |
| Europe                    | 38                         | 99                     | 696   |
| North and Central America | 14                         | 98                     | 406   |
| Oceania                   | 10                         | 80                     | 28  |
| South America             | 11                         | 97                     | 332   |
| <b>WORLD</b>              | <b>136</b>                 | <b>91</b>              | <b>12 492</b>                                       |

**TABLE 80. Number of people employed in forestry and logging, by region, 1990–2015**

| Region                    | Data availability          |                        | No. of people employed (1 000 full-time equivalent) |               |               |               |
|---------------------------|----------------------------|------------------------|---|---------------|---------------|---------------|
|                           | No. of reporting countries | % of total forest area | 1990  | 2000          | 2010          | 2015          |
| Africa                    | 27                         | 54                     | 1 740   | 2 003         | 1 969         | 2 030         |
| Asia                      | 22                         | 84                     | 9 948   | 9 338         | 8 735         | 8 511         |
| Europe                    | 35                         | 99                     | 1 036   | 883           | 658           | 691           |
| North and Central America | 7                          | 88                     | 220   | 192           | 169           | 189           |
| Oceania                   | 4                          | 5                      | 6   | 9             | 9             | 9             |
| South America             | 9                          | 89                     | 251   | 252           | 341           | 301           |
| <b>WORLD</b>              | <b>104</b>                 | <b>81</b>              | <b>13 201</b>                                       | <b>12 677</b> | <b>11 881</b> | <b>11 730</b> |

### TRENDS

The number of people employed in forestry and logging decreased by 1.47 million between 1990 and 2015, although the rate of decrease slowed in the period 2010–2015; decreases occurred in all regions except Africa and South America (although insufficient data were available to determine employment trends in Oceania) (Table 80).

The decline in employment in Asia mainly reflected a steep decline in China, where the number of people employed more than halved between 1990 and 2015 (due partly to a partial logging ban in the late 1990s). The decline in employment in Europe was due to the restructuring of formerly centrally planned economies, which, in some countries, led to decreased production and lower employment. More generally, the privatization of forestry in Eastern Europe led to large increases in labour productivity and consequently to a decline in employment. Increases in employment in Africa and South America occurred partly because roundwood production grew faster than labour productivity.<sup>22</sup>

### Education

Education on forests will be crucial for enabling societies to address challenges such as climate change, energy demand, environmental degradation and biodiversity loss and to adapt to changing economic, social and environmental conditions. The forest managers of the future are likely to require a wide range of skills, such as in implementing integrated landscape approaches and participatory forest management, the adoption of new technologies, and managing the multifunctional roles of forests.

FRA 2020 sought data on the number of graduates in post-secondary education programmes with a focus on

forests and related subjects, disaggregated by gender and level of education. The collected data indicate an increase in the number of students graduating in forestry, including the strong involvement of women in forest education and progress towards gender parity.

### STATUS

FRA 2020 received information on forest education from 119 countries and territories representing 86 percent of the global forest area. Reporting varied considerably between regions: for example, the reporting countries represented 97 percent of the regional forest areas in Europe and North and Central America and 55 percent in Africa.

Globally, 331 000 students graduated in forestry in 2015 (Table 81), which is equivalent to 95 graduates per 1 million ha of forest. About 6 000 doctoral degrees were awarded in forestry in that year, as well as 28 200 master's degrees, 113 000 bachelor's degrees and 149 000 technical certificates. Most countries provided data for only a few levels of education; thus, the aggregated numbers at the global and regional levels are underestimated, particularly in Africa, Europe (where data by level of education were missing for the Russian Federation) and Oceania.

The largest number of graduated students in all forestry degrees combined was in Asia, with 194 000 graduated students in 2015 (Table 82), of whom the majority (60 percent) were graduates with technical certificates or diplomas. Asia also had by far the highest ratio of forestry graduates by forest area (at 336 forestry-graduated students per 1 million ha of forest). The number of graduated students in China accounted for 82 percent of the regional total.

The second-largest number of graduated students was in North and Central America, at 65 900, of whom the majority (53 percent) graduated with bachelor's degrees. The number of graduated students was low in Africa and Oceania, at least partly because of the relatively small number of countries reporting on this parameter.

<sup>22</sup> The explanations for employment trends in this paragraph draw on FAO (2008).

Women represented about 42 percent of all graduated forestry students in 2015, with some differences by education level. The proportion of women graduating in forestry in 2015 was highest in Oceania, at 63 percent, although the total number of graduates in that region was small. Women accounted for 50 percent of all graduates in North and Central America.

Males and females were represented almost equally in master's and bachelor's degrees (with women accounting for 48 percent in both), but women were underrepresented in doctoral degrees and technical certificates, at about one-third of graduated students. The proportion of women by education level varied notably between regions: for example, the lowest proportion of women graduating with doctoral degrees was 10 percent in Asia, and the highest was 47 percent in North and Central America. Europe had the lowest proportion of women in forestry education, at

23 percent, but the percentage of women in that region graduating with doctoral degrees was much higher than the global average, at 43 percent.

#### TRENDS

The countries and territories providing complete time-series data for one or more education category represent only about half the global forest area; therefore, the trends reported here should be treated with caution. Overall, there was a substantial increase in the number of graduated forestry students between 2000 and 2015, with the number more than doubling in all levels of education (Figure 46).

For those countries providing time series of gender-disaggregated data, the proportion of women graduating in forestry increased between 2000 and 2015 (Figure 47). This was true for all education levels, although the number of women graduating with doctoral degrees declined between

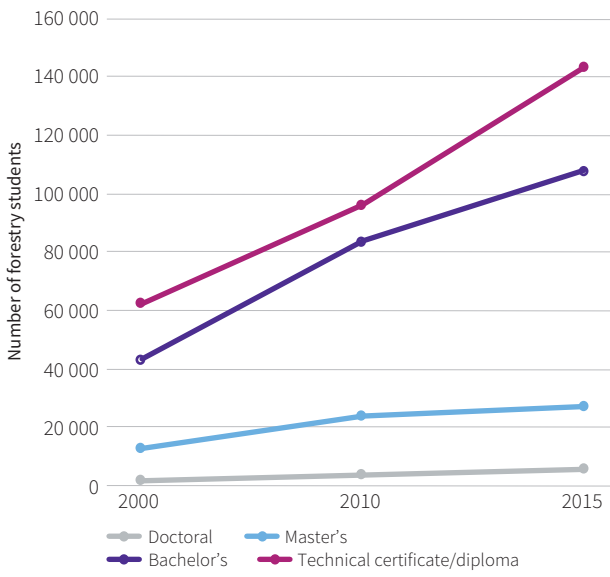
**TABLE 81.** Number of graduated students, by level of education, 2015

| Level of education               | Data availability          |                        | Graduated students     |           |
|----------------------------------|----------------------------|------------------------|------------------------|-----------|
|                                  | No. of reporting countries | % of total forest area | Total no. of graduates | % female  |
| Doctoral degree                  | 95                         | 59                     | 5 593                  | 33        |
| Master's degree or equivalent    | 104                        | 62                     | 28 210                 | 48        |
| Bachelor's degree or equivalent  | 105                        | 62                     | 112 631                | 48        |
| Technical certificate or diploma | 95                         | 47                     | 149 358                | 31        |
| Not specified                    | 2                          | 20                     | 35 120                 | 42        |
| <b>TOTAL GRADUATES</b>           |                            |                        | <b>330 912</b>         | <b>33</b> |

**TABLE 82.** Graduated students in forestry, by region and level of education, 2015

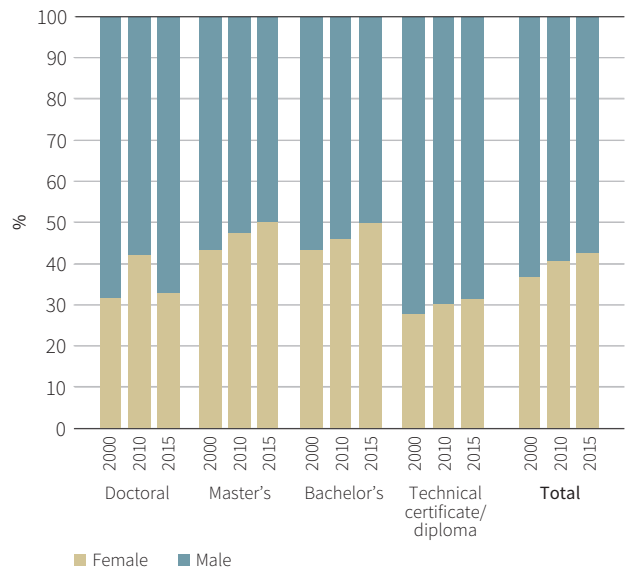
| Region                    | Doctoral degree | Master's degree or equivalent | Bachelor's degree or equivalent | Technical certificate or diploma | Not specified | Total number of graduates | No. of graduates per 1 million ha of forest | % female  |
|---------------------------|-----------------|-------------------------------|---------------------------------|----------------------------------|---------------|---------------------------|---|-----------|
| Africa                    | 86              | 766                           | 1 836                           | 3 035                            | 120           | 5 843                     | 17  | 30        |
| Asia                      | 2 002           | 12 618                        | 63 624                          | 115 379                          | –             | 193 623                   | 336   | 36        |
| Europe                    | 417             | 3 297                         | 6 705                           | 10 416                           | 35 000        | 55 835                    | 56  | 23        |
| North and Central America | 1 727           | 9 559                         | 34 709                          | 19 917                           | –             | 65 912                    | 91  | 50        |
| Oceania                   | 56              | 3                             | 58                              | 501                              | –             | 618                       | 4   | 63        |
| South America             | 1 305           | 1 967                         | 5 699                           | 110                              | –             | 9 081                     | 13  | 36        |
| <b>WORLD</b>              | <b>5 593</b>    | <b>28 210</b>                 | <b>112 631</b>                  | <b>149 358</b>                   | <b>35 120</b> | <b>330 912</b>            | <b>95</b>                                   | <b>42</b> |

**FIGURE 46.** Number of forestry students, by degree category, 2000–2015



2010 and 2015 after increasing substantially between 2000 and 2010. Women, therefore, are increasingly participating in forest-related education in many countries, but efforts may still be needed to achieve gender parity, especially for doctoral degrees and technical qualifications.

**FIGURE 47.** Proportion of female and male graduated forestry students, by education level, 2000–2015



10

Non-wood  
forest products  
removals  
and value



# F

orests provide a wide range of non-wood forest products (NWFPs), including foods, medicines, fodder, aromatic products, wild meat and honey. Most global statistical

compilations and reporting on the production, trade and consumption of forest products focus on wood products (Box 9, p. 111), and data collection on NWFPs has rarely been systematic, despite their considerable economic and social importance. There are two main reasons for this: NWFPs are largely the domain of the informal sector; and the range of NWFPs is highly diverse.

For FRA 2020, countries and territories were asked to identify the ten most important NWFPs, estimate the quantity of removals in 2015 and commercial values of marketed production, and provide information on key NWFP species. FRA 2020 defined NWFPs as “goods derived from forests that are tangible and physical objects of biological origin other than wood”; information was categorized according to product characteristics (i.e. plant- or animal-based) and end uses.<sup>23</sup>

Information on NWFPs is still poor: in addition to the reasons mentioned above, there is a lack of harmonization of definitions and difficulties associated with the collation and standardization of data from different sources.

Despite the scarcity of information, NWFPs are economically important in many countries and for large numbers of people. The collection of better data on NWFPs would help in determining their contributions to healthy diets, nature conservation, poverty alleviation, economic development and the SDGs and in ensuring their sustainable management. A starting point would be to improve the methods used for data collection and

<sup>23</sup> For FRA 2020, NWFPs were classified as either plant-based or animal-based. **Plant-based products** include food, fodder, raw material for medicine and aromatic products, raw material for colorants and dyes, raw material for handicrafts, utensils and construction, ornamental plants, exudates, and other plant products. **Animal-based products** comprised wild meat, honey and beeswax, hides, skins and trophies, living animals, raw material for medicine, raw material for colorants, other edible products and other non-edible products.

to increase statistical support for those countries lacking sufficient capacity to do so.

## COVERAGE

FRA 2020 received information on NWFPs from 124 countries and territories representing 73 percent of the global forest area. Information was provided by countries representing more than 75 percent of the forest area in all regions except Europe, where no data were forthcoming from the Russian Federation (Table 83).

Although countries and territories were asked to identify their ten commercially most important NWFPs for 2015, not all did so, with the average varying from five in North and Central America to eight in Africa and South America. Some countries identified more than ten such products, including Argentina (50 products), Brazil (37), Canada (which, in reporting on wild pelts, specified quantities and values for 24 species), and the Central African Republic (23).

## FOREST PRODUCT CATEGORIES OF MAJOR IMPORTANCE

NWFPs that constitute foods represent almost half of all NWFPs reported (Figure 48). They include edible non-animal products – fruits, vegetables, spices and mushrooms – as well as animal products such as honey, insects and wild meat.

Edible plant products are of considerable importance in Africa, with 77 percent of reporting countries providing information on these. Edible plant products are also important in other regions; for example, a huge diversity – such as nuts and many species of fruits, vegetables and spices – are marketed in Asia. European plant-based forest foods mainly comprise berries, nuts (pine nuts and chestnuts) and mushrooms.

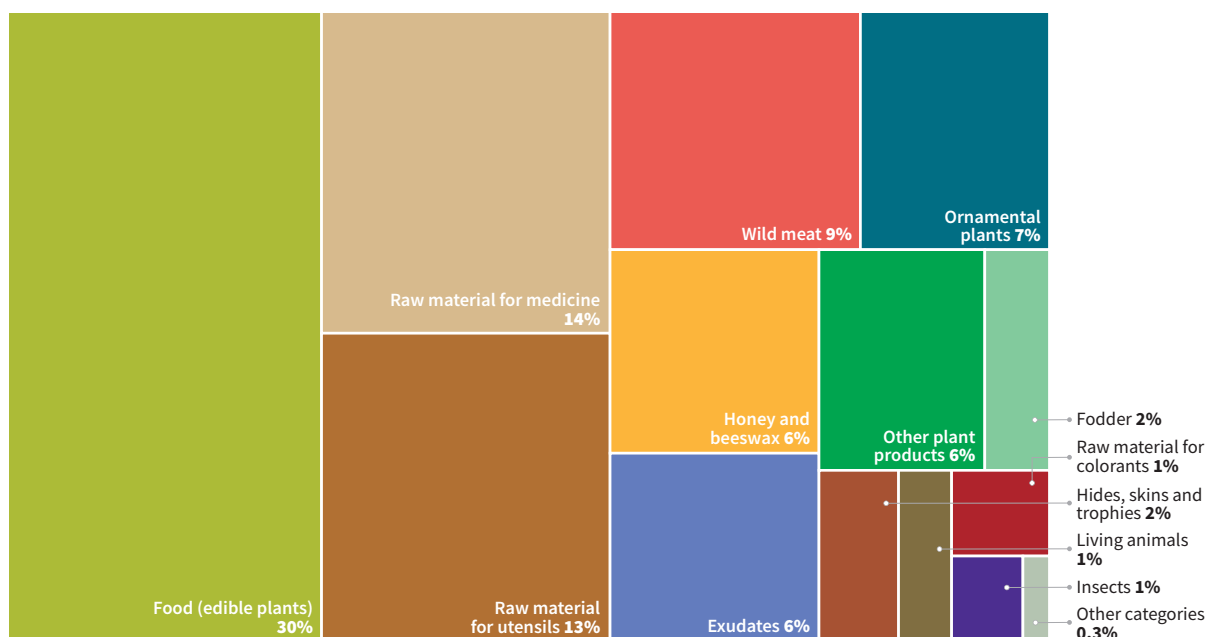
Fifty-six of the 124 reporting countries and territories provided information on medicinal and aromatic plants (this was the second-most reported category in Africa, Asia and Oceania). “Raw material for handicrafts, utensils and construction” – which includes bamboo, rattan, palm leaves, cork and other species – was the most-reported

**TABLE 83. Reporting coverage for non-wood forest products**

| Region                    | No. of reporting countries | Forest area (2015) |                           | Population in 2015*              |                                  |                            |
|---------------------------|----------------------------|--------------------|---------------------------|----------------------------------|----------------------------------|----------------------------|
|                           |                            | (1 000 ha)         | % of regional forest area | Rural population (1 000 persons) | Urban population (1 000 persons) | % of regional population** |
| Africa                    | 39                         | 497 814            | 76                        | 520 685                          | 377 572                          | 75                         |
| Asia                      | 20                         | 548 334            | 89                        | 2 005 297                        | 1 864 723                        | 88                         |
| Europe                    | 33                         | 193 269            | 19                        | 149 273                          | 422 155                          | 77                         |
| North and Central America | 11                         | 734 863            | 97                        | 100 142                          | 401 610                          | 88                         |
| Oceania                   | 10                         | 182 968            | 99                        | 11 787                           | 26 056                           | 96                         |
| South America             | 11                         | 831 070            | 97                        | 66 020                           | 343 506                          | 98                         |
| <b>WORLD</b>              | <b>124</b>                 | <b>2 988 316</b>   | <b>73</b>                 | <b>2 853 203</b>                 | <b>3 435 622</b>                 | <b>85</b>                  |

*Note:* Population data were obtained from United Nations, Department of Economic and Social Affairs, Population Division (2018). \* The table reports data on population and its disaggregation by urban/rural to highlight the potential impacts of the use of non-wood forest products (NWFPs). People living in rural areas are the primary users of NWFPs, both for direct household use and for commercial sale. Urban dwellers often derive indirect benefits from NWFPs, such as the consumption of NWFPs considered to be health products or delicacies and the use of NWFPs such as cork and bamboo manufactured products in their homes and workplaces. \*\* Regional populations include only those countries in the region reporting on NWFPs.

**FIGURE 48. Global importance of non-wood forest product categories, 2015**



product group in Central America, South America and Oceania and the third most-reported product group in Africa and Asia.

**ECONOMIC VALUE OF NON-WOOD FOREST PRODUCTS**

Eighty-one countries and territories reported quantitative information on the economic value of NWFPs, representing 54 percent of the global forest area; the percentage was

even lower in Asia (33 percent of the forest area) and Africa (27 percent). Given the low coverage, the data reported here should be viewed as a considerable underestimate of the economic value of NWFPs.

Globally, the reported value of NWFPs was about USD 7.71 billion in 2015, with plant products accounting for 80 percent of this value. The single-largest product group, by value, was edible plants (37 percent of the total value), followed by ornamental plants (22 percent), wild meat



(9 percent), other plant products (8 percent), honey and beeswax (7 percent), and medicinal and aromatic plants (5 percent) (Figure 49).

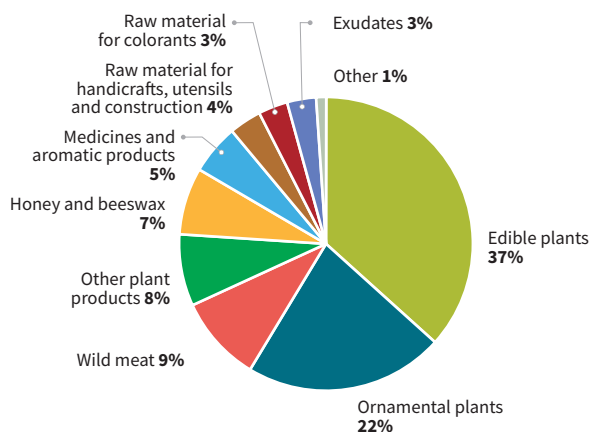
In Europe, the main product groups were ornamental plants (39 percent), edible plants (30 percent), wild meat (17 percent) and bee products (8 percent). The high value of the ornamental plants product group was due mainly (97 percent) to Christmas trees, where the market was dominated by Germany (51 percent), the United Kingdom of Great Britain and Northern Ireland (28 percent) and Denmark (8 percent).

In North and Central America and in South America, the most economically important categories are edible plant products (49 percent of total value), other plant products (21 percent) and exudates (10 percent) (the latter are especially important in South American countries).

In Africa, the most commercially important product groups reported were edible plants (45 percent of the commercial value), medicinal and aromatic plants (20 percent) and raw material for colorants (19 percent).

The most economically important product group in Asia in 2015 was edible plants, at 42 percent of the reported

FIGURE 49. Non-wood forest product categories as a proportion of total reported economic value, 2015



Note: Numbers may not sum to the totals indicated and percentages may not tally to 100 due to rounding.

value, followed by raw materials for handicrafts, utensils and construction (25 percent) and other plant products (21 percent).

In Oceania, honey and beeswax accounted for the highest reported value, at 68 percent (although this figure was due entirely to Australia and New Zealand). The product group “wild meat, hides, skins and trophies” accounted for 17 percent of the regional value.

### Box 9. Wood removals

The volume of wood removed from forests is an indicator of the economic and social roles of forest resources in national economies and dependent local communities. In most countries, revenue from harvested wood is the single-largest income source from forests. Information on wood removals also helps in monitoring the use of forest and tree resources by comparing actual removals with the sustainable potential.

Data on wood removals were requested from countries in Global Forest Resources Assessments in 2005, 2010 and 2015; in contrast, the analysis presented here is based on data on removals contained in the FAOSTAT database (FAO, 2020a). FAO and partner agencies (Eurostat, the International Tropical Timber Organization and the United Nations Economic Commission for Europe) annually collect statistics on removals of roundwood, the production of various wood and paper products, and trade in these products. Global statistics

on wood and paper products (including wood removals) have been collected and published annually in the *FAO Yearbook of Forest Products* (e.g. FAO, 2020b) since 1947. To reduce the reporting burden on countries, and because detailed annual statistics are already available in FAOSTAT, wood removals were not included in the Global Forest Resources Assessment 2020 questionnaire.

Global wood removals were estimated at 3.97 billion m<sup>3</sup> in 2018 (the latest available data), of which about half was industrial roundwood and the other half woodfuel. This amount includes removals from forests, other wooded land and trees outside forests. There are significant differences among the regions in the percentages of the wood harvest used as woodfuel, ranging from 90 percent in Africa and 62 percent in Asia to less than 25 percent in Europe, North America and Oceania (removals were roughly even for woodfuel and

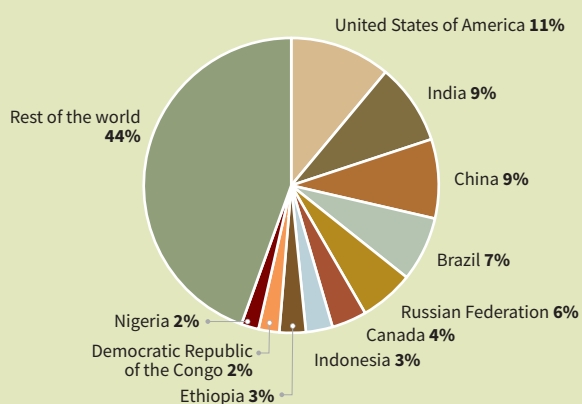
(Continued)

TABLE 84. Industrial wood and woodfuel removals, by region and subregion, 1990–2018

| Region/subregion                       | Wood removals (million m <sup>3</sup> ) |              |              |              |              |              |              |              |              |              |              |              |
|--|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|  | Industrial roundwood                    |              |              |              | Woodfuel     |              |              |              | Total        |              |              |              |
|  | 1990                                    | 2000         | 2010         | 2018         | 1990         | 2000         | 2010         | 2018         | 1990         | 2000         | 2010         | 2018         |
| Eastern and Southern Africa            | 29                                      | 36           | 35           | 37           | 200          | 250          | 293          | 317          | 229          | 286          | 327          | 354          |
| Northern Africa                        | 3                                       | 4            | 3            | 2            | 45           | 50           | 54           | 58           | 48           | 53           | 58           | 60           |
| Western and Central Africa             | 32                                      | 35           | 37           | 41           | 245          | 301          | 351          | 383          | 277          | 337          | 388          | 425          |
| <b>Total Africa</b>                    | <b>61</b>                               | <b>71</b>    | <b>72</b>    | <b>79</b>    | <b>445</b>   | <b>551</b>   | <b>644</b>   | <b>700</b>   | <b>506</b>   | <b>623</b>   | <b>715</b>   | <b>779</b>   |
| East Asia                              | 123                                     | 117          | 184          | 211          | 295          | 236          | 196          | 176          | 418          | 353          | 380          | 387          |
| South and Southeast Asia               | 137                                     | 142          | 177          | 206          | 590          | 563          | 557          | 527          | 727          | 705          | 734          | 733          |
| Western and Central Asia               | 9                                       | 14           | 19           | 25           | 11           | 9            | 11           | 15           | 20           | 22           | 29           | 41           |
| <b>Total Asia</b>                      | <b>268</b>                              | <b>273</b>   | <b>379</b>   | <b>442</b>   | <b>897</b>   | <b>808</b>   | <b>764</b>   | <b>718</b>   | <b>1 165</b> | <b>1 081</b> | <b>1 144</b> | <b>1 161</b> |
| Europe excl. Russian Federation        | n.a.                                    | 374          | 371          | 430          | n.a.         | 97           | 140          | 158          | n.a.         | 470          | 511          | 588          |
| <b>Total Europe</b>                    | <b>642</b>                              | <b>519</b>   | <b>533</b>   | <b>650</b>   | <b>157</b>   | <b>109</b>   | <b>154</b>   | <b>175</b>   | <b>799</b>   | <b>628</b>   | <b>687</b>   | <b>824</b>   |
| Caribbean                              | 1                                       | 1            | 1            | 1            | 6            | 4            | 5            | 5            | 7            | 6            | 6            | 6            |
| Central America                        | 3                                       | 3            | 3            | 4            | 34           | 38           | 42           | 44           | 37           | 42           | 45           | 48           |
| North America                          | 591                                     | 628          | 480          | 527          | 123          | 86           | 82           | 111          | 713          | 714          | 562          | 638          |
| <b>Total North and Central America</b> | <b>595</b>                              | <b>632</b>   | <b>485</b>   | <b>532</b>   | <b>162</b>   | <b>129</b>   | <b>129</b>   | <b>159</b>   | <b>757</b>   | <b>761</b>   | <b>613</b>   | <b>691</b>   |
| <b>Total Oceania</b>                   | <b>34</b>                               | <b>47</b>    | <b>57</b>    | <b>77</b>    | <b>9</b>     | <b>13</b>    | <b>11</b>    | <b>10</b>    | <b>43</b>    | <b>60</b>    | <b>68</b>    | <b>87</b>    |
| <b>Total South America</b>             | <b>110</b>                              | <b>147</b>   | <b>198</b>   | <b>248</b>   | <b>162</b>   | <b>185</b>   | <b>162</b>   | <b>181</b>   | <b>272</b>   | <b>332</b>   | <b>359</b>   | <b>429</b>   |
| <b>WORLD</b>                           | <b>1 710</b>                            | <b>1 690</b> | <b>1 723</b> | <b>2 028</b> | <b>1 833</b> | <b>1 795</b> | <b>1 863</b> | <b>1 943</b> | <b>3 543</b> | <b>3 485</b> | <b>3 586</b> | <b>3 971</b> |

Note: n.a. = not available.

