
Food and Agriculture Organization of the United Nations
UN environment programme
2020
IN BRIEF
THE STATE OF THE WORLD'S FORESTS
FORESTS, BIODIVERSITY AND PEOPLE

This booklet contains the key messages and content from the publication *The State of the World's Forests 2020*. The numbering of the tables and figures corresponds to that publication.

CONTENTS

FOREWORD

As we were putting the finishing touches to *The State of the World's Forests 2020 (SOFO)*, the world came face to face with the unprecedented challenges of the COVID-19 pandemic. While the immediate global priority is to tackle this public health emergency, our long-term response must also address the underlying causes of such a pandemic. The degradation and loss of forests is one such contributing factor, disrupting nature's balance and increasing the risk and exposure of people to zoonotic diseases. Understanding and keeping track of the state of our world's forests has never been so important.

This year marks the end of the United Nations Decade on Biodiversity and the implementation of the Strategic Plan for Biodiversity 2011–2020. All countries are coming together to review progress towards the Plan's five Strategic Goals and the 20 Aichi Biodiversity Targets to shape the post-2020 global biodiversity framework.

This framework must be underpinned by evidence: evidence of the current state of the world's biodiversity and recent trends; evidence of the linkages between biodiversity and sustainable development; and evidence of successful actions taken to conserve and sustainably use the many products and services that the world's biodiversity provides to support food security and human well-being.

The vast majority of terrestrial biodiversity is found in the world's forests – from boreal forests in the far North to tropical rainforests. Together, they contain more than 60 000 different tree species and provide habitats for 80 percent of amphibian species, 75 percent of bird species and 68 percent of mammal species. About 60 percent of all vascular plants are found in tropical forests. Mangroves provide breeding grounds and nurseries for numerous species of fish and shellfish and help trap sediments that might otherwise adversely affect seagrass beds and coral reefs, habitats for marine life.

The conservation of the majority of the world's biodiversity is thus utterly dependent on the way in which we interact with and use the world's forests.

This edition of *SOFO* examines the contributions of forests, and of the people who use and manage them, to the conservation and sustainable use of biodiversity. It assesses progress to date in meeting global targets and goals relating to forest biodiversity and describes the effectiveness of policies, actions and approaches for conservation and sustainable development alike, illustrated by case studies of innovative practices and win-win solutions.

This volume does not aim to be a comprehensive treatise on forest biodiversity, but rather to provide an update on its current state and a summary of its importance for humanity. It is intended to complement *The State of the World's Biodiversity for Food and Agriculture*, released by the Commission on Genetic Resources for Food and Agriculture of the Food and Agriculture Organization of the United Nations (FAO) in 2019, last year's *Global Assessment Report on Biodiversity and Ecosystem Services* of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the *Global Biodiversity Outlook 5* of the Convention on Biological Diversity (CBD).

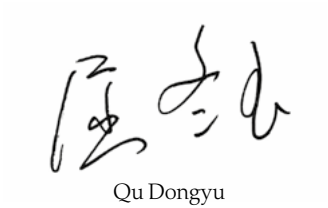
For the first time, this edition of *SOFO* is a joint effort between two United Nations entities: FAO and the United Nations Environment Programme (UNEP). Building on our ongoing collaboration and comparative advantages, we bring together new information generated by FAO's Global Forest Resources Assessment 2020 with analyses of the status and representativeness of protected forests over time undertaken by the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC).

SOFO 2020 confirms that deforestation and forest degradation continue to take place at alarming rates, which contribute significantly to the ongoing loss of biodiversity. Agricultural expansion continues to be one of the main drivers, while the resilience of human food systems and their capacity to adapt to future change depends on that very biodiversity.

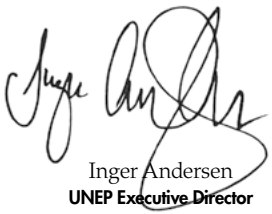
SOFO 2020 also identifies signs of hope. The rate of forest loss is decreasing globally and solutions that balance conservation and sustainable use of forest biodiversity do exist. To turn the tide on deforestation and biodiversity loss, we urgently need to see these solutions being scaled up as well as instill transformational change in the way we produce and consume food. We also need to conserve and manage forests and trees within an integrated landscape approach and reverse the damage done through forest restoration efforts.

Critical to these transformations are effective governance, policy alignment between sectors and administrative levels, land-tenure security, respect for the rights and knowledge of local communities and indigenous peoples, enhanced capacity for monitoring of biodiversity outcomes, and by no means least, innovative financing modalities.

Ultimately, we need to foster a new relationship with nature, and we can achieve that together. *SOFO 2020* contributes to that vision. We hope you will find it interesting, valuable and inspiring.



Qu Dongyu
FAO Director-General



Inger Andersen
UNEP Executive Director

EXECUTIVE SUMMARY

As the United Nations Decade on Biodiversity 2011–2020 comes to a close and countries prepare to adopt a post-2020 global biodiversity framework, this edition of *The State of the World's Forests* (*SOFO*) takes the opportunity to examine the contributions of forests, and of the people who use and manage them, to the conservation and sustainable use of biodiversity. It is intended to complement *The State of the World's Biodiversity for Food and Agriculture*, released by the Food and Agriculture Organization of the United Nations (FAO) in February 2019; the *Global Assessment Report on Biodiversity and Ecosystem Services* of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the draft of which was released in 2019; and the *Global Biodiversity Outlook 5* of the Convention on Biological Diversity (CBD), released in 2020.

Forests harbour most of Earth's terrestrial biodiversity. The conservation of the world's biodiversity is thus utterly dependent on the way in which we interact with and use the world's forests. Forests provide habitats for 80 percent of amphibian species, 75 percent of bird species and 68 percent of mammal species. About 60 