Figure 50. Top ten countries for wood removals, 2018



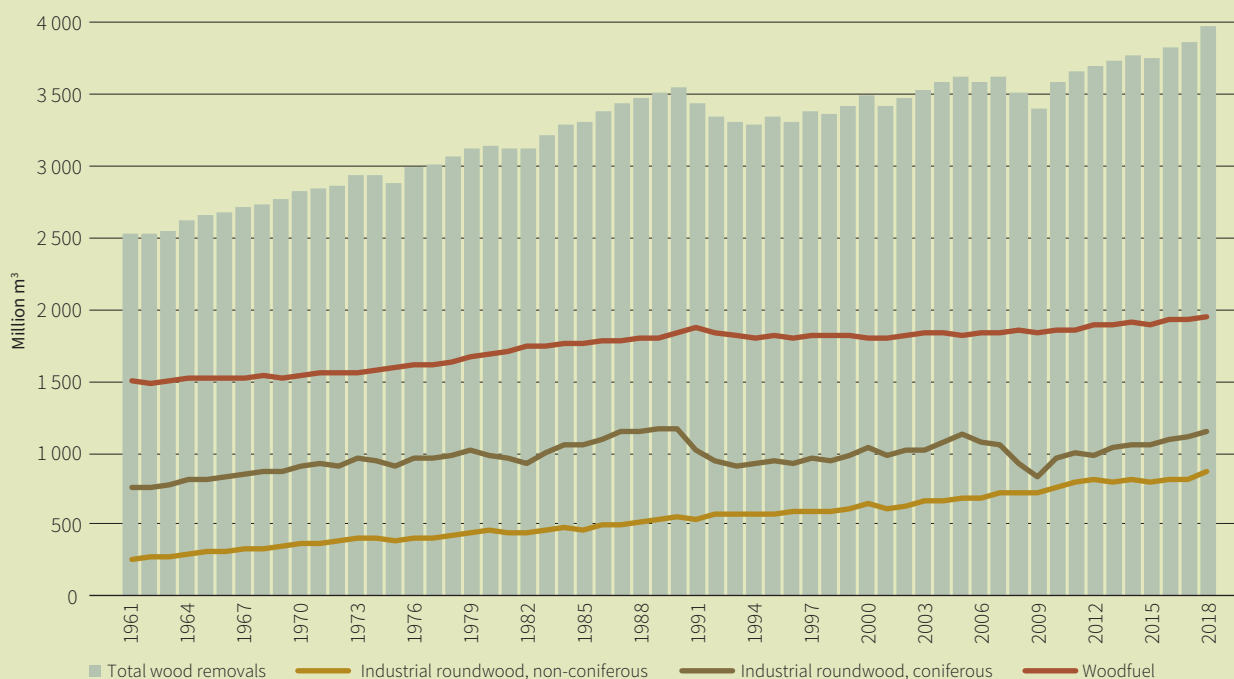
industrial roundwood in South America). Table 84 shows regional and subregional wood removals for selected years during 1990–2018.

The top ten countries for wood removals, led by the United States of America, accounted for 55 percent of total global removals in 2018 (Figure 50).

Production and trade values for global wood removals and all major wood-based products reached their highest levels since 1947 (when FAO started reporting forest product statistics) in 2018 (FAO, 2019). Global wood removals have fluctuated in response to changes in the production of coniferous industrial roundwood, with significant declines in the early 1990s (during the breakup of the Soviet Union) and 2009 (during the global financial crisis). In contrast, global

(Continued)

Figure 51. Global trends in wood removals, 1961–2018



removals of non-coniferous industrial roundwood and woodfuel have grown steadily since the 1960s (Figure 51). The proportions of industrial roundwood and woodfuel were roughly the same in 1990 and 2018, although there was variation in this between regions.

In Africa, wood removals increased steadily between 1990 and 2018, from 506 million m<sup>3</sup> to 779 million m<sup>3</sup>. The average annual growth of 2 percent in wood removals in Africa over the period was in line with population growth. Removals increased for both industrial roundwood and woodfuel.

In Asia, wood removals were roughly steady over the period 1990–2018, with the supply of industrial roundwood increasing and woodfuel removals declining correspondingly. This trend was influenced by the rapid development of forest-based industries in the region (i.e. increasing demand for industrial roundwood) and growing living standards (which reduced demand for woodfuel as alternative energy sources became available), particularly in the East Asia and South and Southeast Asia subregions.

A sharp decline in removals in the Russian Federation in the early 1990s – a result of the transition from a centrally planned to a market-based economy – caused an overall reduction in removals in Europe of 21 percent between 1990 and 2000. Thereafter, however,

removals in Europe moved back up, reaching a record 824 million m<sup>3</sup> in 2018, 3 percent higher than in 1990.

Removals in North and Central America were reasonably steady in the 1990s but declined sharply in the 2000s due to the global financial crisis, which had negative impacts on the housing sector and consequently on wood demand, especially in Canada and the United States of America. Total removals in the region decreased from 761 million m<sup>3</sup> in 2000 to 613 million m<sup>3</sup> in 2010 before rebounding – in line with economic recovery – to 691 million m<sup>3</sup> in 2018. In addition to increasing removals of industrial roundwood, woodfuel removals have been growing in the region to meet increasing export demand for wood pellets.

There has been a steady increase in removals in Oceania in recent decades. Four countries (Australia, New Zealand, Papua New Guinea and the Solomon Islands) account for most of the region's wood removals, which doubled from 43 million m<sup>3</sup> in 1990 to 87 million m<sup>3</sup> in 2018, due largely to an increased supply of wood from forest plantations in Australia and New Zealand.

Wood removals in South America also grew steadily between 1990 and 2018, from 272 million m<sup>3</sup> to 429 million m<sup>3</sup>. Similarly to Oceania, a growing supply of industrial

(Continued)

### Box 9. (Continued)

roundwood from forest plantations (especially in Argentina, Brazil, Chile and Uruguay) accounted for most of the increase.

Overall, wood removals are increasing globally as demand for and the consumption of wood products escalates in line with growing populations and incomes. This trend is expected to continue in coming decades.

Not all wood removals originate in forests, and the volume of wood removals in 2018 was less than 1 percent of the forest growing stock.

Most of the long-term growth in wood supply is occurring in countries that have established forest plantations in recent decades (especially in Asia, Latin America and Oceania). Removals in Europe have increased significantly since 2000, particularly in Eastern Europe (including the Russian Federation), where forest industries and demand for wood are expanding rapidly.



11

Discussion



# B

uilding on the experience obtained over more than 70 years (FAO, 2018a), FRA 2020 has achieved several important results, including increased country participation, a reduced reporting burden, stronger capacity-development activities, and improved data availability and quality.

## Enhanced country participation

Since 2005, FRAs have been based on country reports prepared by a global network of officially nominated national correspondents, who are responsible for compiling national data for FRA reports and communicating these to the FRA secretariat. For FRA 2020, 187 national correspondents were nominated, an increase of 19 compared with FRA 2015.

Many national correspondents coordinated the inputs of other collaborators in compiling country reports. To help in sharing the reporting workload among national collaborators, data for FRA 2020 were collected via an online platform that enabled national correspondents to invite other contributors. More than 700 contributors had registered by the end of the data-collection process, showing the strong participation of countries and their commitment to the FRA process.

Overall, there was greater participation by countries in FRA 2020 compared with previous assessments. This is illustrated by the number of desk studies prepared by FAO for countries that did not nominate national correspondents or submit reports, which declined from 79 in FRA 2015 to 47 (compiled mainly for small countries and territories and representing less than 0.5 percent of the global forest area) in FRA 2020.

## Reduced reporting burden

FRA 2020 reduced the reporting burden on countries through the revision of the reporting content and by excluding data already available via other reporting processes. For the first time since FRA 2000, therefore, there was a substantial

reduction in the number of variables for which data were requested. The introduction of the FRA online platform also improved the reporting process and simplified the work of national correspondents. The main features of this platform are easy access to the reporting tables; facilitated data entry; on-the-fly validation checks; tools for data visualization and analysis; and a communication module that allows direct messaging between collaborators and reviewers. FAO's collaboration with Google has enabled the platform to link with Google Earth Engine's functionalities, thereby providing all countries with access to remote sensing data and products and allowing them to use these to generate estimates on, for example, tree cover, burned area, protected-forest area and mangrove area.

## Stronger capacity development

Capacity development is a key factor in delivering successful FRAs and ensuring consistency and continuity. At its 23rd and 24th sessions in 2016 and 2018, the FAO Committee on Forestry recommended that FAO "supports the countries in strengthening collection, analysis and dissemination of forest data with a view to support the national SDG indicator framework and country reports", "continues to explore new and innovative tools and techniques to further improve support to Members in collecting, analysing and reporting data on forest and related aspects", and "supports countries with tools, methodologies and capacity-building for generating better information and data on forests' contribution to the SDGs" (FAO, 2016, 2018b).

In responding to these recommendations, FRA 2020 initiated an intensive capacity-development programme in early 2018. The programme had two components – FRA 2020 reporting, and remote sensing. The reporting workshops focused on training national correspondents in the FRA methodology and the new online reporting tool and on supporting countries to complete their reports. One global and nine regional reporting workshops were convened between March and December 2018 involving more than 300 national collaborators.

### Box 10. Remote sensing survey, 2020

Since 1990, FAO Global Forest Resources Assessments (FRAs) have complemented the information collected through the country reporting process with remote sensing-based global and regional analyses of the world's forest resources. FRA 2020 continues this tradition through a global remote sensing survey (RSS), with two main objectives: to improve the capacity of countries to use the latest remote sensing data and products to improve estimates of forest area and forest-area change, including for reporting on forest-related indicators for the Sustainable Development Goals; and to derive independent regional and global estimates of forest area and forest-area change.

The RSS was designed in collaboration with the Joint Research Centre of the European Commission and a number of international experts. The FRA 2020 RSS builds on the experience of previous surveys, and it also benefits from recent technological developments and improved access to freely available satellite imagery. The resultant methodology is based on the visual interpretation of roughly 430 000 global samples (Figure 52) with the help of satellite images and a new tool, Collect Earth Online,<sup>24</sup>

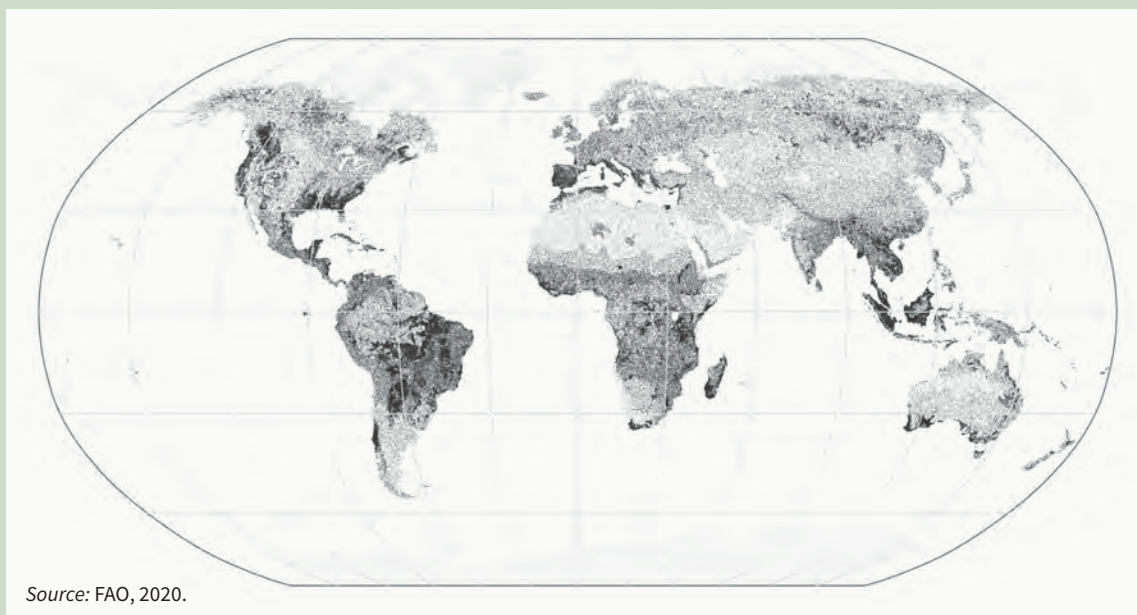
which FAO developed in collaboration with the National Aeronautics and Space Administration of the United States of America and Google.

The RSS has a strong capacity-development component, and data are being collected at national and regional workshops by national experts with thorough knowledge of local vegetation and land uses. Each workshop starts with training on the RSS methodology, followed by a field visit to illustrate and discuss samples that are difficult to assess with remote sensing. The latter parts of workshops focus on data collection for the samples assigned to each country and territory.

The RSS was still under implementation in early 2020. By then, capacity-development workshops had involved participants from 70 countries, trained 384 national experts on the methodology, and obtained 134 700 samples. Data collection will be completed in 2020 and the reporting of results is scheduled for 2021.

*More information on the RSS is available at [www.fao.org/forest-resources-assessment/remote-sensing/fra-2020-remote-sensing-survey](http://www.fao.org/forest-resources-assessment/remote-sensing/fra-2020-remote-sensing-survey)*

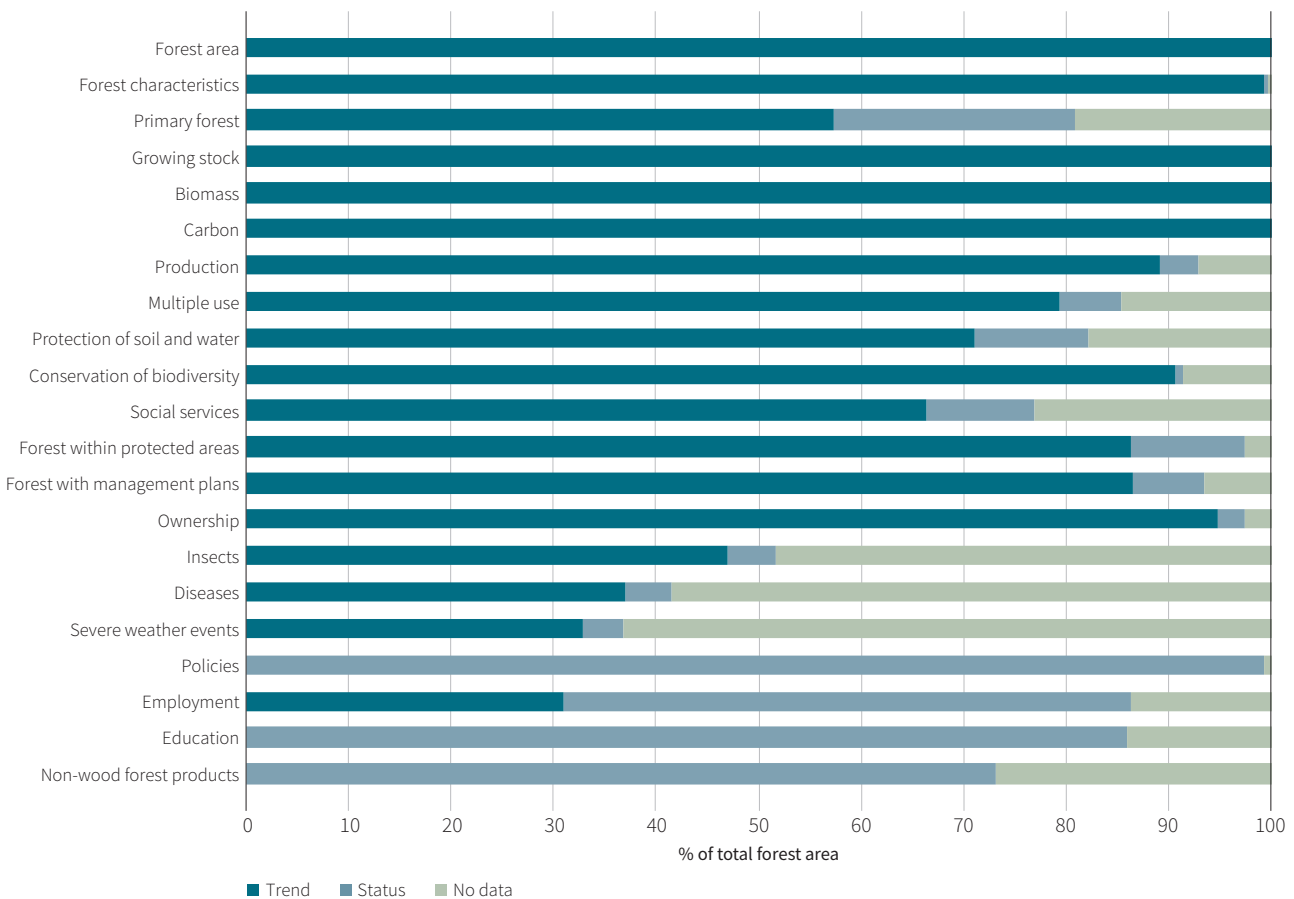
Figure 52. Sample sites for the remote sensing survey



<sup>24</sup> <https://collect.earth> and [www.openforis.org/tools/collect-earth-online.html](http://www.openforis.org/tools/collect-earth-online.html)



FIGURE 53. Data availability for status and trends, 21 main variables



The implementation of the remote sensing capacity-development component started in late 2018 and will continue to the end of 2020. The purpose of this activity is to support countries in using remote sensing to derive information on key forest characteristics and especially forest area and its changes. Sixteen training and analysis workshops were convened in 2018 and 2019, which also contributed to the collection of global remote sensing survey sample data (Box 10).

### Improved data availability and quality

FRA 2020 estimates are based on official national statistics derived from field inventories, remote sensing, expert estimates and a combination of these. Many governments in developing countries have invested in the development of self-sustaining national forest monitoring systems in the last decade, often supported by donors and international organizations. FAO has assisted more than 50 national governments since 2009 to develop robust national field-

based forest inventories, satellite land-monitoring systems, or both, mostly in the context of the REDD+ Programme. Combined with specific FRA capacity building, these efforts have had a clear, positive impact on the availability and quality of information on forest resources.

The response frequency of countries and territories was generally very good for FRA 2020, and data availability for key variables was high. Of the 21 variables shown in Figure 53, the global forest area represented exceeded 80 percent for 16 variables reporting on status and for ten variables reporting on trends.<sup>25</sup>

The preliminary findings of an assessment of national forest monitoring capacities undertaken by the Center for International Forestry Research and Wageningen University suggest that data quality has improved in FRA 2020 (Box 11).

<sup>25</sup> In some cases, missing values were gap-filled to obtain complete time series for regional and global estimates. The percentages presented in Figure 53, therefore, may not always be reproduced by aggregating the reported country data.

## Box 11. National forest monitoring tier assessment

The Center for International Forestry Research (CIFOR) and Wageningen University assessed national forest monitoring capacities based on country reports submitted for the Global Forest Resources Assessment (FRA) 2020.<sup>26</sup>

The assessment applied a three-class tier system for data quality (Table 85) to a selection of core forest indicators: forest-area status, forest-area trend, growing-stock status, growing-stock trend, biomass, and carbon (Table 86 and Table 87).

**TABLE 85.** The three-class tier system applied in the assessment of data quality

| Class         | Variable      | Status   | Trend  |
|---------------|---------------|--|--|
| <b>Tier 3</b> | Forest area   | Data from 2013 or more recent<br><i>Source:</i> national forest inventories (NFIs), remote sensing surveys or wall-to-wall mapping | Multiple sets of consistent data (in terms of methods and classes), 2013 or more recent, including change estimates from (e.g.) REDD+ forest reference (emission) levels |
|               | Growing stock | Data from 2009 or more recent<br><i>Source:</i> NFIs or remote sensing-based method calibrated with plot data                      | Multiple consistent NFIs or consistent remote sensing-based estimate   |
|               | Biomass       | Country-specific expansion factors or allometric equations used for deriving biomass estimates                                     |  |
|               | Carbon        | Data provided for all five carbon pools  |  |
| <b>Tier 2</b> | Forest area   | Data older than 2013<br><i>Source:</i> NFIs, remote sensing surveys or wall-to-wall mapping  | Limited consistency between data sources   |
|               | Growing stock | Data older than 2009   | Multiple NFIs or remote sensing-based estimates but limited consistency and/or older than 2009   |
|               | Carbon        | Data provided for at least two carbon pools  |  |
| <b>Tier 1</b> | Forest area   | Other data sources, such as registers or questionnaires, expert assessments  | Other data sources, including data from registers or questionnaires, and expert assessments  |
|               | Growing stock |  |  |
|               | Biomass       | Use of Intergovernmental Panel on Climate Change default factors or generic equations  |  |
|               | Carbon        | Other  |  |

**TABLE 86.** Number of countries by data-reliability tier, for six indicators

| Indicator            | FRA 2015 |        |        |        | FRA 2020 |        |        |        |
|----------------------|----------|--------|--------|--------|----------|--------|--------|--------|
|                      | No data  | Tier 1 | Tier 2 | Tier 3 | No data  | Tier 1 | Tier 2 | Tier 3 |
| Forest-area status   | 0        | 106    | 64     | 66     | 0        | 54     | 57     | 125    |
| Forest-area trend    | 0        | 128    | 64     | 44     | 0        | 71     | 62     | 103    |
| Growing-stock status | 34       | 113    | 44     | 45     | 32       | 72     | 40     | 92     |
| Growing-stock trend  | 36       | 129    | 41     | 30     | 32       | 84     | 60     | 60     |
| Biomass*             | 36       | 149    | –      | 51     | 30       | 146    | –      | 60     |
| Carbon               | 37       | –      | –      | –      | 30       | 22     | 139    | 45     |

Note: \*Only tiers 1 and 3 were used for biomass.

<sup>26</sup> The analysis was conducted by Mst Karimon Nesha, Veronique De Sy and Martin Herold (CIFOR/Wageningen University), updating a previous publication by Romijn *et al.* (2015). The full findings of the FRA 2020 analysis will be published in 2020.

### Box 11. (Continued)

According to the assessment's preliminary findings, more than 90 percent of the estimated forest area in 2020 (status) in FRA 2020 can be categorized as tier 3 (highest reliability of the data sources), with regional variations (Table 88). This is a substantial improvement compared with FRA 2015,<sup>27</sup> with the number of countries reporting tier 3 for forest-area status and trends almost doubling.

Overall, data quality is greatly improved in FRA 2020 compared with FRA 2015 for all the selected indicators; this indicates that many countries produced new data and

are considerably improving their monitoring and reporting on forests. Given the improvement in national-level data, regional and global aggregates are also more reliable than previously. On the other hand, most countries are still reporting on biomass using default factors, and there is room for improvement in estimates of trends, particularly in Africa. Note that this analysis examined only a few indicators and does not reflect the situation for many other variables included in FRA 2020 for which data coverage and quality remain poor.

**TABLE 87. Proportion of forest area (%) by data-reliability tier, for six indicators**

| Indicator            | FRA 2015 |        |        |        | FRA 2020 |        |        |        |
|----------------------|----------|--------|--------|--------|----------|--------|--------|--------|
|                      | No data  | Tier 1 | Tier 2 | Tier 3 | No data  | Tier 1 | Tier 2 | Tier 3 |
| Forest-area status   | 0        | 10     | 31     | 59     | 0        | 2      | 5      | 93     |
| Forest-area trend    | 0        | 34     | 42     | 24     | 0        | 2      | 12     | 86     |
| Growing-stock status | 6        | 21     | 40     | 32     | 4        | 5      | 7      | 85     |
| Growing-stock trend  | 15       | 37     | 28     | 19     | 4        | 8      | 27     | 61     |
| Biomass*             | 2        | 55     | –      | 44     | <1       | 24     | –      | 76     |
| Carbon               | 3        | –      | –      | –      | <1       | 1      | 38     | 61     |

Note: \*Only tiers 1 and 3 were used for biomass.

**TABLE 88. Proportion of forest area in data-reliability tier 3, by region**

| Region                    | %                  |                   |                      |                     |         |        |
|---------------------------|--------------------|-------------------|----------------------|---------------------|---------|--------|
|                           | Forest-area status | Forest-area trend | Growing-stock status | Growing-stock trend | Biomass | Carbon |
| Africa                    | 79                 | 31                | 69                   | 24                  | 32      | 1      |
| Asia                      | 92                 | 92                | 87                   | 80                  | 53      | 18     |
| Europe                    | 96                 | 96                | 96                   | 96                  | 94      | 90     |
| North and Central America | 99                 | 98                | 99                   | 97                  | 99      | 97     |
| Oceania                   | 97                 | 97                | 5                    | 5                   | 78      | 78     |
| South America             | 95                 | 95                | 86                   | 14                  | 82      | 66     |



<sup>27</sup> The tier classification system used in FRA 2020 differs slightly to that used in FRA 2015. This is especially significant for forest-area status, where tier 3 status was given to data sources less than ten years old (2004) for FRA 2015 and to data sources from 2013 for FRA 2020. No data on tiers are provided for FRA 2015 because the classes applied in FRA 2020 and FRA 2015 are not comparable. Also, tiers were self-assessed by countries in FRA 2015.



12

Conclusion



## Take-home messages

**The global forest area continues to shrink** – by an average of 4.7 million ha per year. Globally, the rate of net forest loss has declined since the 1990s, but the latest data show that the pace of this decline slowed in the most recent ten-year period, mainly because the forest area in Asia and Europe expanded less than in the previous decade. Given the current global trend of a shrinking net forest area, it is unlikely that the Global Forest Goal of increasing the world's forest area by 3 percent will be met by 2030.

**Halting deforestation remains a challenge.** Deforestation continues, albeit at a lower rate than in the past. In the most recent five-year period (2015–2020), deforestation occurred at a rate of 10 million ha per year – 2 million ha less per year than in 2010–2015. At this rate of reduction, however, achieving the SDG 15 target of halting deforestation will take another 25 years.

**The deforestation hotspot is now in Africa.** More than 90 percent of deforestation is taking place in the tropics. Of the world's six regions, Africa lost the largest area to deforestation in 2010–2020, surpassing South America (the previous leader). Earlier studies have shown that, in tropical and subtropical countries, agricultural expansion accounts for 73 percent of deforestation. In Africa, the continuation of a high rate of deforestation largely reflects the combined impacts of high population growth and the need to sustain livelihoods with small-scale agriculture.

**Deforestation has halved in Asia and South America.** Deforestation rates in Asia and South America are only about half what they were in the 1990s. In Asia, this is mainly the result of reductions in deforestation in South and Southeast Asia. The decline in deforestation in South America is due largely to a reduction in Brazil, particularly between 2010 and 2015, although some other countries in the region have also curbed deforestation.

### **Forest management is moving towards sustainability.**

Long-term management plans exist for more than half the global forest area, and the area of forest with management plans has increased steadily since 2000. Less than 25 percent of the forest area in Africa and South America is under long-term management plans, however; this is cause for concern, given that the existence of such plans is an indicator of the intention to sustainably manage forest resources.

### **Production is still an important forest management objective.**

About 30 percent of all forests globally is managed primarily for the production of wood and non-wood forest products – this has been the case since at least 1990. Although the volume of wood removals increased between 1990 and 2020, the number of people employed in forestry and logging declined because of increases (in some regions) in mechanization and labour productivity.

### **Aichi Biodiversity Target 11 (to protect at least 17 percent of the terrestrial area by 2020) has been exceeded for forest ecosystems as a whole.**

Globally, 18 percent of the world's forest area, or more than 700 million ha, is in legally established protected areas such as national parks, conservation areas and game reserves (IUCN categories I–IV).

### **Urgent action is needed to strengthen the positive trend of declining deforestation**

and to incentivize afforestation, forest restoration and forest conservation, especially in tropical developing countries. Such action is necessary if the world is to meet commitments to halt deforestation, increase forest area, and restore 350 million ha of the world's deforested and degraded land.

### **Global forest monitoring capacity is greater than ever,**

but important information gaps remain. Countries need additional support to improve their capacity to collect and report data on a number of key forest indicators. By

facilitating the sharing of tools and data sources, FAO's new digital reporting platform is helping address such information gaps.

## Next steps

FRA is a country-driven process, which FAO conducts at the request of its member states. Future assessments should continue to build capacity in countries with the aim of enabling continuous forest reporting capacity. This is likely to be increasingly important, with emerging needs for frequent reporting on key variables and indicators – such as the two forest-related SDG indicators, which also have strong linkages with other initiatives such as the New York Declaration on Forests and the Bonn Challenge.

The aim behind several changes to FRA 2020 was to reduce the reporting burden for countries and improve data availability and consistency. This effort should continue as a means to assist national and international policy formulation and decision-making processes. With support from the European Union, the Government of Norway, the Global Environment Facility and potentially other donors, and in collaboration with FAO member states, the FRA Advisory Group, Collaborative Forest Resources Questionnaire partners, and others, FRA will continue to evolve as a dynamic and transparent reporting process that provides easy access to up-to-date, high-quality data.









# Annex 1. Statistical factsheets

| <b>WORLD</b><br>236 countries and territories  |       |       |       |                   |                                    |
|--|-------|-------|-------|-------------------|------------------------------------|
| VARIABLE (UNIT)                                | 1990  | 2000  | 2010  | 2020 <sup>a</sup> | DATA AVAILABILITY (%) <sup>b</sup> |
| Forest area (million ha)                       | 4 236 | 4 158 | 4 106 | 4 059             | 100                                |
| Forest area (% of land area)                   | 32.5  | 31.9  | 31.5  | 31.1              | 100                                |
| Growing stock (billion m <sup>3</sup> )        | 560   | 556   | 555   | 557               | 100 <sup>c</sup>                   |
| Growing stock (m <sup>3</sup> /ha)             | 132.1 | 133.8 | 135.2 | 137.1             | 100 <sup>c</sup>                   |
| Carbon stock in biomass (Gt)                   | 298   | 296   | 294   | 295               | 100 <sup>c</sup>                   |
| Carbon stock in biomass (t/ha)                 | 70.3  | 71.1  | 71.6  | 72.6              | 100 <sup>c</sup>                   |
| Total carbon stock (Gt)                        | 668   | 663   | 662   | 662               | 100 <sup>c</sup>                   |
| Total carbon stock (t/ha)                      | 157.8 | 159.5 | 161.3 | 163.1             | 100 <sup>c</sup>                   |
| Naturally regenerating forest (million ha)     | 4 038 | 3 919 | 3 816 | 3 737             | 99                                 |
| Planted forest (million ha)                    | 170   | 211   | 262   | 293               | 99                                 |
| ... of which plantation forest (million ha)    | 75    | 95    | 116   | 131               | 99                                 |
| Primary forest (million ha)                    | 906   | 872   | 837   | 825               | 57                                 |
| Mangroves (million ha)                         | 15.8  | 15.3  | 14.9  | 14.7              | 99                                 |
| Forest in protected areas (million ha)         | 438   | 500   | 601   | 629               | 86                                 |
| Forest area with management plans (million ha) | -     | 1 758 | 1 856 | 1 991             | 87                                 |
| Designated management objective                |       |       |       |                   |                                    |
| Production (million ha)                        | 1 136 | 1 113 | 1 097 | 1 134             | 89                                 |
| Protection of soil and water (million ha)      | 272   | 296   | 325   | 390               | 71                                 |
| Conservation (million ha)                      | 311   | 347   | 399   | 422               | 91                                 |
| Social services (million ha)                   | 188   | 180   | 180   | 182               | 66                                 |
| Multiple use (million ha)                      | 809   | 780   | 751   | 738               | 79                                 |
| Other (million ha)                             | 322   | 336   | 312   | 210               | 68                                 |
| VARIABLE (UNIT)                                | 1990  | 2000  | 2010  | 2015              | DATA AVAILABILITY (%) <sup>b</sup> |
| Private ownership (million ha)                 | 828   | 817   | 841   | 857               | 95                                 |
| Public ownership (million ha)                  | 2 950 | 2 918 | 2 859 | 2 835             | 95                                 |
| Other/unknown ownership (million ha)           | 446   | 330   | 299   | 284               | 100                                |

**Note:**

<sup>a</sup> Data for 2020 comprise countries that reported complete time series of data, and values may differ from those presented in the report based on the analysis of exclusively 2020 data.

<sup>b</sup> Data availability refers to the proportion of total forest area represented by reporting countries.

<sup>c</sup> Missing values have been filled with FAO estimates.

| <b>AFRICA</b><br>58 countries and territories  |       |       |       |                   |                                    |
|--|-------|-------|-------|-------------------|------------------------------------|
| VARIABLE (UNIT)  | 1990  | 2000  | 2010  | 2020 <sup>a</sup> | DATA AVAILABILITY (%) <sup>b</sup> |
| Forest area (million ha)   | 743   | 710   | 676   | 637               | 100                                |
| Forest area (% of land area)   | 24.9  | 23.8  | 22.6  | 21.3              | 100                                |
| Growing stock (billion m <sup>3</sup> )  | 88    | 84    | 81    | 76                | 100 <sup>c</sup>                   |
| Growing stock (m <sup>3</sup> /ha)   | 118.0 | 118.8 | 119.8 | 120.0             | 100 <sup>c</sup>                   |
| Carbon stock in biomass (Gt)   | 59    | 56    | 54    | 51                | 100 <sup>c</sup>                   |
| Carbon stock in biomass (t/ha)   | 79.1  | 79.3  | 79.5  | 79.4              | 100 <sup>c</sup>                   |
| Total carbon stock (Gt)  | 94    | 90    | 86    | 81                | 100 <sup>c</sup>                   |
| Total carbon stock (t/ha)  | 126.9 | 126.9 | 127.1 | 127.1             | 100 <sup>c</sup>                   |
| Naturally regenerating forest (million ha)   | 734   | 701   | 665   | 625               | 100                                |
| Planted forest (million ha)  | 8.5   | 8.9   | 10.6  | 11.4              | 100                                |
| ... of which plantation forest (million ha)  | 6.0   | 6.2   | 7.1   | 7.7               | 100                                |
| Primary forest (million ha)  | 143   | 137   | 131   | 123               | 51                                 |
| Mangroves (million ha)   | 3.40  | 3.33  | 3.26  | 3.24              | 95                                 |
| Forest in protected areas (million ha)   | 124   | 125   | 129   | 131               | 72                                 |
| Forest area with management plans (million ha)   | -     | 79    | 91    | 118               | 64                                 |
| Designated management objective  |       |       |       |                   |                                    |
| Production (million ha)  | 109   | 104   | 91    | 91                | 79                                 |
| Protection of soil and water (million ha)  | 43    | 41    | 38    | 36                | 52                                 |
| Conservation (million ha)  | 95    | 97    | 104   | 107               | 69                                 |
| Social services (million ha)   | 2.0   | 1.8   | 1.7   | 3.0               | 28                                 |
| Multiple use (million ha)  | 95    | 88    | 82    | 73                | 37                                 |
| Other (million ha)   | 0     | 0     | 0     | 0                 | 23                                 |
| VARIABLE (UNIT)  | 1990  | 2000  | 2010  | 2015              | DATA AVAILABILITY (%) <sup>b</sup> |
| Private ownership (million ha)   | 46    | 39    | 37    | 36                | 93                                 |
| Public ownership (million ha)  | 526   | 508   | 481   | 463               | 93                                 |
| Other/unknown ownership (million ha)   | 166   | 158   | 154   | 157               | 100                                |
| <i>Note:</i>   |       |       |       |                   |                                    |
| <sup>a</sup> Data for 2020 comprise countries that reported complete time series of data, and values may differ from those presented in the report based on the analysis of exclusively 2020 data. |       |       |       |                   |                                    |
| <sup>b</sup> Data availability refers to the proportion of total forest area represented by reporting countries.   |       |       |       |                   |                                    |
| <sup>c</sup> Missing values have been filled with FAO estimates.   |       |       |       |                   |                                    |

**ASIA****48 countries and territories**

| VARIABLE (UNIT)                                | 1990  | 2000  | 2010  | 2020 <sup>a</sup> | DATA AVAILABILITY (%) <sup>b</sup> |
|--|-------|-------|-------|-------------------|------------------------------------|
| Forest area (million ha)                       | 585   | 587   | 611   | 623               | 100                                |
| Forest area (% of land area)                   | 18.8  | 18.9  | 19.7  | 20.0              | 100                                |
| Growing stock (billion m <sup>3</sup> )        | 52    | 54    | 58    | 63                | 100 <sup>c</sup>                   |
| Growing stock (m <sup>3</sup> /ha)             | 88.1  | 92.4  | 95.3  | 100.4             | 100 <sup>c</sup>                   |
| Carbon stock in biomass (Gt)                   | 34    | 35    | 36    | 38                | 100 <sup>c</sup>                   |
| Carbon stock in biomass (t/ha)                 | 58.2  | 59.7  | 59.2  | 60.3              | 100 <sup>c</sup>                   |
| Total carbon stock (Gt)                        | 77    | 79    | 82    | 85                | 100 <sup>c</sup>                   |
| Total carbon stock (t/ha)                      | 131.7 | 133.7 | 134.1 | 136.1             | 100                                |
| Naturally regenerating forest (million ha)     | 511   | 493   | 491   | 487               | 100                                |
| Planted forest (million ha)                    | 74    | 94    | 120   | 135               | 100                                |
| ... of which plantation forest (million ha)    | 50    | 62    | 72    | 79                | 100                                |
| Primary forest (million ha)                    | 100   | 93    | 86    | 86                | 90                                 |
| Mangroves (million ha)                         | 6.33  | 6.32  | 5.93  | 5.55              | 96                                 |
| Forest in protected areas (million ha)         | 85    | 102   | 128   | 135               | 85                                 |
| Forest area with management plans (million ha) | -     | 280   | 314   | 353               | 89                                 |
| Designated management objective                |       |       |       |                   |                                    |
| Production (million ha)                        | 202   | 207   | 188   | 190               | 97                                 |
| Protection of soil and water (million ha)      | 103   | 117   | 134   | 132               | 96                                 |
| Conservation (million ha)                      | 63    | 67    | 81    | 89                | 98                                 |
| Social services (million ha)                   | 3.7   | 3.5   | 4.7   | 5.7               | 92                                 |
| Multiple use (million ha)                      | 95    | 109   | 120   | 134               | 94                                 |
| Other (million ha)                             | 28    | 28    | 29    | 29                | 89                                 |
| VARIABLE (UNIT)                                | 1990  | 2000  | 2010  | 2015              | DATA AVAILABILITY (%) <sup>b</sup> |
| Private ownership (million ha)                 | 64    | 73    | 119   | 132               | 98                                 |
| Public ownership (million ha)                  | 490   | 485   | 463   | 464               | 98                                 |
| Other/unknown ownership (million ha)           | 32    | 25    | 22    | 10                | 100                                |

*Note:*

<sup>a</sup> Data for 2020 comprise countries that reported complete time series of data, and values may differ from those presented in the report based on the analysis of exclusively 2020 data.

<sup>b</sup> Data availability refers to the proportion of total forest area represented by reporting countries.

<sup>c</sup> Missing values have been filled with FAO estimates.

| <b>EUROPE</b>  |       |       |       |                   |                                    |
|--|-------|-------|-------|-------------------|------------------------------------|
| <b>50 countries and territories</b>  |       |       |       |                   |                                    |
| VARIABLE (UNIT)  | 1990  | 2000  | 2010  | 2020 <sup>a</sup> | DATA AVAILABILITY (%) <sup>b</sup> |
| Forest area (million ha)   | 994   | 1 002 | 1 014 | 1 017             | 100                                |
| Forest area (% of land area)   | 44.9  | 45.3  | 45.8  | 46.0              | 100                                |
| Growing stock (billion m <sup>3</sup> )  | 104   | 108   | 113   | 116               | 100 <sup>c</sup>                   |
| Growing stock (m <sup>3</sup> /ha)   | 104.9 | 107.8 | 111.5 | 114.2             | 100 <sup>c</sup>                   |
| Carbon stock in biomass (Gt)   | 45    | 48    | 51    | 55                | 100 <sup>c</sup>                   |
| Carbon stock in biomass (t/ha)   | 45.4  | 47.5  | 50.5  | 53.6              | 100 <sup>c</sup>                   |
| Total carbon stock (Gt)  | 159   | 162   | 168   | 172               | 100 <sup>c</sup>                   |
| Total carbon stock (t/ha)  | 159.7 | 162.1 | 165.8 | 169.5             | 100 <sup>c</sup>                   |
| Naturally regenerating forest (million ha)   | 913   | 913   | 914   | 915               | 97                                 |
| Planted forest (million ha)  | 54    | 62    | 72    | 74                | 97                                 |
| ... of which plantation forest (million ha)  | 2.9   | 3.8   | 4.2   | 4.0               | 97                                 |
| Primary forest (million ha)  | 0.85  | 0.99  | 1.32  | 1.41              | 44                                 |
| Mangroves (million ha)   | 0     | 0     | 0     | 0                 | 100                                |
| Forest in protected areas (million ha)   | 18    | 29    | 41    | 46                | 94                                 |
| Forest area with management plans (million ha)   | -     | 934   | 938   | 942               | 96                                 |
| Designated management objective  |       |       |       |                   |                                    |
| Production (million ha)  | 510   | 473   | 482   | 514               | 95                                 |
| Protection of soil and water (million ha)  | 76    | 90    | 106   | 171               | 94                                 |
| Conservation (million ha)  | 18    | 28    | 35    | 39                | 97                                 |
| Social services (million ha)   | 24    | 17    | 18    | 19                | 96                                 |
| Multiple use (million ha)  | 38    | 38    | 41    | 43                | 94                                 |
| Other (million ha)   | 277   | 303   | 279   | 178               | 96                                 |
| VARIABLE (UNIT)  | 1990  | 2000  | 2010  | 2015              | DATA AVAILABILITY (%) <sup>b</sup> |
| Private ownership (million ha)   | 74    | 83    | 90    | 92                | 97                                 |
| Public ownership (million ha)  | 894   | 890   | 895   | 895               | 97                                 |
| Other/unknown ownership (million ha)   | 18    | 20    | 8     | 28                | 100                                |
| <i>Note:</i>   |       |       |       |                   |                                    |
| <sup>a</sup> Data for 2020 comprise countries that reported complete time series of data, and values may differ from those presented in the report based on the analysis of exclusively 2020 data. |       |       |       |                   |                                    |
| <sup>b</sup> Data availability refers to the proportion of total forest area represented by reporting countries.   |       |       |       |                   |                                    |
| <sup>c</sup> Missing values have been filled with FAO estimates.   |       |       |       |                   |                                    |

**NORTH AND CENTRAL AMERICA**  
41 countries and territories

| VARIABLE (UNIT)                                | 1990  | 2000  | 2010  | 2020 <sup>a</sup> | DATA AVAILABILITY (%) <sup>b</sup> |
|--|-------|-------|-------|-------------------|------------------------------------|
| Forest area (million ha)                       | 755   | 752   | 754   | 753               | 100                                |
| Forest area (% of land area)                   | 35.4  | 35.3  | 35.4  | 35.3              | 100                                |
| Growing stock (billion m <sup>3</sup> )        | 90    | 92    | 93    | 95                | 100 <sup>c</sup>                   |
| Growing stock (m <sup>3</sup> /ha)             | 119.6 | 122.0 | 123.6 | 126.3             | 100 <sup>c</sup>                   |
| Carbon stock in biomass (Gt)                   | 39    | 40    | 41    | 42                | 100 <sup>c</sup>                   |
| Carbon stock in biomass (t/ha)                 | 52.2  | 53.7  | 54.2  | 55.3              | 100 <sup>c</sup>                   |
| Total carbon stock (Gt)                        | 143   | 144   | 146   | 146               | 100 <sup>c</sup>                   |
| Total carbon stock (t/ha)                      | 189.6 | 191.6 | 193.0 | 194.1             | 100 <sup>c</sup>                   |
| Naturally regenerating forest (million ha)     | 732   | 720   | 714   | 706               | 100                                |
| Planted forest (million ha)                    | 23    | 33    | 41    | 47                | 100                                |
| ... of which plantation forest (million ha)    | 6.6   | 9.3   | 13.5  | 15.2              | 100                                |
| Primary forest (million ha)                    | 317   | 314   | 314   | 313               | 97                                 |
| Mangroves (million ha)                         | 2.43  | 2.44  | 2.45  | 2.55              | 100                                |
| Forest in protected areas (million ha)         | 42    | 51    | 71    | 73                | 98                                 |
| Forest area with management plans (million ha) | -     | 387   | 401   | 432               | 97                                 |
| Designated management objective                |       |       |       |                   |                                    |
| Production (million ha)                        | 207   | 217   | 225   | 230               | 88                                 |
| Protection of soil and water (million ha)      | 16    | 16    | 17    | 17                | 47                                 |
| Conservation (million ha)                      | 46    | 53    | 69    | 74                | 97                                 |
| Social services (million ha)                   | 15    | 15    | 15    | 15                | 47                                 |
| Multiple use (million ha)                      | 260   | 260   | 258   | 254               | 88                                 |
| Other (million ha)                             | 0.9   | 1.0   | 0.9   | 0.9               | 47                                 |
| VARIABLE (UNIT)                                | 1990  | 2000  | 2010  | 2015              | DATA AVAILABILITY (%) <sup>b</sup> |
| Private ownership (million ha)                 | 264   | 263   | 262   | 264               | 97                                 |
| Public ownership (million ha)                  | 450   | 450   | 455   | 455               | 97                                 |
| Other/unknown ownership (million ha)           | 41    | 39    | 36    | 32                | 100                                |

*Note:*

<sup>a</sup> Data for 2020 comprise countries that reported complete time series of data, and values may differ from those presented in the report based on the analysis of exclusively 2020 data.

<sup>b</sup> Data availability refers to the proportion of total forest area represented by reporting countries.

<sup>c</sup> Missing values have been filled with FAO estimates.

| <b>OCEANIA</b><br>25 countries and territories   |       |       |       |                   |                                    |
|--|-------|-------|-------|-------------------|------------------------------------|
| VARIABLE (UNIT)  | 1990  | 2000  | 2010  | 2020 <sup>a</sup> | DATA AVAILABILITY (%) <sup>b</sup> |
| Forest area (million ha)   | 185   | 183   | 181   | 185               | 100                                |
| Forest area (% of land area)   | 21.8  | 21.6  | 21.3  | 21.8              | 100                                |
| Growing stock (billion m <sup>3</sup> )  | 19    | 19    | 19    | 19                | 100 <sup>c</sup>                   |
| Growing stock (m <sup>3</sup> /ha)   | 101.2 | 102.0 | 103.8 | 101.8             | 100 <sup>c</sup>                   |
| Carbon stock in biomass (Gt)   | 14    | 14    | 14    | 14                | 100 <sup>c</sup>                   |
| Carbon stock in biomass (t/ha)   | 75.4  | 75.7  | 76.6  | 74.9              | 100 <sup>c</sup>                   |
| Total carbon stock (Gt)  | 33    | 33    | 33    | 33                | 100 <sup>c</sup>                   |
| Total carbon stock (t/ha)  | 180.2 | 180.6 | 182.7 | 178.5             | 100 <sup>c</sup>                   |
| Naturally regenerating forest (million ha)   | 182   | 179   | 176   | 180               | 100                                |
| Planted forest (million ha)  | 2.8   | 3.8   | 4.5   | 4.8               | 100                                |
| ... of which plantation forest (million ha)  | 2.8   | 3.8   | 4.3   | 4.4               | 100                                |
| Primary forest (million ha)  | 3     | 3     | 3     | 3                 | 7                                  |
| Mangroves (million ha)   | 1.45  | 1.15  | 1.31  | 1.26              | 100                                |
| Forest in protected areas (million ha)   | 18    | 21    | 26    | 28                | 78                                 |
| Forest area with management plans (million ha)   | -     | 12    | 12    | 12                | 25                                 |
| Designated management objective  |       |       |       |                   |                                    |
| Production (million ha)  | 8.0   | 8.7   | 9.3   | 9.2               | 98                                 |
| Protection of soil and water (million ha)  | 1.2   | 1.2   | 1.2   | 1.2               | 26                                 |
| Conservation (million ha)  | 20    | 24    | 29    | 31                | 98                                 |
| Social services (million ha)   | 0     | 0     | 0     | 0                 | 5                                  |
| Multiple use (million ha)  | 13    | 10    | 12    | 12                | 97                                 |
| Other (million ha)   | 0     | 0     | 0     | 0                 | 78                                 |
| VARIABLE (UNIT)  | 1990  | 2000  | 2010  | 2015              | DATA AVAILABILITY (%) <sup>b</sup> |
| Private ownership (million ha)   | 78    | 74    | 77    | 84                | 98                                 |
| Public ownership (million ha)  | 103   | 104   | 99    | 95                | 98                                 |
| Other/unknown ownership (million ha)   | 4.7   | 5.8   | 4.0   | 1.2               | 100                                |
| <i>Note:</i>   |       |       |       |                   |                                    |
| <sup>a</sup> Data for 2020 comprise countries that reported complete time series of data, and values may differ from those presented in the report based on the analysis of exclusively 2020 data. |       |       |       |                   |                                    |
| <sup>b</sup> Data availability refers to the proportion of total forest area represented by reporting countries.   |       |       |       |                   |                                    |
| <sup>c</sup> Missing values have been filled with FAO estimates.   |       |       |       |                   |                                    |



**SOUTH AMERICA**  
14 countries and territories

| VARIABLE (UNIT)                                | 1990  | 2000  | 2010  | 2020 <sup>a</sup> | DATA AVAILABILITY (%) <sup>b</sup> |
|--|-------|-------|-------|-------------------|------------------------------------|
| Forest area (million ha)                       | 974   | 923   | 870   | 844               | 100                                |
| Forest area (% of land area)                   | 55.8  | 52.8  | 49.8  | 48.3              | 100                                |
| Growing stock (billion m <sup>3</sup> )        | 207   | 199   | 191   | 187               | 100 <sup>c</sup>                   |
| Growing stock (m <sup>3</sup> /ha)             | 212.8 | 215.7 | 219.2 | 222.1             | 100 <sup>c</sup>                   |
| Carbon stock in biomass (Gt)                   | 106   | 102   | 98    | 96                | 100 <sup>c</sup>                   |
| Carbon stock in biomass (t/ha)                 | 109.4 | 111.0 | 112.9 | 114.1             | 100 <sup>c</sup>                   |
| Total carbon stock (Gt)                        | 162   | 155   | 148   | 145               | 100 <sup>c</sup>                   |
| Total carbon stock (t/ha)                      | 166.1 | 167.9 | 170.0 | 171.6             | 100 <sup>c</sup>                   |
| Naturally regenerating forest (million ha)     | 967   | 913   | 855   | 824               | 100                                |
| Planted forest (million ha)                    | 7.0   | 9.4   | 14.9  | 20.2              | 100                                |
| ... of which plantation forest (million ha)    | 7.0   | 9.3   | 14.7  | 20.1              | 100                                |
| Primary forest (million ha)                    | 342   | 325   | 302   | 299               | 72                                 |
| Mangroves (million ha)                         | 2.15  | 2.05  | 1.98  | 2.12              | 100                                |
| Forest in protected areas (million ha)         | 150   | 172   | 206   | 216               | 80                                 |
| Forest area with management plans (million ha) | -     | 65    | 99    | 134               | 95                                 |
| Designated management objective                |       |       |       |                   |                                    |
| Production (million ha)                        | 99    | 102   | 102   | 100               | 83                                 |
| Protection of soil and water (million ha)      | 33    | 31    | 30    | 34                | 71                                 |
| Conservation (million ha)                      | 68    | 78    | 82    | 83                | 86                                 |
| Social services (million ha)                   | 144   | 143   | 141   | 140               | 71                                 |
| Multiple use (million ha)                      | 309   | 275   | 238   | 223               | 71                                 |
| Other (million ha)                             | 16    | 3.0   | 3.0   | 2.9               | 71                                 |
| VARIABLE (UNIT)                                | 1990  | 2000  | 2010  | 2015              | DATA AVAILABILITY (%) <sup>b</sup> |
| Private ownership (million ha)                 | 302   | 286   | 255   | 248               | 87                                 |
| Public ownership (million ha)                  | 488   | 480   | 466   | 462               | 87                                 |
| Other/unknown ownership (million ha)           | 184   | 82    | 75    | 55                | 100                                |

*Note:*

<sup>a</sup> Data for 2020 comprise countries that reported complete time series of data, and values may differ from those presented in the report based on the analysis of exclusively 2020 data.

<sup>b</sup> Data availability refers to the proportion of total forest area represented by reporting countries.

<sup>c</sup> Missing values have been filled with FAO estimates.

## Annex 2. Global tables

**TABLE A1. Extent of forest, 1990–2020**

| Country/territory                | Forest area (1 000 ha) |         |         |         | Net annual change |       |             |       |             |       |
|----------------------------------|------------------------|---------|---------|---------|-------------------|-------|-------------|-------|-------------|-------|
|                                  | 1990                   | 2000    | 2010    | 2020    | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                                  |                        |         |         |         | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Afghanistan                      | 1 208                  | 1 208   | 1 208   | 1 208   | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Albania                          | 789                    | 769     | 782     | 789     | -2.0              | -0.25 | 1.3         | 0.16  | 0.7         | 0.09  |
| Algeria                          | 1 667                  | 1 579   | 1 918   | 1 949   | -8.8              | -0.54 | 33.9        | 1.96  | 3.1         | 0.16  |
| American Samoa                   | 18                     | 18      | 17      | 17      | n.s.              | -0.19 | n.s.        | -0.17 | n.s.        | -0.17 |
| Andorra                          | 16                     | 16      | 16      | 16      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Angola                           | 79 263                 | 77 709  | 72 158  | 66 607  | -155.4            | -0.20 | -555.1      | -0.74 | -555.1      | -0.80 |
| Anguilla                         | 6                      | 6       | 6       | 6       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Antigua and Barbuda              | 10                     | 9       | 9       | 8       | -0.1              | -0.67 | -0.1        | -0.73 | -0.1        | -0.78 |
| Argentina                        | 35 204                 | 33 378  | 30 214  | 28 573  | -182.6            | -0.53 | -316.4      | -0.99 | -164.1      | -0.56 |
| Armenia                          | 335                    | 333     | 331     | 328     | -0.2              | -0.06 | -0.2        | -0.06 | -0.2        | -0.06 |
| Aruba                            | n.s.                   | n.s.    | n.s.    | n.s.    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Australia                        | 133 882                | 131 814 | 129 546 | 134 005 | -206.8            | -0.16 | -226.8      | -0.17 | 445.9       | 0.34  |
| Austria                          | 3 776                  | 3 838   | 3 863   | 3 899   | 6.2               | 0.16  | 2.5         | 0.07  | 3.6         | 0.09  |
| Azerbaijan                       | 945                    | 987     | 1 032   | 1 132   | 4.2               | 0.44  | 4.5         | 0.45  | 9.9         | 0.92  |
| Bahamas                          | 510                    | 510     | 510     | 510     | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Bahrain                          | n.s.                   | n.s.    | 1       | 1       | n.s.              | 5.34  | n.s.        | 3.46  | n.s.        | 3.02  |
| Bangladesh                       | 1 920                  | 1 920   | 1 888   | 1 883   | n.s.              | n.s.  | -3.2        | -0.17 | -0.5        | -0.03 |
| Barbados                         | 6                      | 6       | 6       | 6       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Belarus                          | 7 780                  | 8 273   | 8 630   | 8 768   | 49.3              | 0.62  | 35.7        | 0.42  | 13.8        | 0.16  |
| Belgium                          | 677                    | 667     | 690     | 689     | -1.0              | -0.15 | 2.3         | 0.33  | -0.1        | -0.01 |
| Belize                           | 1 600                  | 1 459   | 1 391   | 1 277   | -14.1             | -0.92 | -6.8        | -0.48 | -11.4       | -0.85 |
| Benin                            | 4 835                  | 4 135   | 3 635   | 3 135   | -70.0             | -1.55 | -50.0       | -1.28 | -50.0       | -1.47 |
| Bermuda                          | 1                      | 1       | 1       | 1       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Bhutan                           | 2 507                  | 2 606   | 2 705   | 2 725   | 9.9               | 0.39  | 9.9         | 0.37  | 2.0         | 0.07  |
| Bolivia (Plurinational State of) | 57 805                 | 55 101  | 53 086  | 50 834  | -270.3            | -0.48 | -201.5      | -0.37 | -225.2      | -0.43 |
| Bonaire, Sint Eustatius and Saba | 2                      | 2       | 2       | 2       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Bosnia and Herzegovina           | 2 210                  | 2 112   | 2 103   | 2 188   | -9.8              | -0.45 | -0.9        | -0.04 | 8.5         | 0.40  |
| Botswana                         | 18 804                 | 17 621  | 16 438  | 15 255  | -118.3            | -0.65 | -118.3      | -0.69 | -118.3      | -0.74 |
| Brazil                           | 588 898                | 551 089 | 511 581 | 496 620 | -3 780.9          | -0.66 | -3 950.8    | -0.74 | -1 496.1    | -0.30 |
| British Virgin Islands           | 4                      | 4       | 4       | 4       | n.s.              | -0.11 | n.s.        | -0.08 | n.s.        | -0.06 |
| Brunei Darussalam                | 413                    | 397     | 380     | 380     | -1.6              | -0.39 | -1.7        | -0.44 | 0.0         | 0.00  |
| Bulgaria                         | 3 327                  | 3 375   | 3 737   | 3 893   | 4.8               | 0.14  | 36.2        | 1.02  | 15.6        | 0.41  |
| Burkina Faso                     | 7 717                  | 7 217   | 6 717   | 6 216   | -50.0             | -0.67 | -50.0       | -0.72 | -50.0       | -0.77 |

(Continued)

TABLE A1. (Continued)

| Country/territory                     | Forest area (1 000 ha) |         |         |         | Net annual change |       |             |       |             |       |
|---------------------------------------|------------------------|---------|---------|---------|-------------------|-------|-------------|-------|-------------|-------|
|                                       | 1990                   | 2000    | 2010    | 2020    | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                                       |                        |         |         |         | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Burundi                               | 276                    | 194     | 194     | 280     | -8.3              | -3.48 | 0.0         | 0.00  | 8.6         | 3.73  |
| Cabo Verde                            | 15                     | 40      | 43      | 46      | 2.4               | 9.95  | 0.3         | 0.73  | 0.3         | 0.68  |
| Cambodia                              | 11 005                 | 10 781  | 10 589  | 8 068   | -22.4             | -0.21 | -19.2       | -0.18 | -252.1      | -2.68 |
| Cameroon                              | 22 500                 | 21 597  | 20 900  | 20 340  | -90.3             | -0.41 | -69.7       | -0.33 | -56.0       | -0.27 |
| Canada                                | 348 273                | 347 802 | 347 322 | 346 928 | -47.1             | -0.01 | -48.0       | -0.01 | -39.4       | -0.01 |
| Cayman Islands                        | 13                     | 13      | 13      | 13      | n.s.              | -0.15 | n.s.        | -0.16 | 0.0         | 0.00  |
| Central African Republic              | 23 203                 | 22 903  | 22 603  | 22 303  | -30.0             | -0.13 | -30.0       | -0.13 | -30.0       | -0.13 |
| Chad                                  | 6 730                  | 6 353   | 5 530   | 4 313   | -37.7             | -0.57 | -82.3       | -1.38 | -121.7      | -2.45 |
| Chile                                 | 15 246                 | 15 817  | 16 725  | 18 211  | 57.1              | 0.37  | 90.8        | 0.56  | 148.5       | 0.85  |
| China                                 | 157 141                | 177 001 | 200 610 | 219 978 | 1 986.0           | 1.20  | 2 361.0     | 1.26  | 1 936.8     | 0.93  |
| Colombia                              | 64 958                 | 62 736  | 60 808  | 59 142  | -222.3            | -0.35 | -192.8      | -0.31 | -166.6      | -0.28 |
| Comoros                               | 46                     | 42      | 37      | 33      | -0.4              | -0.99 | -0.4        | -1.10 | -0.4        | -1.24 |
| Congo                                 | 22 315                 | 22 195  | 22 075  | 21 946  | -12.0             | -0.05 | -12.0       | -0.05 | -12.9       | -0.06 |
| Cook Islands                          | 15                     | 16      | 16      | 16      | 0.1               | 0.43  | n.s.        | 0.01  | 0.0         | 0.00  |
| Costa Rica                            | 2 907                  | 2 857   | 2 871   | 3 035   | -5.0              | -0.17 | 1.4         | 0.05  | 16.4        | 0.56  |
| Côte d'Ivoire                         | 7 851                  | 5 094   | 3 966   | 2 837   | -275.6            | -4.23 | -112.9      | -2.47 | -112.9      | -3.29 |
| Croatia                               | 1 850                  | 1 885   | 1 920   | 1 939   | 3.5               | 0.19  | 3.5         | 0.18  | 1.9         | 0.10  |
| Cuba                                  | 2 058                  | 2 435   | 2 932   | 3 242   | 37.7              | 1.70  | 49.7        | 1.87  | 31.0        | 1.01  |
| Curaçao                               | n.s.                   | n.s.    | n.s.    | n.s.    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Cyprus                                | 161                    | 172     | 173     | 173     | 1.1               | 0.63  | 0.1         | 0.07  | n.s.        | -0.02 |
| Czechia                               | 2 629                  | 2 637   | 2 657   | 2 677   | 0.8               | 0.03  | 2.0         | 0.08  | 2.0         | 0.07  |
| Democratic People's Republic of Korea | 6 912                  | 6 455   | 6 242   | 6 030   | -45.7             | -0.68 | -21.2       | -0.33 | -21.2       | -0.35 |
| Democratic Republic of the Congo      | 150 629                | 143 899 | 137 169 | 126 155 | -673.0            | -0.46 | -673.0      | -0.48 | -1 101.4    | -0.83 |
| Denmark                               | 531                    | 572     | 586     | 628     | 4.0               | 0.73  | 1.5         | 0.26  | 4.2         | 0.69  |
| Djibouti                              | 6                      | 6       | 6       | 6       | 0.0               | 0.00  | 0.0         | 0.00  | n.s.        | 0.35  |
| Dominica                              | 50                     | 48      | 48      | 48      | -0.2              | -0.50 | 0.0         | 0.00  | 0.0         | 0.00  |
| Dominican Republic                    | 1 595                  | 1 972   | 2 073   | 2 144   | 37.8              | 2.15  | 10.1        | 0.50  | 7.1         | 0.34  |
| Ecuador                               | 14 632                 | 13 731  | 13 028  | 12 498  | -90.2             | -0.63 | -70.2       | -0.52 | -53.0       | -0.41 |
| Egypt                                 | 44                     | 59      | 66      | 45      | 1.5               | 3.06  | 0.6         | 1.04  | -2.1        | -3.71 |
| El Salvador                           | 719                    | 674     | 629     | 584     | -4.5              | -0.64 | -4.5        | -0.69 | -4.5        | -0.74 |
| Equatorial Guinea                     | 2 699                  | 2 616   | 2 532   | 2 448   | -8.4              | -0.31 | -8.4        | -0.32 | -8.4        | -0.34 |
| Eritrea                               | 1 150                  | 1 118   | 1 087   | 1 055   | -3.2              | -0.28 | -3.2        | -0.29 | -3.2        | -0.29 |
| Estonia                               | 2 206                  | 2 239   | 2 336   | 2 438   | 3.3               | 0.15  | 9.7         | 0.43  | 10.2        | 0.43  |
| Eswatini                              | 461                    | 473     | 485     | 498     | 1.2               | 0.26  | 1.2         | 0.25  | 1.2         | 0.25  |
| Ethiopia                              | 19 259                 | 18 529  | 17 799  | 17 069  | -73.0             | -0.39 | -73.0       | -0.40 | -73.0       | -0.42 |
| Falkland Islands (Malvinas)*          | 0                      | 0       | 0       | 0       | 0.0               |       | 0.0         |       | 0.0         |       |
| Faroe Islands                         | n.s.                   | n.s.    | n.s.    | n.s.    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Fiji                                  | 940                    | 1 006   | 1 073   | 1 140   | 6.7               | 0.69  | 6.7         | 0.64  | 6.7         | 0.61  |

(Continued)

TABLE A1. (Continued)

| Country/territory          | Forest area (1 000 ha) |         |        |        | Net annual change |       |             |       |             |       |
|----------------------------|------------------------|---------|--------|--------|-------------------|-------|-------------|-------|-------------|-------|
|                            | 1990                   | 2000    | 2010   | 2020   | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                            |                        |         |        |        | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Finland                    | 21 875                 | 22 446  | 22 242 | 22 409 | 57.0              | 0.26  | -20.4       | -0.09 | 16.7        | 0.07  |
| France                     | 14 436                 | 15 288  | 16 419 | 17 253 | 85.2              | 0.58  | 113.1       | 0.72  | 83.4        | 0.50  |
| French Guiana              | 8 125                  | 8 079   | 8 037  | 8 003  | -4.6              | -0.06 | -4.3        | -0.05 | -3.4        | -0.04 |
| French Polynesia           | 144                    | 149     | 149    | 149    | 0.4               | 0.28  | 0.1         | 0.06  | 0.0         | 0.00  |
| Gabon                      | 23 762                 | 23 700  | 23 649 | 23 531 | -6.2              | -0.03 | -5.1        | -0.02 | -11.9       | -0.05 |
| Gambia                     | 415                    | 357     | 300    | 243    | -5.7              | -1.48 | -5.7        | -1.73 | -5.7        | -2.10 |
| Georgia                    | 2 752                  | 2 761   | 2 822  | 2 822  | 0.8               | 0.03  | 6.2         | 0.22  | 0.0         | 0.00  |
| Germany                    | 11 300                 | 11 354  | 11 409 | 11 419 | 5.4               | 0.05  | 5.5         | 0.05  | 1.0         | 0.01  |
| Ghana                      | 9 924                  | 8 849   | 7 943  | 7 986  | -107.6            | -1.14 | -90.6       | -1.07 | 4.3         | 0.05  |
| Gibraltar                  | 0                      | 0       | 0      | 0      | 0.0               |       | 0.0         |       | 0.0         |       |
| Greece                     | 3 299                  | 3 600   | 3 902  | 3 902  | 30.2              | 0.88  | 30.2        | 0.81  | n.s.        | n.s.  |
| Greenland                  | n.s.                   | n.s.    | n.s.   | n.s.   | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Grenada                    | 18                     | 18      | 18     | 18     | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Guadeloupe                 | 73                     | 72      | 72     | 72     | -0.1              | -0.12 | -0.1        | -0.10 | n.s.        | 0.05  |
| Guam                       | 24                     | 24      | 24     | 28     | 0.0               | 0.00  | 0.0         | 0.00  | 0.4         | 1.55  |
| Guatemala                  | 4 781                  | 4 209   | 3 723  | 3 528  | -57.2             | -1.27 | -48.7       | -1.22 | -19.5       | -0.54 |
| Guernsey                   | n.s.                   | n.s.    | n.s.   | n.s.   | 0.0               | 0.00  | n.s.        | 6.21  | 0.0         | 0.00  |
| Guinea                     | 7 276                  | 6 929   | 6 569  | 6 189  | -34.7             | -0.49 | -36.0       | -0.53 | -38.0       | -0.59 |
| Guinea-Bissau              | 2 233                  | 2 149   | 2 064  | 1 980  | -8.4              | -0.38 | -8.4        | -0.40 | -8.4        | -0.42 |
| Guyana                     | 18 602                 | 18 564  | 18 520 | 18 415 | -3.8              | -0.02 | -4.4        | -0.02 | -10.4       | -0.06 |
| Haiti                      | 383                    | 381     | 378    | 347    | -0.2              | -0.06 | -0.2        | -0.06 | -3.1        | -0.85 |
| Holy See                   | 0                      | 0       | 0      | 0      | 0.0               |       | 0.0         |       | 0.0         |       |
| Honduras                   | 6 988                  | 6 778   | 6 575  | 6 359  | -21.0             | -0.30 | -20.3       | -0.30 | -21.6       | -0.33 |
| Hungary                    | 1 814                  | 1 921   | 2 046  | 2 053  | 10.7              | 0.58  | 12.5        | 0.63  | 0.7         | 0.03  |
| Iceland                    | 17                     | 30      | 45     | 51     | 1.3               | 5.74  | 1.5         | 4.12  | 0.7         | 1.40  |
| India                      | 63 938                 | 67 591  | 69 496 | 72 160 | 365.3             | 0.56  | 190.5       | 0.28  | 266.4       | 0.38  |
| Indonesia                  | 118 545                | 101 280 | 99 659 | 92 133 | -1 726.5          | -1.56 | -162.1      | -0.16 | -752.6      | -0.78 |
| Iran (Islamic Republic of) | 9 076                  | 9 326   | 10 692 | 10 752 | 25.0              | 0.27  | 136.6       | 1.38  | 6.0         | 0.06  |
| Iraq                       | 804                    | 818     | 825    | 825    | 1.4               | 0.17  | 0.7         | 0.09  | 0.0         | 0.00  |
| Ireland                    | 462                    | 630     | 720    | 782    | 16.9              | 3.16  | 9.0         | 1.34  | 6.2         | 0.82  |
| Isle of Man                | 3                      | 3       | 3      | 3      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Israel                     | 132                    | 153     | 154    | 140    | 2.1               | 1.49  | 0.1         | 0.07  | -1.4        | -0.95 |
| Italy                      | 7 590                  | 8 369   | 9 028  | 9 566  | 78.0              | 0.98  | 65.9        | 0.76  | 53.8        | 0.58  |
| Jamaica                    | 521                    | 521     | 558    | 597    | n.s.              | -0.01 | 3.7         | 0.70  | 3.8         | 0.67  |
| Japan                      | 24 950                 | 24 876  | 24 966 | 24 935 | -7.4              | -0.03 | 9.0         | 0.04  | -3.1        | -0.01 |
| Jersey                     | 1                      | 1       | 1      | 1      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Jordan                     | 98                     | 98      | 98     | 98     | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Kazakhstan                 | 3 162                  | 3 157   | 3 082  | 3 455  | -0.5              | -0.02 | -7.5        | -0.24 | 37.3        | 1.15  |
| Kenya                      | 3 859                  | 3 961   | 3 616  | 3 611  | 10.3              | 0.26  | -34.5       | -0.91 | -0.5        | -0.01 |
| Kiribati                   | 1                      | 1       | 1      | 1      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |

(Continued)

TABLE A1. (Continued)

| Country/territory                | Forest area (1 000 ha) |        |        |        | Net annual change |       |             |       |             |       |
|----------------------------------|------------------------|--------|--------|--------|-------------------|-------|-------------|-------|-------------|-------|
|                                  | 1990                   | 2000   | 2010   | 2020   | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                                  |                        |        |        |        | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Kuwait                           | 3                      | 5      | 6      | 6      | 0.1               | 3.46  | 0.1         | 2.57  | 0.0         | 0.00  |
| Kyrgyzstan                       | 1 136                  | 1 181  | 1 230  | 1 315  | 4.4               | 0.38  | 4.9         | 0.41  | 8.6         | 0.68  |
| Lao People's Democratic Republic | 17 843                 | 17 425 | 16 941 | 16 596 | -41.8             | -0.24 | -48.5       | -0.28 | -34.5       | -0.21 |
| Latvia                           | 3 173                  | 3 241  | 3 372  | 3 411  | 6.8               | 0.21  | 13.1        | 0.40  | 3.9         | 0.11  |
| Lebanon                          | 140                    | 138    | 137    | 143    | -0.2              | -0.11 | -0.1        | -0.06 | 0.6         | 0.43  |
| Lesotho                          | 35                     | 35     | 35     | 35     | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Liberia                          | 8 525                  | 8 223  | 7 920  | 7 617  | -30.3             | -0.36 | -30.3       | -0.37 | -30.3       | -0.39 |
| Libya                            | 217                    | 217    | 217    | 217    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Liechtenstein                    | 7                      | 7      | 7      | 7      | n.s.              | 0.30  | n.s.        | n.s.  | n.s.        | n.s.  |
| Lithuania                        | 1 945                  | 2 020  | 2 170  | 2 201  | 7.5               | 0.38  | 15.0        | 0.72  | 3.1         | 0.14  |
| Luxembourg                       | 86                     | 87     | 89     | 89     | 0.1               | 0.10  | 0.2         | 0.23  | 0.0         | 0.00  |
| Madagascar                       | 13 693                 | 13 031 | 12 562 | 12 430 | -66.3             | -0.49 | -46.9       | -0.37 | -13.2       | -0.11 |
| Malawi                           | 3 502                  | 3 082  | 2 662  | 2 242  | -42.0             | -1.27 | -42.0       | -1.45 | -42.0       | -1.70 |
| Malaysia                         | 20 619                 | 19 691 | 18 948 | 19 114 | -92.7             | -0.46 | -74.4       | -0.38 | 16.6        | 0.09  |
| Maldives                         | 1                      | 1      | 1      | 1      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Mali                             | 13 296                 | 13 296 | 13 296 | 13 296 | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Malta                            | n.s.                   | n.s.   | n.s.   | n.s.   | 0.0               | 0.00  | 0.0         | 0.00  | n.s.        | 2.77  |
| Marshall Islands                 | 9                      | 9      | 9      | 9      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Martinique                       | 48                     | 49     | 50     | 52     | 0.1               | 0.19  | 0.2         | 0.31  | 0.2         | 0.39  |
| Mauritania                       | 476                    | 422    | 367    | 313    | -5.4              | -1.21 | -5.4        | -1.37 | -5.4        | -1.59 |
| Mauritius                        | 41                     | 42     | 38     | 39     | 0.1               | 0.21  | -0.4        | -0.88 | n.s.        | 0.10  |
| Mayotte                          | 19                     | 16     | 14     | 14     | -0.3              | -1.96 | -0.1        | -0.83 | -0.1        | -0.37 |
| Mexico                           | 70 592                 | 68 381 | 66 943 | 65 692 | -221.0            | -0.32 | -143.8      | -0.21 | -125.1      | -0.19 |
| Micronesia (Federated States of) | 64                     | 64     | 64     | 64     | n.s.              | 0.04  | n.s.        | 0.04  | n.s.        | 0.05  |
| Monaco                           | 0                      | 0      | 0      | 0      | 0.0               |       | 0.0         |       | 0.0         |       |
| Mongolia                         | 14 352                 | 14 264 | 14 184 | 14 173 | -8.8              | -0.06 | -8.0        | -0.06 | -1.1        | -0.01 |
| Montenegro                       | 626                    | 626    | 827    | 827    | 0.0               | 0.00  | 20.1        | 2.82  | 0.0         | 0.00  |
| Montserrat                       | 4                      | 3      | 3      | 3      | -0.1              | -3.31 | 0.0         | 0.00  | 0.0         | 0.00  |
| Morocco                          | 5 485                  | 5 507  | 5 675  | 5 742  | 2.1               | 0.04  | 16.8        | 0.30  | 6.8         | 0.12  |
| Mozambique                       | 43 378                 | 41 188 | 38 972 | 36 744 | -219.0            | -0.52 | -221.6      | -0.55 | -222.8      | -0.59 |
| Myanmar                          | 39 218                 | 34 868 | 31 441 | 28 544 | -435.0            | -1.17 | -342.7      | -1.03 | -289.7      | -0.96 |
| Namibia                          | 8 769                  | 8 059  | 7 349  | 6 639  | -71.0             | -0.84 | -71.0       | -0.92 | -71.0       | -1.01 |
| Nauru                            | 0                      | 0      | 0      | 0      | 0.0               |       | 0.0         |       | 0.0         |       |
| Nepal                            | 5 672                  | 5 781  | 5 962  | 5 962  | 10.9              | 0.19  | 18.1        | 0.31  | 0.0         | 0.00  |
| Netherlands                      | 345                    | 360    | 373    | 370    | 1.4               | 0.40  | 1.4         | 0.38  | -0.4        | -0.11 |
| New Caledonia                    | 831                    | 838    | 839    | 838    | 0.7               | 0.08  | 0.1         | 0.01  | -0.1        | -0.01 |
| New Zealand                      | 9 372                  | 9 850  | 9 848  | 9 893  | 47.8              | 0.50  | -0.2        | n.s.  | 4.4         | 0.05  |
| Nicaragua                        | 6 399                  | 5 399  | 4 188  | 3 408  | -100.0            | -1.68 | -121.1      | -2.51 | -78.1       | -2.04 |

(Continued)

TABLE A1. (Continued)

| Country/territory                            | Forest area (1 000 ha) |         |         |         | Net annual change |       |             |       |             |       |
|--|------------------------|---------|---------|---------|-------------------|-------|-------------|-------|-------------|-------|
|  | 1990                   | 2000    | 2010    | 2020    | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|  |                        |         |         |         | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Niger  | 1 945                  | 1 328   | 1 204   | 1 080   | -61.7             | -3.74 | -12.4       | -0.98 | -12.4       | -1.08 |
| Nigeria                                      | 26 526                 | 24 893  | 23 260  | 21 627  | -163.3            | -0.63 | -163.3      | -0.68 | -163.3      | -0.73 |
| Niue   | 19                     | 19      | 19      | 19      | n.s.              | -0.05 | n.s.        | -0.03 | n.s.        | 0.05  |
| Norfolk Island                               | n.s.                   | n.s.    | n.s.    | n.s.    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| North Macedonia                              | 912                    | 958     | 960     | 1 001   | 4.6               | 0.49  | 0.3         | 0.03  | 4.1         | 0.42  |
| Northern Mariana Islands                     | 34                     | 32      | 30      | 24      | -0.2              | -0.50 | -0.2        | -0.53 | -0.6        | -2.16 |
| Norway                                       | 12 132                 | 12 113  | 12 102  | 12 180  | -1.9              | -0.02 | -1.1        | -0.01 | 7.8         | 0.06  |
| Oman   | 3                      | 3       | 3       | 3       | 0.0               | 0.00  | 0.0         | 0.00  | -0.1        | -1.81 |
| Pakistan                                     | 4 987                  | 4 511   | 4 094   | 3 726   | -47.6             | -1.00 | -41.8       | -0.97 | -36.8       | -0.94 |
| Palau  | 38                     | 40      | 41      | 41      | 0.1               | 0.37  | 0.1         | 0.24  | 0.1         | 0.21  |
| Palestine                                    | 9                      | 9       | 10      | 10      | 0.0               | 0.00  | 0.1         | 0.92  | n.s.        | 0.19  |
| Panama                                       | 4 607                  | 4 442   | 4 328   | 4 214   | -16.5             | -0.36 | -11.4       | -0.26 | -11.4       | -0.27 |
| Papua New Guinea                             | 36 400                 | 36 278  | 36 179  | 35 856  | -12.2             | -0.03 | -9.9        | -0.03 | -32.3       | -0.09 |
| Paraguay                                     | 25 546                 | 22 992  | 19 570  | 16 102  | -255.4            | -1.05 | -342.1      | -1.60 | -346.8      | -1.93 |
| Peru   | 76 449                 | 75 298  | 74 050  | 72 330  | -115.1            | -0.15 | -124.8      | -0.17 | -171.9      | -0.23 |
| Philippines                                  | 7 779                  | 7 309   | 6 840   | 7 189   | -47.0             | -0.62 | -47.0       | -0.66 | 34.9        | 0.50  |
| Pitcairn Islands                             | 4                      | 4       | 4       | 4       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Poland                                       | 8 882                  | 9 059   | 9 329   | 9 483   | 17.7              | 0.20  | 27.0        | 0.29  | 15.4        | 0.16  |
| Portugal                                     | 3 399                  | 3 281   | 3 252   | 3 312   | -11.8             | -0.35 | -2.9        | -0.09 | 6.0         | 0.18  |
| Puerto Rico                                  | 320                    | 429     | 491     | 496     | 10.9              | 2.97  | 6.2         | 1.36  | 0.5         | 0.10  |
| Qatar  | 0                      | 0       | 0       | 0       | 0.0               |       | 0.0         |       | 0.0         |       |
| Republic of Korea                            | 6 551                  | 6 476   | 6 387   | 6 287   | -7.5              | -0.12 | -8.9        | -0.14 | -10.0       | -0.16 |
| Republic of Moldova                          | 325                    | 344     | 375     | 387     | 1.9               | 0.57  | 3.0         | 0.84  | 1.2         | 0.32  |
| Réunion                                      | 88                     | 91      | 94      | 98      | 0.3               | 0.34  | 0.3         | 0.33  | 0.4         | 0.46  |
| Romania                                      | 6 371                  | 6 366   | 6 515   | 6 929   | -0.5              | -0.01 | 14.9        | 0.23  | 41.4        | 0.62  |
| Russian Federation                           | 808 950                | 809 269 | 815 136 | 815 312 | 31.9              | n.s.  | 586.7       | 0.07  | 17.6        | n.s.  |
| Rwanda                                       | 317                    | 287     | 265     | 276     | -3.0              | -0.99 | -2.2        | -0.79 | 1.1         | 0.41  |
| Saint Barthélemy                             | n.s.                   | n.s.    | n.s.    | n.s.    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Saint Helena, Ascension and Tristan da Cunha | 2                      | 2       | 2       | 2       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Saint Kitts and Nevis                        | 11                     | 11      | 11      | 11      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Saint Lucia                                  | 21                     | 21      | 21      | 21      | n.s.              | -0.12 | n.s.        | -0.11 | 0.0         | 0.00  |
| Saint Martin (French part)                   | 1                      | 1       | 1       | 1       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Saint Pierre and Miquelon                    | 2                      | 2       | 1       | 1       | n.s.              | -1.28 | n.s.        | -1.47 | n.s.        | -1.64 |
| Saint Vincent and the Grenadines             | 28                     | 29      | 29      | 29      | 0.1               | 0.36  | 0.0         | 0.00  | 0.0         | 0.00  |
| Samoa  | 176                    | 171     | 166     | 162     | -0.5              | -0.28 | -0.5        | -0.28 | -0.5        | -0.29 |
| San Marino                                   | 1                      | 1       | 1       | 1       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Sao Tome and Principe                        | 59                     | 58      | 58      | 52      | n.s.              | -0.04 | n.s.        | -0.04 | -0.6        | -1.12 |
| Saudi Arabia                                 | 977                    | 977     | 977     | 977     | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |

(Continued)

TABLE A1. (Continued)

| Country/territory                                    | Forest area (1 000 ha) |         |         |         | Net annual change |       |             |       |             |       |
|--|------------------------|---------|---------|---------|-------------------|-------|-------------|-------|-------------|-------|
|  | 1990                   | 2000    | 2010    | 2020    | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|  |                        |         |         |         | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Senegal  | 9 303                  | 8 853   | 8 468   | 8 068   | -45.0             | -0.49 | -38.5       | -0.44 | -40.0       | -0.48 |
| Serbia   | 2 313                  | 2 460   | 2 713   | 2 723   | 14.7              | 0.62  | 25.3        | 0.98  | 1.0         | 0.04  |
| Seychelles   | 34                     | 34      | 34      | 34      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Sierra Leone   | 3 127                  | 2 929   | 2 732   | 2 535   | -19.7             | -0.65 | -19.7       | -0.69 | -19.7       | -0.75 |
| Singapore  | 15                     | 17      | 18      | 16      | 0.2               | 1.39  | 0.1         | 0.42  | -0.2        | -1.30 |
| Sint Maarten (Dutch part)                            | n.s.                   | n.s.    | n.s.    | n.s.    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Slovakia   | 1 902                  | 1 901   | 1 918   | 1 926   | -0.1              | -0.01 | 1.7         | 0.09  | 0.8         | 0.04  |
| Slovenia   | 1 188                  | 1 233   | 1 247   | 1 238   | 4.5               | 0.37  | 1.4         | 0.11  | -0.9        | -0.07 |
| Solomon Islands                                      | 2 545                  | 2 538   | 2 530   | 2 523   | -0.7              | -0.03 | -0.7        | -0.03 | -0.7        | -0.03 |
| Somalia  | 8 283                  | 7 515   | 6 748   | 5 980   | -76.8             | -0.97 | -76.8       | -1.07 | -76.8       | -1.20 |
| South Africa   | 18 142                 | 17 778  | 17 414  | 17 050  | -36.4             | -0.20 | -36.4       | -0.21 | -36.4       | -0.21 |
| South Sudan  | 7 157                  | 7 157   | 7 157   | 7 157   | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Spain  | 13 905                 | 17 094  | 18 545  | 18 572  | 318.9             | 2.09  | 145.1       | 0.82  | 2.7         | 0.01  |
| Sri Lanka  | 2 350                  | 2 166   | 2 104   | 2 113   | -18.4             | -0.81 | -6.3        | -0.29 | 0.9         | 0.04  |
| Sudan  | 23 570                 | 21 826  | 20 081  | 18 360  | -174.4            | -0.77 | -174.5      | -0.83 | -172.2      | -0.89 |
| Suriname   | 15 378                 | 15 341  | 15 300  | 15 196  | -3.7              | -0.02 | -4.1        | -0.03 | -10.4       | -0.07 |
| Svalbard and Jan Mayen Islands                       | 0                      | 0       | 0       | 0       | 0.0               |       | 0.0         |       | 0.0         |       |
| Sweden   | 28 063                 | 28 163  | 28 073  | 27 980  | 10.0              | 0.04  | -9.0        | -0.03 | -9.3        | -0.03 |
| Switzerland  | 1 154                  | 1 196   | 1 235   | 1 269   | 4.3               | 0.36  | 3.9         | 0.32  | 3.4         | 0.28  |
| Syrian Arab Republic                                 | 372                    | 432     | 492     | 522     | 6.0               | 1.51  | 6.0         | 1.31  | 3.0         | 0.59  |
| Tajikistan   | 408                    | 410     | 410     | 424     | 0.2               | 0.05  | 0.0         | 0.00  | 1.4         | 0.33  |
| Thailand   | 19 361                 | 18 998  | 20 073  | 19 873  | -36.3             | -0.19 | 107.5       | 0.55  | -20.0       | -0.10 |
| Timor-Leste  | 963                    | 949     | 935     | 921     | -1.4              | -0.15 | -1.4        | -0.15 | -1.4        | -0.15 |
| Togo   | 1 362                  | 1 268   | 1 239   | 1 209   | -9.3              | -0.71 | -3.0        | -0.24 | -3.0        | -0.24 |
| Tokelau  | 0                      | 0       | 0       | 0       | 0.0               |       | 0.0         |       | 0.0         |       |
| Tonga  | 9                      | 9       | 9       | 9       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Trinidad and Tobago                                  | 242                    | 237     | 232     | 228     | -0.5              | -0.23 | -0.4        | -0.18 | -0.4        | -0.18 |
| Tunisia  | 644                    | 668     | 687     | 703     | 2.4               | 0.36  | 2.0         | 0.29  | 1.5         | 0.22  |
| Turkey   | 19 783                 | 20 148  | 21 083  | 22 220  | 36.5              | 0.18  | 93.5        | 0.45  | 113.7       | 0.53  |
| Turkmenistan   | 4 127                  | 4 127   | 4 127   | 4 127   | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Turks and Caicos Islands                             | 11                     | 11      | 11      | 11      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Tuvalu   | 1                      | 1       | 1       | 1       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Uganda   | 3 575                  | 3 163   | 2 750   | 2 338   | -41.3             | -1.22 | -41.3       | -1.39 | -41.3       | -1.61 |
| Ukraine  | 9 274                  | 9 510   | 9 548   | 9 690   | 23.6              | 0.25  | 3.8         | 0.04  | 14.2        | 0.15  |
| United Arab Emirates                                 | 245                    | 309     | 317     | 317     | 6.4               | 2.36  | 0.8         | 0.25  | 0.0         | 0.00  |
| United Kingdom of Great Britain and Northern Ireland | 2 778                  | 2 954   | 3 059   | 3 190   | 17.6              | 0.62  | 10.5        | 0.35  | 13.1        | 0.42  |
| United Republic of Tanzania                          | 57 390                 | 53 670  | 49 950  | 45 745  | -372.0            | -0.67 | -372.0      | -0.72 | -420.5      | -0.88 |
| United States of America                             | 302 450                | 303 536 | 308 720 | 309 795 | 108.6             | 0.04  | 518.4       | 0.17  | 107.5       | 0.03  |

(Continued)

**TABLE A1.** (Continued)

| Country/territory                  | Forest area (1 000 ha) |        |        |        | Net annual change |       |             |       |             |       |
|------------------------------------|------------------------|--------|--------|--------|-------------------|-------|-------------|-------|-------------|-------|
|                                    | 1990                   | 2000   | 2010   | 2020   | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                                    |                        |        |        |        | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| United States Virgin Islands       | 25                     | 20     | 18     | 20     | -0.4              | -1.80 | -0.2        | -1.04 | 0.1         | 0.78  |
| Uruguay                            | 798                    | 1 369  | 1 731  | 2 031  | 57.1              | 5.55  | 36.2        | 2.38  | 30.0        | 1.61  |
| Uzbekistan                         | 2 549                  | 2 961  | 3 350  | 3 690  | 41.2              | 1.51  | 38.8        | 1.24  | 34.0        | 0.97  |
| Vanuatu                            | 442                    | 442    | 442    | 442    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Venezuela (Bolivarian Republic of) | 52 026                 | 49 151 | 47 505 | 46 231 | -287.5            | -0.57 | -164.6      | -0.34 | -127.4      | -0.27 |
| Viet Nam                           | 9 376                  | 11 784 | 13 388 | 14 643 | 240.8             | 2.31  | 160.4       | 1.28  | 125.5       | 0.90  |
| Wallis and Futuna Islands          | 6                      | 6      | 6      | 6      | n.s.              | 0.02  | n.s.        | 0.02  | n.s.        | 0.02  |
| Western Sahara                     | 665                    | 669    | 665    | 665    | 0.4               | 0.06  | -0.4        | -0.06 | n.s.        | n.s.  |
| Yemen                              | 549                    | 549    | 549    | 549    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Zambia                             | 47 412                 | 47 054 | 46 696 | 44 814 | -35.8             | -0.08 | -35.8       | -0.08 | -188.2      | -0.41 |
| Zimbabwe                           | 18 827                 | 18 366 | 17 905 | 17 445 | -46.1             | -0.25 | -46.1       | -0.25 | -46.1       | -0.26 |

Note: The rate of change (%) is calculated as the compound annual change rate.

\* A dispute exists between the Government of Argentina and the Government of the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).



**TABLE A2. Extent of naturally regenerating forest, 1990–2020**

| Country/territory                | Naturally regenerating forest (1 000 ha) |         |         |         | Net annual change |       |             |       |             |       |
|----------------------------------|--|---------|---------|---------|-------------------|-------|-------------|-------|-------------|-------|
|                                  | 1990                                     | 2000    | 2010    | 2020    | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                                  |  |         |         |         | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Afghanistan                      | 1 208                                    | 1 208   | 1 208   | 1 208   | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Albania                          | –  | –       | 712     | –       | –                 | –     | –           | –     | –           | –     |
| Algeria                          | 1 334                                    | 1 234   | 1 420   | 1 439   | -10.0             | -0.78 | 18.6        | 1.41  | 1.9         | 0.13  |
| American Samoa                   | 18                                       | 18      | 17      | 17      | n.s.              | -0.19 | n.s.        | -0.17 | n.s.        | -0.17 |
| Andorra                          | 16                                       | 16      | 16      | 16      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Angola                           | 78 302                                   | 76 767  | 71 284  | 65 800  | -153.5            | -0.20 | -548.3      | -0.74 | -548.3      | -0.80 |
| Anguilla                         | –  | –       | –       | –       | –                 | –     | –           | –     | –           | –     |
| Antigua and Barbuda              | –  | –       | –       | –       | –                 | –     | –           | –     | –           | –     |
| Argentina                        | 34 438                                   | 32 302  | 29 027  | 27 137  | -213.6            | -0.64 | -327.5      | -1.06 | -189.0      | -0.67 |
| Armenia                          | 321                                      | 322     | 310     | 310     | 0.1               | 0.03  | -1.2        | -0.38 | 0.0         | 0.00  |
| Aruba                            | n.s.                                     | n.s.    | n.s.    | n.s.    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Australia                        | 132 859                                  | 130 329 | 127 378 | 131 615 | -253.0            | -0.19 | -295.1      | -0.23 | 423.7       | 0.33  |
| Austria                          | 2 037                                    | 2 154   | 2 184   | 2 228   | 11.8              | 0.56  | 2.9         | 0.14  | 4.4         | 0.20  |
| Azerbaijan                       | 652                                      | 681     | 743     | 826     | 2.9               | 0.44  | 6.2         | 0.88  | 8.3         | 1.06  |
| Bahamas                          | 510                                      | 510     | 510     | 510     | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Bahrain                          | 0  | 0       | 0       | 0       | 0.0               |       | 0.0         |       | 0.0         |       |
| Bangladesh                       | 1 845                                    | 1 845   | 1 816   | 1 725   | n.s.              | n.s.  | -2.9        | -0.16 | -9.1        | -0.51 |
| Barbados                         | 6  | 6       | 6       | 6       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Belarus                          | 6 576                                    | 6 413   | 6 484   | 6 556   | -16.3             | -0.25 | 7.0         | 0.11  | 7.2         | 0.11  |
| Belgium                          | 231                                      | 259     | 283     | 251     | 2.8               | 1.15  | 2.4         | 0.90  | -3.2        | -1.20 |
| Belize                           | 1 598                                    | 1 457   | 1 389   | 1 275   | -14.1             | -0.92 | -6.8        | -0.48 | -11.4       | -0.86 |
| Benin                            | 4 823                                    | 4 119   | 3 615   | 3 112   | -70.4             | -1.57 | -50.4       | -1.30 | -50.3       | -1.49 |
| Bermuda                          | –  | –       | –       | –       | –                 | –     | –           | –     | –           | –     |
| Bhutan                           | 2 487                                    | 2 586   | 2 686   | 2 704   | 9.9               | 0.39  | 9.9         | 0.38  | 1.9         | 0.07  |
| Bolivia (Plurinational State of) | 57 785                                   | 55 066  | 53 036  | 50 771  | -271.8            | -0.48 | -203.0      | -0.37 | -226.5      | -0.44 |
| Bonaire, Sint Eustatius and Saba | 2  | 2       | 2       | 2       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Bosnia and Herzegovina           | –  | –       | –       | –       | –                 | –     | –           | –     | –           | –     |
| Botswana                         | 18 804                                   | 17 621  | 16 438  | 15 255  | -118.3            | -0.65 | -118.3      | -0.69 | -118.3      | -0.74 |
| Brazil                           | 585 340                                  | 547 436 | 504 252 | 485 396 | -3 790.4          | -0.67 | -4 318.4    | -0.82 | -1 885.6    | -0.38 |
| British Virgin Islands           |  |         |         |         |                   |       |             |       |             |       |
| Brunei Darussalam                | 412                                      | 396     | 376     | 375     | -1.6              | -0.40 | -2.0        | -0.51 | -0.2        | -0.04 |
| Bulgaria                         | 2 295                                    | 2 442   | 2 920   | 3 116   | 14.7              | 0.62  | 47.8        | 1.80  | 19.6        | 0.65  |
| Burkina Faso                     | 7 703                                    | 7 148   | 6 594   | 6 039   | -55.4             | -0.74 | -55.4       | -0.80 | -55.5       | -0.87 |

*(Continued)*

TABLE A2. (Continued)

| Country/territory                     | Naturally regenerating forest (1 000 ha) |         |         |         | Net annual change |       |             |       |             |       |
|---------------------------------------|--|---------|---------|---------|-------------------|-------|-------------|-------|-------------|-------|
|                                       | 1990                                     | 2000    | 2010    | 2020    | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                                       |  |         |         |         | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Burundi                               | 115                                      | 81      | 81      | 167     | -3.4              | -3.46 | 0.0         | 0.00  | 8.6         | 7.49  |
| Cabo Verde                            | 14                                       | 14      | 14      | 14      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Cambodia                              | 10 938                                   | 10 681  | 10 435  | 7 464   | -25.6             | -0.24 | -24.6       | -0.23 | -297.0      | -3.29 |
| Cameroon                              | 22 482                                   | 21 576  | 20 859  | 20 279  | -90.6             | -0.41 | -71.7       | -0.34 | -58.0       | -0.28 |
| Canada                                | 343 655                                  | 338 416 | 333 306 | 328 765 | -523.9            | -0.15 | -510.9      | -0.15 | -454.2      | -0.14 |
| Cayman Islands                        | 13                                       | 13      | 13      | 13      | n.s.              | -0.15 | n.s.        | -0.16 | 0.0         | 0.00  |
| Central African Republic              | 23 201                                   | 22 901  | 22 601  | 22 301  | -30.0             | -0.13 | -30.0       | -0.13 | -30.0       | -0.13 |
| Chad                                  | 6 719                                    | 6 339   | 5 513   | 4 293   | -38.0             | -0.58 | -82.6       | -1.39 | -122.0      | -2.47 |
| Chile                                 | 13 600                                   | 13 539  | 13 895  | 15 026  | -6.1              | -0.04 | 35.6        | 0.26  | 113.1       | 0.79  |
| China                                 | 112 989                                  | 122 170 | 127 286 | 135 282 | 918.2             | 0.78  | 511.6       | 0.41  | 799.6       | 0.61  |
| Colombia                              | 64 861                                   | 62 570  | 60 426  | 58 715  | -229.1            | -0.36 | -214.3      | -0.35 | -171.2      | -0.29 |
| Comoros                               | 43                                       | 39      | 36      | 33      | -0.3              | -0.80 | -0.3        | -0.87 | -0.3        | -0.95 |
| Congo                                 | 22 256                                   | 22 136  | 22 016  | 21 887  | -12.0             | -0.05 | -12.0       | -0.05 | -12.9       | -0.06 |
| Cook Islands                          | 14                                       | 14      | 14      | 14      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Costa Rica                            | 2 881                                    | 2 811   | 2 804   | 2 948   | -7.0              | -0.25 | -0.6        | -0.02 | 14.4        | 0.50  |
| Côte d'Ivoire                         | 7 844                                    | 5 081   | 3 951   | 2 823   | -276.4            | -4.25 | -112.9      | -2.48 | -112.9      | -3.31 |
| Croatia                               | 1 758                                    | 1 803   | 1 845   | 1 871   | 4.6               | 0.26  | 4.2         | 0.23  | 2.5         | 0.14  |
| Cuba                                  | 1 711                                    | 2 093   | 2 436   | 2 709   | 38.2              | 2.04  | 34.3        | 1.53  | 27.3        | 1.07  |
| Curaçao                               | n.s.                                     | n.s.    | n.s.    | n.s.    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Cyprus                                | 137                                      | 144     | 142     | 140     | 0.7               | 0.52  | -0.2        | -0.13 | -0.2        | -0.17 |
| Czechia                               | 31                                       | 47      | 88      | 138     | 1.6               | 4.28  | 4.0         | 6.39  | 5.0         | 4.61  |
| Democratic People's Republic of Korea | 5 782                                    | 5 399   | 5 222   | 5 043   | -38.3             | -0.68 | -17.8       | -0.33 | -17.9       | -0.35 |
| Democratic Republic of the Congo      | 150 574                                  | 143 842 | 137 111 | 126 098 | -673.1            | -0.46 | -673.1      | -0.48 | -1 101.4    | -0.83 |
| Denmark                               | –  | –       | 140     | 216     | –                 | –     | –           | –     | 7.7         | 4.49  |
| Djibouti                              | 6  | 6       | 6       | 6       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Dominica                              | 50                                       | 47      | 47      | 47      | -0.2              | -0.50 | 0.0         | 0.00  | 0.0         | 0.00  |
| Dominican Republic                    | 1 574                                    | 1 929   | 1 963   | 1 954   | 35.6              | 2.06  | 3.3         | 0.17  | -0.9        | -0.04 |
| Ecuador                               | 14 588                                   | 13 660  | 12 943  | 12 387  | -92.7             | -0.65 | -71.7       | -0.54 | -55.7       | -0.44 |
| Egypt                                 | 0  | 0       | 0       | 0       | 0.0               |       | 0.0         |       | 0.0         |       |
| El Salvador                           | 709                                      | 661     | 614     | 566     | -4.8              | -0.69 | -4.8        | -0.74 | -4.8        | -0.80 |
| Equatorial Guinea                     | 2 699                                    | 2 491   | 2 407   | 2 323   | -20.9             | -0.80 | -8.4        | -0.34 | -8.4        | -0.35 |
| Eritrea                               | 1 140                                    | 1 097   | 1 058   | 1 012   | -4.3              | -0.38 | -3.9        | -0.36 | -4.6        | -0.45 |
| Estonia                               | 2 011                                    | 2 041   | 2 129   | 2 223   | 3.0               | 0.15  | 8.9         | 0.43  | 9.3         | 0.43  |
| Eswatini                              | 297                                      | 330     | 363     | 396     | 3.3               | 1.05  | 3.3         | 0.95  | 3.3         | 0.87  |
| Ethiopia                              | 18 919                                   | 18 189  | 17 058  | 15 865  | -73.0             | -0.39 | -113.1      | -0.64 | -119.3      | -0.72 |
| Falkland Islands (Malvinas)*          | 0  | 0       | 0       | 0       | 0.0               |       | 0.0         |       | 0.0         |       |
| Faroe Islands                         | 0  | 0       | 0       | 0       | 0.0               |       | 0.0         |       | 0.0         |       |
| Fiji                                  | 855                                      | 881     | 907     | 933     | 2.6               | 0.30  | 2.6         | 0.29  | 2.6         | 0.28  |

(Continued)

TABLE A2. (Continued)

| Country/territory          | Naturally regenerating forest (1 000 ha) |        |        |        | Net annual change |       |             |       |             |       |
|----------------------------|--|--------|--------|--------|-------------------|-------|-------------|-------|-------------|-------|
|                            | 1990                                     | 2000   | 2010   | 2020   | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                            |  |        |        |        | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Finland                    | 17 485                                   | 17 301 | 15 334 | 15 041 | -18.4             | -0.11 | -196.7      | -1.20 | -29.3       | -0.19 |
| France                     | 12 908                                   | 13 702 | 14 346 | 14 819 | 79.4              | 0.60  | 64.4        | 0.46  | 47.3        | 0.32  |
| French Guiana              | 8 124                                    | 8 079  | 8 036  | 8 002  | -4.6              | -0.06 | -4.3        | -0.05 | -3.4        | -0.04 |
| French Polynesia           | 140                                      | 140    | 140    | 140    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Gabon                      | 23 731                                   | 23 670 | 23 619 | 23 501 | -6.1              | -0.03 | -5.1        | -0.02 | -11.9       | -0.05 |
| Gambia                     | 413                                      | 356    | 298    | 241    | -5.7              | -1.48 | -5.7        | -1.74 | -5.7        | -2.11 |
| Georgia                    | 2 698                                    | 2 701  | 2 750  | 2 750  | 0.2               | 0.01  | 5.0         | 0.18  | n.s.        | n.s.  |
| Germany                    | 5 650                                    | 5 677  | 5 705  | 5 710  | 2.7               | 0.05  | 2.8         | 0.05  | 0.5         | 0.01  |
| Ghana                      | 9 874                                    | 8 799  | 7 723  | 7 689  | -107.6            | -1.15 | -107.6      | -1.30 | -3.4        | -0.04 |
| Gibraltar                  | 0  | 0      | 0      | 0      | 0.0               |       | 0.0         |       | 0.0         |       |
| Greece                     | 3 181                                    | 3 472  | 3 763  | 3 763  | 29.1              | 0.88  | 29.1        | 0.81  | n.s.        | n.s.  |
| Greenland                  | 0  | 0      | 0      | 0      | 0.0               |       | 0.0         |       | 0.0         |       |
| Grenada                    | 17                                       | 17     | 17     | 17     | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Guadeloupe                 | 73                                       | 72     | 71     | 71     | -0.1              | -0.12 | -0.1        | -0.10 | n.s.        | 0.05  |
| Guam                       | 24                                       | 24     | 24     | 28     | 0.0               | 0.00  | 0.0         | 0.00  | 0.4         | 1.55  |
| Guatemala                  | 4 757                                    | 4 172  | 3 611  | 3 376  | -58.5             | -1.30 | -56.1       | -1.43 | -23.5       | -0.67 |
| Guernsey                   | n.s.                                     | n.s.   | n.s.   | n.s.   | 0.0               | 0.00  | n.s.        | 3.87  | 0.0         | 0.00  |
| Guinea                     | 7 236                                    | 6 884  | 6 517  | 6 132  | -35.2             | -0.50 | -36.7       | -0.55 | -38.5       | -0.61 |
| Guinea-Bissau              | 2 233                                    | 2 149  | 2 064  | 1 979  | -8.4              | -0.38 | -8.5        | -0.40 | -8.5        | -0.42 |
| Guyana                     | 18 602                                   | 18 564 | 18 520 | 18 415 | -3.8              | -0.02 | -4.4        | -0.02 | -10.4       | -0.06 |
| Haiti                      | 371                                      | 361    | 350    | 315    | -1.0              | -0.28 | -1.0        | -0.29 | -3.5        | -1.05 |
| Holy See                   | 0  | 0      | 0      | 0      | 0.0               |       | 0.0         |       | 0.0         |       |
| Honduras                   | 6 988                                    | 6 779  | 6 575  | 6 359  | -20.9             | -0.30 | -20.3       | -0.30 | -21.6       | -0.33 |
| Hungary                    | -  | -      | 1 253  | 1 264  | -                 | -     | -           | -     | 1.2         | 0.09  |
| Iceland                    | 11                                       | 11     | 11     | 12     | n.s.              | 0.40  | n.s.        | 0.39  | n.s.        | 0.36  |
| India                      | 58 223                                   | 58 223 | 56 717 | 58 891 | 0.0               | 0.00  | -150.6      | -0.26 | 217.4       | 0.38  |
| Indonesia                  | 118 400                                  | 97 432 | 95 473 | 87 608 | -2 096.8          | -1.93 | -195.9      | -0.20 | -786.5      | -0.86 |
| Iran (Islamic Republic of) | 8 560                                    | 8 810  | 9 751  | 9 751  | 25.0              | 0.29  | 94.1        | 1.02  | 0.0         | 0.00  |
| Iraq                       | 743                                      | 754    | 758    | 735    | 1.1               | 0.15  | 0.4         | 0.05  | -2.3        | -0.30 |
| Ireland                    | 81                                       | 81     | 81     | 108    | n.s.              | 0.02  | -0.1        | -0.08 | 2.7         | 2.92  |
| Isle of Man                | -  | -      | -      | -      | -                 | -     | -           | -     | -           | -     |
| Israel                     | 66                                       | 65     | 66     | 55     | -0.1              | -0.15 | 0.1         | 0.15  | -1.1        | -1.81 |
| Italy                      | 7 061                                    | 7 774  | 8 394  | 8 921  | 71.3              | 0.97  | 62.0        | 0.77  | 52.7        | 0.61  |
| Jamaica                    | 512                                      | 513    | 550    | 589    | n.s.              | 0.01  | 3.7         | 0.71  | 3.8         | 0.68  |
| Japan                      | 14 663                                   | 14 545 | 14 674 | 14 751 | -11.8             | -0.08 | 12.9        | 0.09  | 7.7         | 0.05  |
| Jersey                     | -  | -      | -      | -      | -                 | -     | -           | -     | -           | -     |
| Jordan                     | 51                                       | 51     | 51     | 51     | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Kazakhstan                 | 2 645                                    | 2 628  | 2 638  | 3 034  | -1.7              | -0.06 | 1.0         | 0.04  | 39.6        | 1.41  |
| Kenya                      | 3 706                                    | 3 808  | 3 464  | 3 458  | 10.3              | 0.27  | -34.5       | -0.94 | -0.5        | -0.02 |
| Kiribati                   | -  | -      | -      | -      | -                 | -     | -           | -     | -           | -     |

(Continued)

TABLE A2. (Continued)

| Country/territory                | Naturally regenerating forest (1 000 ha) |        |        |        | Net annual change |       |             |       |             |       |
|----------------------------------|--|--------|--------|--------|-------------------|-------|-------------|-------|-------------|-------|
|                                  | 1990                                     | 2000   | 2010   | 2020   | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                                  |  |        |        |        | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Kuwait                           | 0  | 0      | 0      | 0      | 0.0               |       | 0.0         |       | 0.0         |       |
| Kyrgyzstan                       | 977                                      | 1 016  | 1 045  | 1 086  | 3.8               | 0.38  | 2.9         | 0.29  | 4.1         | 0.39  |
| Lao People's Democratic Republic | 16 237                                   | 15 845 | 15 345 | 14 824 | -39.2             | -0.24 | -50.0       | -0.32 | -52.1       | -0.34 |
| Latvia                           | 2 859                                    | 2 919  | 2 964  | 2 945  | 6.0               | 0.21  | 4.6         | 0.16  | -1.9        | -0.06 |
| Lebanon                          | 139                                      | 138    | 137    | 143    | -0.1              | -0.07 | -0.1        | -0.04 | 0.6         | 0.42  |
| Lesotho                          | 26                                       | 26     | 26     | 26     | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Liberia                          | 8 524                                    | 8 213  | 7 902  | 7 590  | -31.1             | -0.37 | -31.1       | -0.39 | -31.1       | -0.40 |
| Libya                            | 0  | 0      | 0      | 0      | 0.0               |       | 0.0         |       | 0.0         |       |
| Liechtenstein                    | 6  | 6      | 6      | 6      | n.s.              | -0.32 | 0.0         | 0.00  | 0.0         | 0.00  |
| Lithuania                        | 1 534                                    | 1 554  | 1 634  | 1 590  | 2.0               | 0.13  | 8.0         | 0.51  | -4.4        | -0.27 |
| Luxembourg                       | 58                                       | 59     | 59     | 59     | 0.1               | 0.17  | 0.0         | 0.00  | 0.0         | 0.00  |
| Madagascar                       | 13 462                                   | 12 759 | 12 147 | 12 118 | -70.4             | -0.54 | -61.2       | -0.49 | -2.9        | -0.02 |
| Malawi                           | 3 363                                    | 2 964  | 2 565  | 2 166  | -39.9             | -1.25 | -39.9       | -1.43 | -39.9       | -1.68 |
| Malaysia                         | 18 684                                   | 18 064 | 17 639 | 17 417 | -62.0             | -0.34 | -42.5       | -0.24 | -22.2       | -0.13 |
| Maldives                         | 1  | 1      | 1      | 1      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Mali                             | 13 291                                   | 13 241 | 12 766 | 12 728 | -5.0              | -0.04 | -47.5       | -0.36 | -3.8        | -0.03 |
| Malta                            | n.s.                                     | n.s.   | n.s.   | n.s.   | 0.0               | 0.00  | 0.0         | 0.00  | n.s.        | 1.84  |
| Marshall Islands                 | 6  | 6      | 6      | 6      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Martinique                       | 45                                       | 46     | 48     | 50     | 0.1               | 0.16  | 0.1         | 0.31  | 0.2         | 0.41  |
| Mauritania                       | 466                                      | 400    | 335    | 269    | -6.6              | -1.51 | -6.6        | -1.77 | -6.6        | -2.15 |
| Mauritius                        | 24                                       | 24     | 20     | 20     | 0.0               | 0.00  | -0.4        | -1.58 | n.s.        | n.s.  |
| Mayotte                          | 20                                       | 16     | 14     | 13     | -0.4              | -2.43 | -0.2        | -1.07 | -0.1        | -0.41 |
| Mexico                           | 70 552                                   | 68 342 | 66 877 | 65 592 | -221.1            | -0.32 | -146.5      | -0.22 | -128.5      | -0.19 |
| Micronesia (Federated States of) | 43                                       | 47     | 50     | 50     | 0.3               | 0.74  | 0.3         | 0.68  | n.s.        | 0.06  |
| Monaco                           | 0  | 0      | 0      | 0      | 0.0               |       | 0.0         |       | 0.0         |       |
| Mongolia                         | 14 348                                   | 14 255 | 14 174 | 14 165 | -9.3              | -0.06 | -8.1        | -0.06 | -0.9        | -0.01 |
| Montenegro                       | 618                                      | 618    | 819    | 819    | 0.0               | 0.00  | 20.1        | 2.86  | 0.0         | 0.00  |
| Montserrat                       | 4  | 3      | 3      | 3      | -0.1              | -3.31 | 0.0         | 0.00  | 0.0         | 0.00  |
| Morocco                          | 5 167                                    | 5 162  | 5 151  | 5 108  | -0.5              | -0.01 | -1.1        | -0.02 | -4.4        | -0.09 |
| Mozambique                       | 43 340                                   | 41 150 | 38 918 | 36 669 | -219.0            | -0.52 | -223.3      | -0.56 | -224.8      | -0.59 |
| Myanmar                          | 39 187                                   | 34 837 | 31 135 | 28 118 | -435.0            | -1.17 | -370.2      | -1.12 | -301.7      | -1.01 |
| Namibia                          | 8 769                                    | 8 059  | 7 349  | 6 639  | -71.0             | -0.84 | -71.0       | -0.92 | -71.0       | -1.01 |
| Nauru                            | 0  | 0      | 0      | 0      | 0.0               |       | 0.0         |       | 0.0         |       |
| Nepal                            | 5 584                                    | 5 643  | 5 741  | 5 741  | 5.9               | 0.11  | 9.8         | 0.17  | n.s.        | n.s.  |
| Netherlands                      | 50                                       | 46     | 41     | 38     | -0.4              | -0.83 | -0.5        | -1.16 | -0.3        | -0.75 |
| New Caledonia                    | 822                                      | 828    | 829    | 828    | 0.6               | 0.07  | 0.1         | 0.01  | -0.2        | -0.02 |
| New Zealand                      | 7 841                                    | 7 825  | 7 824  | 7 808  | -1.6              | -0.02 | -0.2        | n.s.  | -1.6        | -0.02 |
| Nicaragua                        | 6 399                                    | 5 397  | 4 172  | 3 341  | -100.2            | -1.69 | -122.5      | -2.54 | -83.1       | -2.20 |

(Continued)

TABLE A2. (Continued)

| Country/territory                            | Naturally regenerating forest (1 000 ha) |         |         |         | Net annual change |       |             |       |             |       |
|--|--|---------|---------|---------|-------------------|-------|-------------|-------|-------------|-------|
|  | 1990                                     | 2000    | 2010    | 2020    | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|  |  |         |         |         | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Niger  | 1 897                                    | 1 255   | 1 106   | 957     | -64.2             | -4.05 | -14.9       | -1.26 | -14.9       | -1.43 |
| Nigeria                                      | 26 260                                   | 24 644  | 23 027  | 21 411  | -161.6            | -0.63 | -161.7      | -0.68 | -161.7      | -0.73 |
| Niue   | 19                                       | 19      | 19      | 19      | n.s.              | -0.05 | n.s.        | -0.03 | n.s.        | 0.05  |
| Norfolk Island                               | n.s.                                     | n.s.    | n.s.    | n.s.    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| North Macedonia                              | –  | –       | –       | –       | –                 | –     | –           | –     | –           | –     |
| Northern Mariana Islands                     | 34                                       | 32      | 30      | 24      | -0.2              | -0.50 | -0.2        | -0.53 | -0.6        | -2.16 |
| Norway                                       | –  | –       | 11 987  | 12 072  | –                 | –     | –           | –     | 8.5         | 0.07  |
| Oman   | 2  | 2       | 2       | 2       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Pakistan                                     | 4 733                                    | 4 257   | 3 840   | 3 472   | -47.6             | -1.05 | -41.8       | -1.03 | -36.8       | -1.00 |
| Palau  | –  | –       | –       | –       | –                 | –     | –           | –     | –           | –     |
| Palestine                                    | –  | –       | –       | –       | –                 | –     | –           | –     | –           | –     |
| Panama                                       | 4 596                                    | 4 409   | 4 272   | 4 148   | -18.7             | -0.41 | -13.7       | -0.32 | -12.4       | -0.29 |
| Papua New Guinea                             | 36 339                                   | 36 217  | 36 118  | 35 796  | -12.2             | -0.03 | -9.9        | -0.03 | -32.2       | -0.09 |
| Paraguay                                     | 25 536                                   | 22 961  | 19 519  | 15 947  | -257.4            | -1.06 | -344.2      | -1.61 | -357.3      | -2.00 |
| Peru   | 76 186                                   | 74 583  | 73 080  | 71 242  | -160.3            | -0.21 | -150.3      | -0.20 | -183.8      | -0.25 |
| Philippines                                  | 7 488                                    | 6 989   | 6 489   | 6 808   | -50.0             | -0.69 | -50.0       | -0.74 | 31.9        | 0.48  |
| Pitcairn Islands                             | –  | –       | –       | –       | –                 | –     | –           | –     | –           | –     |
| Poland                                       | –  | –       | –       | –       | –                 | –     | –           | –     | –           | –     |
| Portugal                                     | 1 326                                    | 1 013   | 1 030   | 1 056   | -31.3             | -2.66 | 1.7         | 0.17  | 2.6         | 0.25  |
| Puerto Rico                                  | 320                                      | 429     | 491     | 496     | 10.9              | 2.97  | 6.2         | 1.36  | 0.5         | 0.10  |
| Qatar  | 0  | 0       | 0       | 0       | 0.0               |       | 0.0         |       | 0.0         |       |
| Republic of Korea                            | 4 642                                    | 4 404   | 4 152   | 4 024   | -23.8             | -0.53 | -25.2       | -0.59 | -12.8       | -0.31 |
| Republic of Moldova                          | 179                                      | 189     | 163     | 168     | 1.0               | 0.57  | -2.7        | -1.52 | 0.5         | 0.32  |
| Réunion                                      | 77                                       | 80      | 83      | 88      | 0.3               | 0.38  | 0.3         | 0.37  | 0.4         | 0.52  |
| Romania                                      | 5 843                                    | 5 838   | 5 975   | 6 034   | -0.5              | -0.01 | 13.7        | 0.23  | 5.9         | 0.10  |
| Russian Federation                           | 796 299                                  | 793 908 | 795 523 | 796 432 | -239.1            | -0.03 | 161.5       | 0.02  | 90.9        | 0.01  |
| Rwanda                                       | 204                                      | 161     | 126     | 126     | -4.3              | -2.34 | -3.5        | -2.42 | 0.0         | 0.00  |
| Saint Barthélemy                             | n.s.                                     | n.s.    | n.s.    | n.s.    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Saint Helena, Ascension and Tristan da Cunha | 2  | 2       | 2       | 2       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Saint Kitts and Nevis                        | –  | –       | –       | –       | –                 | –     | –           | –     | –           | –     |
| Saint Lucia                                  | 19                                       | 18      | 17      | 17      | -0.1              | -0.33 | -0.1        | -0.34 | 0.0         | 0.00  |
| Saint Martin (French part)                   | 1  | 1       | 1       | 1       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Saint Pierre and Miquelon                    | 2  | 2       | 1       | 1       | n.s.              | -1.28 | n.s.        | -1.47 | n.s.        | -1.64 |
| Saint Vincent and the Grenadines             | 28                                       | 29      | 28      | 28      | 0.1               | 0.39  | n.s.        | -0.08 | n.s.        | -0.04 |
| Samoa  | 171                                      | 166     | 161     | 157     | -0.5              | -0.28 | -0.5        | -0.29 | -0.5        | -0.30 |
| San Marino                                   | 1  | 1       | 1       | 1       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Sao Tome and Principe                        | 59                                       | 58      | 58      | 52      | n.s.              | -0.04 | n.s.        | -0.04 | -0.6        | -1.12 |
| Saudi Arabia                                 | 977                                      | 977     | 977     | 977     | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |

(Continued)

TABLE A2. (Continued)

| Country/territory                                    | Naturally regenerating forest (1 000 ha) |         |         |         | Net annual change |       |             |       |             |       |
|--|--|---------|---------|---------|-------------------|-------|-------------|-------|-------------|-------|
|  | 1990                                     | 2000    | 2010    | 2020    | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|  |  |         |         |         | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Senegal  | 9 271                                    | 8 821   | 8 436   | 8 036   | -45.0             | -0.50 | -38.5       | -0.45 | -40.0       | -0.48 |
| Serbia   | 2 274                                    | 2 421   | 2 533   | 2 607   | 14.7              | 0.63  | 11.2        | 0.45  | 7.4         | 0.29  |
| Seychelles   | 29                                       | 29      | 29      | 29      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Sierra Leone   | 3 120                                    | 2 922   | 2 718   | 2 514   | -19.8             | -0.65 | -20.4       | -0.72 | -20.4       | -0.78 |
| Singapore  | 15                                       | 17      | 18      | 16      | 0.2               | 1.39  | 0.1         | 0.42  | -0.2        | -1.30 |
| Sint Maarten (Dutch part)                            | n.s.                                     | n.s.    | n.s.    | n.s.    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Slovakia   | 1 164                                    | 1 146   | 1 177   | 1 177   | -1.7              | -0.15 | 3.0         | 0.26  | 0.1         | 0.01  |
| Slovenia   | 1 154                                    | 1 185   | 1 180   | 1 192   | 3.1               | 0.27  | -0.5        | -0.04 | 1.2         | 0.10  |
| Solomon Islands                                      | 2 503                                    | 2 505   | 2 504   | 2 499   | 0.2               | 0.01  | -0.1        | -0.01 | -0.5        | -0.02 |
| Somalia  | 8 280                                    | 7 512   | 6 745   | 5 977   | -76.8             | -0.97 | -76.8       | -1.07 | -76.8       | -1.20 |
| South Africa   | 14 998                                   | 14 634  | 14 270  | 13 906  | -36.4             | -0.25 | -36.4       | -0.25 | -36.4       | -0.26 |
| South Sudan  | 6 969                                    | 6 969   | 6 969   | 6 969   | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Spain  | 11 959                                   | 14 703  | 15 949  | 15 982  | 274.3             | 2.09  | 124.6       | 0.82  | 3.3         | 0.02  |
| Sri Lanka  | 2 094                                    | 1 933   | 1 898   | 1 863   | -16.1             | -0.80 | -3.5        | -0.18 | -3.5        | -0.18 |
| Sudan  | 23 450                                   | 21 701  | 19 954  | 18 230  | -174.9            | -0.77 | -174.7      | -0.84 | -172.5      | -0.90 |
| Suriname   | 15 365                                   | 15 327  | 15 286  | 15 182  | -3.8              | -0.02 | -4.1        | -0.03 | -10.4       | -0.07 |
| Svalbard and Jan Mayen Islands                       | 0  | 0       | 0       | 0       | 0.0               |       | 0.0         |       | 0.0         |       |
| Sweden   | 19 974                                   | 17 845  | 15 592  | 14 068  | -212.9            | -1.12 | -225.3      | -1.34 | -152.4      | -1.02 |
| Switzerland  | 971                                      | 1 024   | 1 074   | 1 120   | 5.3               | 0.54  | 5.0         | 0.48  | 4.6         | 0.42  |
| Syrian Arab Republic                                 | 223                                      | 259     | 296     | 311     | 3.6               | 1.51  | 3.6         | 1.32  | 1.5         | 0.50  |
| Tajikistan   | 295                                      | 297     | 297     | 307     | 0.1               | 0.05  | 0.0         | 0.00  | 1.0         | 0.32  |
| Thailand   | 17 641                                   | 17 011  | 16 831  | 16 336  | -63.0             | -0.36 | -18.0       | -0.11 | -49.5       | -0.30 |
| Timor-Leste  | 963                                      | 949     | 935     | 921     | -1.4              | -0.15 | -1.4        | -0.15 | -1.4        | -0.15 |
| Togo   | 1 341                                    | 1 234   | 1 192   | 1 149   | -10.7             | -0.82 | -4.3        | -0.35 | -4.3        | -0.37 |
| Tokelau  | 0  | 0       | 0       | 0       | 0.0               |       | 0.0         |       | 0.0         |       |
| Tonga  | 8  | 8       | 8       | 8       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Trinidad and Tobago                                  | 159                                      | 156     | 151     | 147     | -0.3              | -0.17 | -0.5        | -0.33 | -0.3        | -0.23 |
| Tunisia  | 491                                      | 491     | 490     | 488     | n.s.              | -0.01 | -0.1        | -0.02 | -0.1        | -0.03 |
| Turkey   | 19 238                                   | 19 593  | 20 461  | 21 503  | 35.5              | 0.18  | 86.8        | 0.43  | 104.2       | 0.50  |
| Turkmenistan   | 4 127                                    | 4 127   | 4 127   | 4 127   | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Turks and Caicos Islands                             | 11                                       | 11      | 11      | 11      | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Tuvalu   | 1  | 1       | 1       | 1       | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Uganda   | 3 406                                    | 2 895   | 2 384   | 1 873   | -51.1             | -1.61 | -51.1       | -1.92 | -51.1       | -2.38 |
| Ukraine  | 4 707                                    | 4 815   | 4 731   | 4 842   | 10.8              | 0.23  | -8.4        | -0.18 | 11.1        | 0.23  |
| United Arab Emirates                                 | -  | -       | -       | -       | -                 | -     | -           | -     | -           | -     |
| United Kingdom of Great Britain and Northern Ireland | 344                                      | 344     | 344     | 344     | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| United Republic of Tanzania                          | 56 837                                   | 53 117  | 49 397  | 45 192  | -372.0            | -0.67 | -372.0      | -0.72 | -420.5      | -0.89 |
| United States of America                             | 284 512                                  | 280 976 | 283 156 | 282 274 | -353.6            | -0.12 | 218.0       | 0.08  | -88.2       | -0.03 |

(Continued)

TABLE A2. (Continued)

| Country/territory                  | Naturally regenerating forest (1 000 ha) |        |        |        | Net annual change |       |             |       |             |       |
|------------------------------------|--|--------|--------|--------|-------------------|-------|-------------|-------|-------------|-------|
|                                    | 1990                                     | 2000   | 2010   | 2020   | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                                    |  |        |        |        | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| United States Virgin Islands       | 25                                       | 20     | 18     | 20     | -0.4              | -1.80 | -0.2        | -1.04 | 0.1         | 0.78  |
| Uruguay                            | 597                                      | 740    | 752    | 849    | 14.3              | 2.17  | 1.2         | 0.16  | 9.7         | 1.22  |
| Uzbekistan                         | 1 356                                    | 1 416  | 1 497  | 1 423  | 6.0               | 0.43  | 8.1         | 0.56  | -7.4        | -0.51 |
| Vanuatu                            | -  | -      | -      | -      | -                 | -     | -           | -     | -           | -     |
| Venezuela (Bolivarian Republic of) | 51 600                                   | 48 411 | 46 516 | 44 873 | -318.9            | -0.64 | -189.6      | -0.40 | -164.3      | -0.36 |
| Viet Nam                           | 8 631                                    | 9 865  | 10 305 | 10 294 | 123.4             | 1.34  | 44.0        | 0.44  | -1.1        | -0.01 |
| Wallis and Futuna Islands          | 6  | 5      | 5      | 5      | n.s.              | -0.31 | n.s.        | -0.32 | n.s.        | -0.17 |
| Western Sahara                     | 665                                      | 669    | 665    | 665    | 0.4               | 0.06  | -0.4        | -0.06 | n.s.        | n.s.  |
| Yemen                              | 549                                      | 549    | 549    | 549    | 0.0               | 0.00  | 0.0         | 0.00  | 0.0         | 0.00  |
| Zambia                             | 47 355                                   | 46 999 | 46 642 | 44 762 | -35.6             | -0.08 | -35.7       | -0.08 | -188.0      | -0.41 |
| Zimbabwe                           | 18 673                                   | 18 246 | 17 797 | 17 337 | -42.7             | -0.23 | -44.9       | -0.25 | -46.1       | -0.26 |

Note: The rate of change (%) is calculated as the compound annual change rate.

\* A dispute exists between the Government of Argentina and the Government of the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

**TABLE A3. Extent of planted forest, 1990–2020**

| Country/territory                   | Planted forest (1 000 ha) |       |       |        | Net annual change |       |             |       |             |       |
|-------------------------------------|---------------------------|-------|-------|--------|-------------------|-------|-------------|-------|-------------|-------|
|                                     | 1990                      | 2000  | 2010  | 2020   | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                                     |                           |       |       |        | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Afghanistan                         | 0                         | 0     | 0     | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Albania                             | -                         | -     | 70    | -      | -                 | -     | -           | -     | -           | -     |
| Algeria                             | 333                       | 345   | 498   | 510    | 1.20              | 0.35  | 15.30       | 3.74  | 1.20        | 0.24  |
| American Samoa                      | 0                         | 0     | 0     | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Andorra                             | 0                         | 0     | 0     | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Angola                              | 961                       | 942   | 874   | 807    | -1.88             | -0.20 | -6.73       | -0.74 | -6.73       | -0.80 |
| Anguilla                            | -                         | -     | -     | -      | -                 | -     | -           | -     | -           | -     |
| Antigua and Barbuda                 | -                         | -     | -     | -      | -                 | -     | -           | -     | -           | -     |
| Argentina                           | 766                       | 1 076 | 1 187 | 1 436  | 31.00             | 3.46  | 11.10       | 0.99  | 24.90       | 1.92  |
| Armenia                             | 14                        | 11    | 21    | 18     | -0.31             | -2.52 | 0.99        | 6.81  | -0.21       | -1.07 |
| Aruba                               | 0                         | 0     | 0     | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Australia                           | 1 023                     | 1 485 | 2 168 | 2 390  | 46.18             | 3.80  | 68.32       | 3.86  | 22.24       | 0.98  |
| Austria                             | 1 739                     | 1 684 | 1 679 | 1 672  | -5.57             | -0.32 | -0.44       | -0.03 | -0.78       | -0.05 |
| Azerbaijan                          | 293                       | 306   | 289   | 306    | 1.32              | 0.44  | -1.69       | -0.57 | 1.65        | 0.56  |
| Bahamas                             | 0                         | 0     | 0     | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Bahrain                             | n.s.                      | n.s.  | 1     | 1      | 0.02              | 5.34  | 0.02        | 3.46  | 0.02        | 3.02  |
| Bangladesh                          | 75                        | 75    | 72    | 158    | 0.00              | 0.00  | -0.32       | -0.44 | 8.61        | 8.19  |
| Barbados                            | 0                         | 0     | 0     | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Belarus                             | 1 204                     | 1 861 | 2 146 | 2 212  | 65.70             | 4.45  | 28.57       | 1.44  | 6.57        | 0.30  |
| Belgium                             | 446                       | 408   | 406   | 438    | -3.84             | -0.90 | -0.15       | -0.04 | 3.18        | 0.76  |
| Belize                              | 2                         | 2     | 2     | 2      | 0.01              | 0.52  | 0.01        | 0.50  | 0.01        | 0.47  |
| Benin                               | 13                        | 16    | 20    | 23     | 0.30              | 2.10  | 0.40        | 2.26  | 0.30        | 1.41  |
| Bermuda                             |                           |       |       |        |                   |       |             |       |             |       |
| Bhutan                              | 19                        | 20    | 20    | 21     | 0.02              | 0.11  | 0.02        | 0.11  | 0.11        | 0.53  |
| Bolivia<br>(Plurinational State of) | 20                        | 35    | 50    | 63     | 1.51              | 5.77  | 1.51        | 3.64  | 1.25        | 2.25  |
| Bonaire, Sint Eustatius and<br>Saba | 0                         | 0     | 0     | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Bosnia and Herzegovina              | -                         | -     | -     | -      | -                 | -     | -           | -     | -           | -     |
| Botswana                            | 0                         | 0     | 0     | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Brazil                              | 3 558                     | 3 652 | 7 328 | 11 224 | 9.41              | 0.26  | 367.61      | 7.21  | 389.53      | 4.35  |
| British Virgin Islands              | -                         | -     | -     | -      | -                 | -     | -           | -     | -           | -     |
| Brunei Darussalam                   | 1                         | 1     | 4     | 5      | 0.06              | 6.93  | 0.24        | 10.97 | 0.16        | 3.55  |
| Bulgaria                            | 1 032                     | 933   | 817   | 777    | -9.90             | -1.00 | -11.60      | -1.32 | -4.00       | -0.50 |
| Burkina Faso                        | 14                        | 68    | 123   | 177    | 5.43              | 17.17 | 5.44        | 6.03  | 5.44        | 3.74  |

*(Continued)*



TABLE A3. (Continued)

| Country/territory                     | Planted forest (1 000 ha) |        |        |        | Net annual change |       |             |       |             |        |
|---------------------------------------|---------------------------|--------|--------|--------|-------------------|-------|-------------|-------|-------------|--------|
|                                       | 1990                      | 2000   | 2010   | 2020   | 1990–2000         |       | 2000–2010   |       | 2010–2020   |        |
|                                       |                           |        |        |        | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %      |
| Burundi                               | 161                       | 113    | 113    | 113    | -4.84             | -3.50 | 0.00        | 0.00  | 0.00        | 0.00   |
| Cabo Verde                            | 2                         | 26     | 29     | 32     | 2.43              | 31.38 | 0.30        | 1.10  | 0.30        | 0.99   |
| Cambodia                              | 67                        | 100    | 155    | 604    | 3.26              | 4.03  | 5.46        | 4.46  | 44.94       | 14.60  |
| Cameroon                              | 18                        | 21     | 41     | 61     | 0.30              | 1.55  | 2.00        | 6.89  | 2.00        | 4.04   |
| Canada                                | 4 618                     | 9 386  | 14 016 | 18 163 | 476.79            | 7.35  | 462.96      | 4.09  | 414.76      | 2.63   |
| Cayman Islands                        | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |        |
| Central African Republic              | 2                         | 2      | 2      | 2      | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00   |
| Chad                                  | 11                        | 14     | 18     | 20     | 0.30              | 2.48  | 0.39        | 2.52  | 0.21        | 1.13   |
| Chile                                 | 1 646                     | 2 278  | 2 830  | 3 185  | 63.19             | 3.30  | 55.23       | 2.19  | 35.43       | 1.19   |
| China                                 | 44 152                    | 54 830 | 73 324 | 84 696 | 1067.83           | 2.19  | 1849.39     | 2.95  | 1137.22     | 1.45   |
| Colombia                              | 97                        | 166    | 381    | 427    | 6.87              | 5.50  | 21.56       | 8.69  | 4.61        | 1.15   |
| Comoros                               | 4                         | 2      | 1      | n.s.   | -0.11             | -3.69 | -0.11       | -5.91 | -0.11       | -16.73 |
| Congo                                 | 60                        | 60     | 60     | 60     | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00   |
| Cook Islands                          | 1                         | 1      | 1      | 1      | 0.06              | 7.99  | 0.00        | 0.00  | 0.00        | 0.00   |
| Costa Rica                            | 27                        | 47     | 67     | 87     | 2.00              | 5.77  | 2.00        | 3.64  | 2.00        | 2.66   |
| Côte d'Ivoire                         | 7                         | 14     | 14     | 14     | 0.73              | 7.61  | 0.00        | 0.00  | 0.00        | 0.00   |
| Croatia                               | 92                        | 82     | 75     | 69     | -1.07             | -1.23 | -0.68       | -0.86 | -0.63       | -0.87  |
| Cuba                                  | 347                       | 342    | 496    | 533    | -0.50             | -0.15 | 15.40       | 3.79  | 3.67        | 0.72   |
| Curaçao                               | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |        |
| Cyprus                                | 24                        | 28     | 31     | 33     | 0.32              | 1.25  | 0.31        | 1.08  | 0.21        | 0.65   |
| Czechia                               | 2 598                     | 2 590  | 2 570  | 2 539  | -0.83             | -0.03 | -2.04       | -0.08 | -3.02       | -0.12  |
| Democratic People's Republic of Korea | 1 130                     | 1 055  | 1 021  | 987    | -7.48             | -0.68 | -3.47       | -0.33 | -3.32       | -0.33  |
| Democratic Republic of the Congo      | 56                        | 57     | 58     | 58     | 0.12              | 0.21  | 0.10        | 0.17  | 0.00        | 0.00   |
| Denmark                               | –                         | –      | 447    | 412    | –                 | –     | –           | –     | -3.49       | -0.81  |
| Djibouti                              | 0                         | 0      | 0      | n.s.   | 0.00              |       | 0.00        |       | 0.02        |        |
| Dominica                              | 1                         | 1      | 1      | 1      | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00   |
| Dominican Republic                    | 21                        | 43     | 110    | 190    | 2.20              | 7.44  | 6.73        | 9.87  | 7.97        | 5.59   |
| Ecuador                               | 44                        | 70     | 85     | 111    | 2.57              | 4.67  | 1.47        | 1.92  | 2.62        | 2.73   |
| Egypt                                 | 44                        | 59     | 66     | 45     | 1.54              | 3.06  | 0.64        | 1.04  | -2.07       | -3.71  |
| El Salvador                           | 10                        | 12     | 15     | 18     | 0.26              | 2.32  | 0.26        | 1.89  | 0.26        | 1.58   |
| Equatorial Guinea                     | 0                         | 125    | 125    | 125    | 12.50             |       | 0.00        | 0.00  | 0.00        | 0.00   |
| Eritrea                               | 10                        | 21     | 29     | 43     | 1.10              | 7.70  | 0.75        | 3.10  | 1.49        | 4.30   |
| Estonia                               | 195                       | 198    | 207    | 216    | 0.29              | 0.15  | 0.86        | 0.43  | 0.91        | 0.43   |
| Eswatini                              | 164                       | 143    | 123    | 102    | -2.06             | -1.34 | -2.06       | -1.54 | -2.06       | -1.82  |
| Ethiopia                              | 340                       | 340    | 741    | 1 203  | 0.00              | 0.00  | 40.11       | 8.11  | 46.26       | 4.97   |
| Falkland Islands (Malvinas)*          | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |        |
| Faroe Islands                         | n.s.                      | n.s.   | n.s.   | n.s.   | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00   |
| Fiji                                  | 85                        | 125    | 166    | 207    | 4.07              | 4.00  | 4.07        | 2.85  | 4.07        | 2.21   |

(Continued)

TABLE A3. (Continued)

| Country/territory          | Planted forest (1 000 ha) |        |        |        | Net annual change |       |             |       |             |       |
|----------------------------|---------------------------|--------|--------|--------|-------------------|-------|-------------|-------|-------------|-------|
|                            | 1990                      | 2000   | 2010   | 2020   | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                            |                           |        |        |        | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Finland                    | 4 390                     | 5 145  | 6 908  | 7 368  | 75.42             | 1.60  | 176.38      | 2.99  | 45.97       | 0.65  |
| France                     | 1 528                     | 1 586  | 2 073  | 2 434  | 5.80              | 0.37  | 48.70       | 2.71  | 36.10       | 1.62  |
| French Guiana              | 1                         | 1      | 1      | 1      | 0.00              | 0.00  | 0.00        | 0.00  | 0.01        | 1.34  |
| French Polynesia           | 4                         | 9      | 9      | 9      | 0.41              | 6.80  | 0.09        | 1.02  | 0.00        | 0.00  |
| Gabon                      | 30                        | 30     | 30     | 30     | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Gambia                     | 2                         | 2      | 2      | 2      | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Georgia                    | 54                        | 60     | 72     | 72     | 0.60              | 1.05  | 1.21        | 1.85  | 0.00        | 0.00  |
| Germany                    | 5 650                     | 5 677  | 5 705  | 5 710  | 2.70              | 0.05  | 2.75        | 0.05  | 0.50        | 0.01  |
| Ghana                      | 50                        | 50     | 220    | 297    | 0.00              | 0.00  | 17.00       | 15.97 | 7.71        | 3.05  |
| Gibraltar                  | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Greece                     | 118                       | 129    | 139    | 139    | 1.08              | 0.88  | 1.04        | 0.78  | 0.00        | 0.00  |
| Greenland                  | n.s.                      | n.s.   | n.s.   | n.s.   | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Grenada                    | n.s.                      | n.s.   | n.s.   | n.s.   | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Guadeloupe                 | 1                         | 1      | 1      | 1      | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Guam                       | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Guatemala                  | 24                        | 37     | 112    | 152    | 1.30              | 4.42  | 7.47        | 11.68 | 4.02        | 3.12  |
| Guernsey                   | n.s.                      | n.s.   | n.s.   | n.s.   | 0.00              | 0.00  | 0.01        | 8.20  | 0.00        | 0.00  |
| Guinea                     | 40                        | 45     | 52     | 57     | 0.50              | 1.18  | 0.70        | 1.46  | 0.50        | 0.92  |
| Guinea-Bissau              | n.s.                      | n.s.   | 1      | 1      | 0.02              | 5.83  | 0.03        | 6.73  | 0.03        | 3.99  |
| Guyana                     | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Haiti                      | 12                        | 20     | 28     | 32     | 0.80              | 5.24  | 0.80        | 3.42  | 0.40        | 1.34  |
| Holy See                   | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Honduras                   | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Hungary                    | –                         | –      | 794    | 789    | –                 | –     | –           | –     | -0.50       | -0.06 |
| Iceland                    | 7                         | 19     | 33     | 40     | 1.23              | 11.16 | 1.44        | 5.83  | 0.63        | 1.74  |
| India                      | 5 715                     | 9 368  | 12 779 | 13 269 | 365.30            | 5.07  | 341.07      | 3.15  | 49.03       | 0.38  |
| Indonesia                  | 145                       | 3 848  | 4 187  | 4 526  | 370.25            | 38.75 | 33.85       | 0.85  | 33.92       | 0.78  |
| Iran (Islamic Republic of) | 516                       | 516    | 941    | 1 001  | 0.00              | 0.00  | 42.53       | 6.20  | 5.99        | 0.62  |
| Iraq                       | 61                        | 64     | 67     | 90     | 0.30              | 0.49  | 0.32        | 0.49  | 2.28        | 2.97  |
| Ireland                    | 380                       | 549    | 640    | 674    | 16.85             | 3.74  | 9.07        | 1.54  | 3.46        | 0.53  |
| Isle of Man                | –                         | –      | –      | –      | –                 | –     | –           | –     | –           | –     |
| Israel                     | 66                        | 88     | 88     | 85     | 2.20              | 2.92  | 0.00        | 0.00  | -0.30       | -0.35 |
| Italy                      | 529                       | 596    | 634    | 645    | 6.68              | 1.20  | 3.88        | 0.63  | 1.07        | 0.17  |
| Jamaica                    | 9                         | 8      | 8      | 8      | -0.06             | -0.68 | 0.01        | 0.10  | 0.01        | 0.11  |
| Japan                      | 10 287                    | 10 331 | 10 292 | 10 184 | 4.40              | 0.04  | -3.90       | -0.04 | -10.80      | -0.11 |
| Jersey                     | –                         | –      | –      | –      | –                 | –     | –           | –     | –           | –     |
| Jordan                     | 47                        | 47     | 47     | 47     | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Kazakhstan                 | 517                       | 529    | 444    | 421    | 1.18              | 0.23  | -8.43       | -1.72 | -2.37       | -0.55 |
| Kenya                      | 153                       | 153    | 153    | 153    | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Kiribati                   | –                         | –      | –      | –      | –                 | –     | –           | –     | –           | –     |

(Continued)

TABLE A3. (Continued)

| Country/territory                | Planted forest (1 000 ha) |       |       |       | Net annual change |       |             |       |             |       |
|----------------------------------|---------------------------|-------|-------|-------|-------------------|-------|-------------|-------|-------------|-------|
|                                  | 1990                      | 2000  | 2010  | 2020  | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                                  |                           |       |       |       | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Kuwait                           | 3                         | 5     | 6     | 6     | 0.14              | 3.46  | 0.14        | 2.57  | 0.00        | 0.00  |
| Kyrgyzstan                       | 159                       | 165   | 185   | 229   | 0.62              | 0.38  | 1.94        | 1.12  | 4.40        | 2.16  |
| Lao People's Democratic Republic | 1 606                     | 1 580 | 1 596 | 1 771 | -2.60             | -0.16 | 1.58        | 0.10  | 17.55       | 1.05  |
| Latvia                           | 314                       | 322   | 408   | 465   | 0.77              | 0.24  | 8.56        | 2.38  | 5.78        | 1.33  |
| Lebanon                          | 1                         | 1     | n.s.  | n.s.  | -0.05             | -6.12 | -0.03       | -5.36 | 0.00        | 0.29  |
| Lesotho                          | 9                         | 9     | 9     | 9     | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Liberia                          | 1                         | 10    | 18    | 27    | 0.86              | 23.38 | 0.86        | 6.50  | 0.86        | 3.91  |
| Libya                            | 217                       | 217   | 217   | 217   | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Liechtenstein                    | n.s.                      | 1     | 1     | 1     | 0.04              | 11.61 | 0.00        | 0.00  | 0.00        | 0.00  |
| Lithuania                        | 411                       | 466   | 536   | 611   | 5.52              | 1.27  | 6.96        | 1.40  | 7.52        | 1.32  |
| Luxembourg                       | 28                        | 28    | 30    | 30    | -0.01             | -0.04 | 0.20        | 0.69  | 0.00        | 0.00  |
| Madagascar                       | 231                       | 272   | 415   | 312   | 4.10              | 1.65  | 14.30       | 4.32  | -10.30      | -2.81 |
| Malawi                           | 139                       | 118   | 97    | 76    | -2.11             | -1.63 | -2.12       | -1.96 | -2.11       | -2.43 |
| Malaysia                         | 1 935                     | 1 628 | 1 309 | 1 697 | -30.72            | -1.71 | -31.86      | -2.16 | 38.82       | 2.63  |
| Maldives                         | 0                         | 0     | 0     | 0     | 0.00              |       | 0.00        |       | 0.00        |       |
| Mali                             | 5                         | 55    | 530   | 568   | 5.00              | 27.10 | 47.50       | 25.43 | 3.80        | 0.69  |
| Malta                            | 0                         | 0     | 0     | n.s.  | 0.00              |       | 0.00        |       | 0.00        |       |
| Marshall Islands                 | 3                         | 3     | 3     | 3     | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Martinique                       | 2                         | 3     | 3     | 3     | 0.02              | 0.60  | 0.01        | 0.34  | 0.00        | 0.07  |
| Mauritania                       | 10                        | 21    | 32    | 44    | 1.12              | 7.75  | 1.12        | 4.32  | 1.11        | 3.00  |
| Mauritius                        | 17                        | 18    | 18    | 18    | 0.09              | 0.49  | -0.01       | -0.03 | -0.01       | -0.06 |
| Mayotte                          | n.s.                      | n.s.  | n.s.  | 1     | 0.01              | 5.84  | 0.02        | 4.37  | 0.01        | 1.80  |
| Mexico                           | 39                        | 40    | 67    | 100   | 0.03              | 0.08  | 2.68        | 5.28  | 3.39        | 4.20  |
| Micronesia (Federated States of) | 20                        | 17    | 14    | 14    | -0.30             | -1.60 | -0.30       | -1.91 | 0.00        | 0.00  |
| Monaco                           | 0                         | 0     | 0     | 0     | 0.00              |       | 0.00        |       | 0.00        |       |
| Mongolia                         | 4                         | 9     | 10    | 8     | 0.46              | 7.45  | 0.11        | 1.15  | -0.24       | -2.72 |
| Montenegro                       | 8                         | 8     | 8     | 8     | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Montserrat                       | 0                         | 0     | 0     | 0     | 0.00              |       | 0.00        |       | 0.00        |       |
| Morocco                          | 318                       | 344   | 523   | 635   | 2.59              | 0.79  | 17.88       | 4.27  | 11.15       | 1.95  |
| Mozambique                       | 38                        | 38    | 55    | 74    | 0.00              | 0.00  | 1.66        | 3.70  | 1.96        | 3.12  |
| Myanmar                          | 31                        | 31    | 305   | 427   | 0.00              | 0.01  | 27.45       | 25.81 | 12.19       | 3.42  |
| Namibia                          | 0                         | 0     | 0     | 0     | 0.00              |       | 0.00        |       | 0.00        |       |
| Nauru                            | 0                         | 0     | 0     | 0     | 0.00              |       | 0.00        |       | 0.00        |       |
| Nepal                            | 88                        | 138   | 221   | 221   | 4.98              | 4.59  | 8.29        | 4.83  | 0.00        | 0.00  |
| Netherlands                      | 295                       | 314   | 333   | 332   | 1.82              | 0.60  | 1.91        | 0.59  | -0.10       | -0.03 |
| New Caledonia                    | 9                         | 10    | 10    | 10    | 0.08              | 0.85  | 0.06        | 0.55  | 0.00        | 0.00  |
| New Zealand                      | 1 531                     | 2 025 | 2 024 | 2 084 | 49.40             | 2.84  | -0.08       | n.s.  | 6.02        | 0.29  |
| Nicaragua                        | n.s.                      | 2     | 16    | 66    | 0.20              | 22.79 | 1.37        | 21.59 | 5.03        | 15.30 |

(Continued)

TABLE A3. (Continued)

| Country/territory                            | Planted forest (1 000 ha) |        |        |        | Net annual change |       |             |       |             |       |
|--|---------------------------|--------|--------|--------|-------------------|-------|-------------|-------|-------------|-------|
|  | 1990                      | 2000   | 2010   | 2020   | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|  |                           |        |        |        | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Niger  | 48                        | 73     | 98     | 123    | 2.50              | 4.28  | 2.50        | 2.99  | 2.45        | 2.26  |
| Nigeria                                      | 265                       | 249    | 233    | 216    | -1.63             | -0.63 | -1.63       | -0.68 | -1.63       | -0.73 |
| Niue   | n.s.                      | n.s.   | n.s.   | n.s.   | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Norfolk Island                               | n.s.                      | n.s.   | n.s.   | n.s.   | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| North Macedonia                              | -                         | -      | -      | -      | -                 | -     | -           | -     | -           | -     |
| Northern Mariana Islands                     | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Norway                                       | -                         | -      | 115    | 108    | -                 | -     | -           | -     | -0.70       | -0.63 |
| Oman   | 1                         | 1      | 1      | 1      | 0.00              | 0.00  | 0.00        | 0.00  | -0.05       | -6.70 |
| Pakistan                                     | 254                       | 254    | 254    | 254    | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Palau  | -                         | -      | -      | -      | -                 | -     | -           | -     | -           | -     |
| Palestine                                    | -                         | -      | -      | -      | -                 | -     | -           | -     | -           | -     |
| Panama                                       | 11                        | 33     | 56     | 66     | 2.18              | 11.49 | 2.31        | 5.47  | 0.98        | 1.64  |
| Papua New Guinea                             | 61                        | 61     | 61     | 61     | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Paraguay                                     | 10                        | 31     | 51     | 156    | 2.03              | 11.54 | 2.03        | 5.23  | 10.49       | 11.85 |
| Peru   | 263                       | 715    | 970    | 1 088  | 45.21             | 10.52 | 25.48       | 3.09  | 11.86       | 1.16  |
| Philippines                                  | 291                       | 321    | 351    | 381    | 3.00              | 0.99  | 3.00        | 0.90  | 3.00        | 0.82  |
| Pitcairn Islands                             | -                         | -      | -      | -      | -                 | -     | -           | -     | -           | -     |
| Poland                                       | -                         | -      | -      | -      | -                 | -     | -           | -     | -           | -     |
| Portugal                                     | 2 073                     | 2 268  | 2 222  | 2 256  | 19.50             | 0.90  | -4.60       | -0.20 | 3.40        | 0.15  |
| Puerto Rico                                  | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Qatar  | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Republic of Korea                            | 1 909                     | 2 072  | 2 235  | 2 263  | 16.31             | 0.82  | 16.31       | 0.76  | 2.79        | 0.12  |
| Republic of Moldova                          | 146                       | 155    | 212    | 219    | 0.86              | 0.57  | 5.70        | 3.18  | 0.68        | 0.32  |
| Réunion                                      | 11                        | 11     | 11     | 11     | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Romania                                      | 528                       | 528    | 540    | 895    | 0.00              | 0.00  | 1.20        | 0.22  | 35.51       | 5.18  |
| Russian Federation                           | 12 651                    | 15 360 | 19 613 | 18 880 | 270.92            | 1.96  | 425.25      | 2.47  | -73.28      | -0.38 |
| Rwanda                                       | 113                       | 127    | 138    | 150    | 1.35              | 1.13  | 1.15        | 0.87  | 1.20        | 0.84  |
| Saint Barthélemy                             | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Saint Helena, Ascension and Tristan da Cunha | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Saint Kitts and Nevis                        | -                         | -      | -      | -      | -                 | -     | -           | -     | -           | -     |
| Saint Lucia                                  | 3                         | 3      | 3      | 3      | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Saint Martin (French part)                   | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Saint Pierre and Miquelon                    | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Saint Vincent and the Grenadines             | n.s.                      | n.s.   | n.s.   | n.s.   | 0.01              | 10.65 | 0.01        | 5.62  | 0.01        | 4.67  |
| Samoa  | 5                         | 5      | 5      | 5      | n.s.              | -0.08 | n.s.        | -0.08 | n.s.        | -0.02 |
| San Marino                                   | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Sao Tome and Principe                        | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Saudi Arabia                                 | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |

(Continued)

TABLE A3. (Continued)

| Country/territory                                    | Planted forest (1 000 ha) |        |        |        | Net annual change |       |             |       |             |       |
|--|---------------------------|--------|--------|--------|-------------------|-------|-------------|-------|-------------|-------|
|  | 1990                      | 2000   | 2010   | 2020   | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|  |                           |        |        |        | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| Senegal  | 32                        | 32     | 32     | 32     | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Serbia   | 39                        | 39     | 180    | 116    | 0.00              | 0.00  | 14.14       | 16.55 | -6.46       | -4.33 |
| Seychelles   | 5                         | 5      | 5      | 5      | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Sierra Leone   | 7                         | 8      | 15     | 21     | 0.12              | 1.63  | 0.67        | 6.39  | 0.67        | 3.87  |
| Singapore  | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Sint Maarten (Dutch part)                            | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Slovakia   | 739                       | 755    | 741    | 749    | 1.63              | 0.22  | -1.39       | -0.19 | 0.73        | 0.10  |
| Slovenia   | 34                        | 48     | 67     | 46     | 1.39              | 3.49  | 1.93        | 3.44  | -2.15       | -3.78 |
| Solomon Islands                                      | 41                        | 33     | 27     | 24     | -0.84             | -2.26 | -0.60       | -2.01 | -0.24       | -0.93 |
| Somalia  | 3                         | 3      | 3      | 3      | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| South Africa   | 3 144                     | 3 144  | 3 144  | 3 144  | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| South Sudan  | 188                       | 188    | 188    | 188    | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Spain  | 1 945                     | 2 391  | 2 596  | 2 590  | 44.62             | 2.09  | 20.52       | 0.83  | -0.64       | -0.02 |
| Sri Lanka  | 257                       | 234    | 206    | 250    | -2.30             | -0.93 | -2.80       | -1.27 | 4.40        | 1.96  |
| Sudan  | 120                       | 125    | 127    | 130    | 0.50              | 0.41  | 0.20        | 0.16  | 0.30        | 0.23  |
| Suriname   | 13                        | 14     | 14     | 14     | 0.12              | 0.85  | 0.00        | 0.00  | 0.00        | 0.00  |
| Svalbard and Jan Mayen Islands                       | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Sweden   | 8 089                     | 10 318 | 12 481 | 13 912 | 222.90            | 2.46  | 216.30      | 1.92  | 143.10      | 1.09  |
| Switzerland  | 182                       | 172    | 161    | 149    | -1.06             | -0.60 | -1.12       | -0.67 | -1.16       | -0.75 |
| Syrian Arab Republic                                 | 149                       | 173    | 196    | 211    | 2.40              | 1.51  | 2.36        | 1.29  | 1.50        | 0.74  |
| Tajikistan   | 113                       | 113    | 113    | 117    | 0.05              | 0.05  | 0.00        | 0.00  | 0.43        | 0.37  |
| Thailand   | 1 720                     | 1 987  | 3 242  | 3 537  | 26.70             | 1.45  | 125.50      | 5.02  | 29.50       | 0.87  |
| Timor-Leste  | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Togo   | 21                        | 34     | 47     | 61     | 1.33              | 5.10  | 1.33        | 3.36  | 1.34        | 2.52  |
| Tokelau  | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Tonga  | 1                         | 1      | 1      | 1      | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| Trinidad and Tobago                                  | 83                        | 81     | 81     | 81     | -0.27             | -0.33 | 0.00        | 0.00  | 0.00        | 0.00  |
| Tunisia  | 153                       | 177    | 198    | 214    | 2.43              | 1.48  | 2.05        | 1.10  | 1.68        | 0.82  |
| Turkey   | 546                       | 556    | 622    | 717    | 0.97              | 0.18  | 6.63        | 1.13  | 9.53        | 1.44  |
| Turkmenistan   | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Turks and Caicos Islands                             | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Tuvalu   | 0                         | 0      | 0      | 0      | 0.00              |       | 0.00        |       | 0.00        |       |
| Uganda   | 170                       | 268    | 367    | 465    | 9.84              | 4.67  | 9.84        | 3.17  | 9.84        | 2.41  |
| Ukraine  | 4 567                     | 4 695  | 4 817  | 4 848  | 12.80             | 0.28  | 12.20       | 0.26  | 3.10        | 0.06  |
| United Arab Emirates                                 | -                         | -      | -      | -      | -                 | -     | -           | -     | -           | -     |
| United Kingdom of Great Britain and Northern Ireland | 2 434                     | 2 610  | 2 715  | 2 846  | 17.60             | 0.70  | 10.50       | 0.40  | 13.10       | 0.47  |
| United Republic of Tanzania                          | 553                       | 553    | 553    | 553    | 0.00              | 0.00  | 0.00        | 0.00  | 0.00        | 0.00  |
| United States of America                             | 17 938                    | 22 560 | 25 564 | 27 521 | 462.20            | 2.32  | 300.40      | 1.26  | 195.70      | 0.74  |

(Continued)

**TABLE A3. (Continued)**

| Country/territory                  | Planted forest (1 000 ha) |       |       |       | Net annual change |       |             |       |             |       |
|------------------------------------|---------------------------|-------|-------|-------|-------------------|-------|-------------|-------|-------------|-------|
|                                    | 1990                      | 2000  | 2010  | 2020  | 1990–2000         |       | 2000–2010   |       | 2010–2020   |       |
|                                    |                           |       |       |       | 1 000 ha/yr       | %     | 1 000 ha/yr | %     | 1 000 ha/yr | %     |
| United States Virgin Islands       | 0                         | 0     | 0     | 0     | 0.00              |       | 0.00        |       | 0.00        |       |
| Uruguay                            | 201                       | 629   | 979   | 1 182 | 42.80             | 12.08 | 35.01       | 4.52  | 20.29       | 1.90  |
| Uzbekistan                         | 1 193                     | 1 545 | 1 852 | 2 267 | 35.19             | 2.62  | 30.72       | 1.83  | 41.44       | 2.04  |
| Vanuatu                            | –                         | –     | –     | –     | –                 | –     | –           | –     | –           | –     |
| Venezuela (Bolivarian Republic of) | 426                       | 740   | 989   | 1 358 | 31.36             | 5.67  | 24.97       | 2.95  | 36.89       | 3.22  |
| Viet Nam                           | 745                       | 1 920 | 3 083 | 4 349 | 117.46            | 9.93  | 116.37      | 4.85  | 126.61      | 3.50  |
| Wallis and Futuna Islands          | n.s.                      | n.s.  | 1     | 1     | 0.02              | 6.35  | 0.02        | 3.85  | 0.01        | 1.55  |
| Western Sahara                     | 0                         | 0     | 0     | 0     | 0.00              |       | 0.00        |       | 0.00        |       |
| Yemen                              | 0                         | 0     | 0     | 0     | 0.00              |       | 0.00        |       | 0.00        |       |
| Zambia                             | 57                        | 55    | 54    | 52    | -0.20             | -0.36 | -0.05       | -0.10 | -0.24       | -0.45 |
| Zimbabwe                           | 154                       | 120   | 108   | 108   | -3.40             | -2.46 | -1.20       | -1.05 | 0.00        | 0.00  |

Note: The rate of change (%) is calculated as the compound annual change rate.

\* A dispute exists between the Government of Argentina and the Government of the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

**TABLE A4. Proportion of total planted forest area occupied by plantation forest and other planted forest, 1990, 2000, 2010 and 2020**

| Country/territory                | Plantation forest (% of planted forest) |      |      |      | Other planted forest (% of planted forest) |      |      |      |
|----------------------------------|---|------|------|------|--|------|------|------|
|                                  | 1990                                    | 2000 | 2010 | 2020 | 1990                                       | 2000 | 2010 | 2020 |
| Afghanistan                      | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Albania                          | 0                                       | 0    | 100  | 0    | 0  | 0    | 0    | 0    |
| Algeria                          | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| American Samoa                   | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Andorra                          | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Angola                           | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Anguilla                         | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Antigua and Barbuda              | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Argentina                        | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Armenia                          | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Aruba                            | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Australia                        | 100                                     | 100  | 93   | 81   | 0  | 0    | 7    | 19   |
| Austria                          | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Azerbaijan                       | 3                                       | 3    | 4    | 7    | 97   | 97   | 96   | 93   |
| Bahamas                          | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Bahrain                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Bangladesh                       | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Barbados                         | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Belarus                          | n.s.                                    | n.s. | n.s. | n.s. | 100  | 100  | 100  | 100  |
| Belgium                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Belize                           | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Benin                            | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Bermuda                          | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Bhutan                           | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Bolivia (Plurinational State of) | 100                                     | 77   | 68   | 62   | 0  | 23   | 32   | 38   |
| Bonaire, Sint Eustatius and Saba | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Bosnia and Herzegovina           | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Botswana                         | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Brazil                           | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| British Virgin Islands           | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Brunei Darussalam                | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Bulgaria                         | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Burkina Faso                     | 5                                       | 5    | 5    | 5    | 95   | 95   | 95   | 95   |
| Burundi                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Cabo Verde                       | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |

(Continued)

TABLE A4. (Continued)

| Country/territory                     | Plantation forest (% of planted forest) |      |      |      | Other planted forest (% of planted forest) |      |      |      |
|---------------------------------------|---|------|------|------|--|------|------|------|
|                                       | 1990                                    | 2000 | 2010 | 2020 | 1990                                       | 2000 | 2010 | 2020 |
| Cambodia                              | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Cameroon                              | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Canada                                | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Cayman Islands                        | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Central African Republic              | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Chad                                  | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Chile                                 | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| China                                 | 80                                      | 71   | 58   | 54   | 20   | 29   | 42   | 46   |
| Colombia                              | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Comoros                               | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Congo                                 | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Cook Islands                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Costa Rica                            | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Côte d'Ivoire                         | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Croatia                               | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Cuba                                  | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Curaçao                               | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Cyprus                                | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Czechia                               | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Democratic People's Republic of Korea | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Democratic Republic of the Congo      | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Denmark                               | 0                                       | 0    | 61   | 58   | 0  | 0    | 39   | 42   |
| Djibouti                              | -                                       | -    | -    | 100  | -  | -    | -    | 0    |
| Dominica                              | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Dominican Republic                    | 25                                      | 36   | 40   | 40   | 75   | 64   | 60   | 60   |
| Ecuador                               | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Egypt                                 | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| El Salvador                           | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Equatorial Guinea                     | -                                       | 100  | 100  | 100  | -  | 0    | 0    | 0    |
| Eritrea                               | 0                                       | 29   | 30   | 38   | 100  | 71   | 70   | 62   |
| Estonia                               | 3                                       | 3    | 3    | 3    | 97   | 97   | 97   | 97   |
| Eswatini                              | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Ethiopia                              | 80                                      | 80   | 80   | 80   | 20   | 20   | 20   | 20   |
| Falkland Islands (Malvinas)*          | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Faroe Islands                         | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Fiji                                  | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Finland                               | n.s.                                    | n.s. | n.s. | n.s. | 100  | 100  | 100  | 100  |
| France                                | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| French Guiana                         | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| French Polynesia                      | 63                                      | 71   | 66   | 66   | 37   | 29   | 34   | 34   |
| Gabon                                 | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |

(Continued)



TABLE A4. (Continued)

| Country/territory                | Plantation forest (% of planted forest) |      |      |      | Other planted forest (% of planted forest) |      |      |      |
|----------------------------------|---|------|------|------|--|------|------|------|
|                                  | 1990                                    | 2000 | 2010 | 2020 | 1990                                       | 2000 | 2010 | 2020 |
| Gambia                           | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Georgia                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Germany                          | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Ghana                            | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Gibraltar                        | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Greece                           | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Greenland                        | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Grenada                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Guadeloupe                       | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Guam                             | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Guatemala                        | 75                                      | 73   | 67   | 77   | 25   | 27   | 33   | 23   |
| Guernsey                         | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Guinea                           | 25                                      | 33   | 38   | 44   | 75   | 67   | 62   | 56   |
| Guinea-Bissau                    | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Guyana                           | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Haiti                            | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Holy See                         | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Honduras                         | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Hungary                          | 0                                       | 0    | 19   | 16   | 0  | 0    | 81   | 84   |
| Iceland                          | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| India                            | 61                                      | 77   | 76   | 76   | 39   | 23   | 24   | 24   |
| Indonesia                        | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Iran (Islamic Republic of)       | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Iraq                             | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Ireland                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Isle of Man                      | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Israel                           | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Italy                            | 25                                      | 21   | 20   | 20   | 75   | 79   | 80   | 80   |
| Jamaica                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Japan                            | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Jersey                           | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Jordan                           | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Kazakhstan                       | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Kenya                            | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Kiribati                         | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Kuwait                           | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Kyrgyzstan                       | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Lao People's Democratic Republic | n.s.                                    | 1    | 7    | 9    | 100  | 99   | 93   | 91   |
| Latvia                           | 0                                       | 0    | 2    | 4    | 100  | 100  | 98   | 96   |
| Lebanon                          | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Lesotho                          | 61                                      | 61   | 61   | 61   | 39   | 39   | 39   | 39   |

(Continued)

TABLE A4. (Continued)

| Country/territory                | Plantation forest (% of planted forest) |      |      |      | Other planted forest (% of planted forest) |      |      |      |
|----------------------------------|---|------|------|------|--|------|------|------|
|                                  | 1990                                    | 2000 | 2010 | 2020 | 1990                                       | 2000 | 2010 | 2020 |
| Liberia                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Libya                            | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Liechtenstein                    | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Lithuania                        | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Luxembourg                       | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Madagascar                       | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Malawi                           | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Malaysia                         | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Maldives                         | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Mali                             | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Malta                            | -                                       | -    | -    | 100  | -  | -    | -    | 0    |
| Marshall Islands                 | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Martinique                       | 100                                     | 100  | 99   | 99   | 0  | 0    | 1    | 1    |
| Mauritania                       | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Mauritius                        | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Mayotte                          | 18                                      | 10   | 7    | 5    | 82   | 90   | 93   | 95   |
| Mexico                           | 98                                      | 87   | 93   | 75   | 2  | 13   | 7    | 25   |
| Micronesia (Federated States of) | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Monaco                           | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Mongolia                         | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Montenegro                       | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Montserrat                       | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Morocco                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Mozambique                       | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Myanmar                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Namibia                          | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Nauru                            | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Nepal                            | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Netherlands                      | 10                                      | 1    | 1    | 1    | 90   | 99   | 99   | 99   |
| New Caledonia                    | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| New Zealand                      | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Nicaragua                        | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Niger                            | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Nigeria                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Niue                             | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Norfolk Island                   | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| North Macedonia                  | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Northern Mariana Islands         | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Norway                           | 0                                       | 0    | 100  | 100  | 0  | 0    | 0    | 0    |
| Oman                             | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Pakistan                         | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |

(Continued)

TABLE A4. (Continued)

| Country/territory                            | Plantation forest (% of planted forest) |      |      |      | Other planted forest (% of planted forest) |      |      |      |
|--|---|------|------|------|--|------|------|------|
|  | 1990                                    | 2000 | 2010 | 2020 | 1990                                       | 2000 | 2010 | 2020 |
| Palau  | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Palestine                                    | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Panama                                       | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Papua New Guinea                             | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Paraguay                                     | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Peru   | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Philippines                                  | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Pitcairn Islands                             | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Poland                                       | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Portugal                                     | 28                                      | 27   | 31   | 31   | 72   | 73   | 69   | 69   |
| Puerto Rico                                  | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Qatar  | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Republic of Korea                            | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Republic of Moldova                          | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Réunion                                      | 91                                      | 91   | 91   | 91   | 9  | 9    | 9    | 9    |
| Romania                                      | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Russian Federation                           | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Rwanda                                       | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Saint Barthélemy                             | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Saint Helena, Ascension and Tristan da Cunha | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Saint Kitts and Nevis                        | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Saint Lucia                                  | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Saint Martin (French part)                   | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Saint Pierre and Miquelon                    | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Saint Vincent and the Grenadines             | 25                                      | 45   | 53   | 57   | 75   | 55   | 47   | 43   |
| Samoa  | 57                                      | 67   | 77   | 87   | 43   | 33   | 23   | 13   |
| San Marino                                   | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Sao Tome and Principe                        | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Saudi Arabia                                 | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Senegal                                      | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Serbia                                       | 0                                       | 0    | 12   | 30   | 100  | 100  | 88   | 70   |
| Seychelles                                   | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Sierra Leone                                 | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Singapore                                    | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Sint Maarten (Dutch part)                    | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Slovakia                                     | 0                                       | n.s. | 1    | 1    | 100  | 100  | 99   | 99   |
| Slovenia                                     | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| Solomon Islands                              | 97                                      | 97   | 97   | 96   | 3  | 3    | 3    | 4    |
| Somalia                                      | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| South Africa                                 | 40                                      | 40   | 40   | 40   | 60   | 60   | 60   | 60   |

(Continued)

TABLE A4. (Continued)

| Country/territory                                    | Plantation forest (% of planted forest) |      |      |      | Other planted forest (% of planted forest) |      |      |      |
|--|---|------|------|------|--|------|------|------|
|  | 1990                                    | 2000 | 2010 | 2020 | 1990                                       | 2000 | 2010 | 2020 |
| South Sudan  | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Spain  | 39                                      | 39   | 39   | 39   | 61   | 61   | 61   | 61   |
| Sri Lanka  | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Sudan  | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Suriname   | 100                                     | 92   | 92   | 92   | 0  | 8    | 8    | 8    |
| Svalbard and Jan Mayen Islands                       | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Sweden   | 0                                       | 6    | 5    | 3    | 100  | 94   | 95   | 97   |
| Switzerland  | n.s.                                    | n.s. | 1    | 1    | 100  | 100  | 99   | 99   |
| Syrian Arab Republic                                 | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Tajikistan   | 69                                      | 69   | 69   | 69   | 31   | 31   | 31   | 31   |
| Thailand   | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Timor-Leste  | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Togo   | 80                                      | 80   | 80   | 80   | 20   | 20   | 20   | 20   |
| Tokelau  | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Tonga  | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Trinidad and Tobago                                  | 72                                      | 74   | 74   | 74   | 28   | 26   | 26   | 26   |
| Tunisia  | 33                                      | 33   | 33   | 33   | 67   | 67   | 67   | 67   |
| Turkey   | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Turkmenistan   | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Turks and Caicos Islands                             | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Tuvalu   | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Uganda   | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Ukraine  | 7                                       | 7    | 7    | 8    | 93   | 93   | 93   | 92   |
| United Arab Emirates                                 | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| United Kingdom of Great Britain and Northern Ireland | 0                                       | 0    | 0    | 0    | 100  | 100  | 100  | 100  |
| United Republic of Tanzania                          | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| United States of America                             | 34                                      | 39   | 49   | 51   | 66   | 61   | 51   | 49   |
| United States Virgin Islands                         | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Uruguay  | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Uzbekistan   | 52                                      | 63   | 71   | 64   | 48   | 37   | 29   | 36   |
| Vanuatu  | 0                                       | 0    | 0    | 0    | 0  | 0    | 0    | 0    |
| Venezuela (Bolivarian Republic of)                   | 99                                      | 90   | 88   | 91   | 1  | 10   | 12   | 9    |
| Viet Nam   | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Wallis and Futuna Islands                            | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |
| Western Sahara                                       | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Yemen  | -                                       | -    | -    | -    | -  | -    | -    | -    |
| Zambia   | 100                                     | 100  | 98   | 87   | 0  | 0    | 2    | 13   |
| Zimbabwe   | 100                                     | 100  | 100  | 100  | 0  | 0    | 0    | 0    |

\* A dispute exists between the Government of Argentina and the Government of the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).



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The following corrections were made to the PDF of the report after it went to print.

| Page | Location                                    | Text in printed PDF  | Text in corrected PDF  |
|------|---|--|--|
| 3    | Second column, line 16                      | Team of Specialists on Sustainable Forest Management   | Team of Specialists on Monitoring Sustainable Forest Management  |
| 15   | Table 4 caption                             | Top ten countries and territories for forest cover as a percentage of total land area, 2020  | Top ten countries and territories for forest area as a percentage of total land area, 2020   |
| 48   | Table 38 caption                            | Volume of biomass and dead-wood stock, by region and subregion, 2020   | Biomass and dead-wood stock, by region and subregion, 2020   |
| 70   | Figure 32 caption                           | Proportion of total forest area designated primarily for other purposes by region, 1990-2020   | Proportion of total forest area designated primarily for other management objectives by region, 1990-2020  |
| 79   | Second column, starting from line 14 and 15 | The share was 100 percent in 48 of those countries, of which 29 were in Asia (mostly Western and Central Asia) and 26 were in Africa (mostly Western and Central Africa).  | The share was 100 percent in 48 of those countries, of which 23 were in Asia (mostly Western and Central Asia) and 16 were in Africa (mostly Western and Central Africa).      |
| 83   | Table 69 heading                            | Forest ownership   | Management rights  |
| 84   | Figure 38                                   | Proportion of total publicly owned forest area, by holder of administrative rights and region, 2015  | Proportion of total publicly owned forest area, by holder of management rights and region, 2015  |
| 96   | Table 78 3rd and 4th column heading         | Degraded forest area/Degraded forest area as % of forest area  | Forest area of reporting countries/% of total forest area  |
| 120  | Note 26                                     | The analysis was conducted by Karimon Nesha, Veronique De Sy and Martin Herold (CIFOR/Wageningen Univesity), updating a previous publication by Romin <i>et al</i> (2015). | The analysis was conducted by Mst Karimon Nesha, Veronique De Sy and Martin Herold (CIFOR/Wageningen Univesity), updating a previous publication by Romin <i>et al</i> (2015). |







Since its creation in 1946, FAO has been monitoring the world's forest resources through periodic assessments conducted in cooperation with its member countries.

The *Global Forest Resources Assessment 2020* (FRA 2020), the latest of these assessments, examines the status of, and trends in, more than 60 forest-related variables in 236 countries and territories in the period 1990–2020.

This main report of FRA 2020 presents a comprehensive view of the world's forests and the ways in which the resource is changing. Such a clear global picture supports the development of sound policies, practices and investments affecting forests and forestry.

This publication has been produced with the assistance of the European Union, the Government of Finland and the Government of Norway.

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LAST UPDATED 12/11/2020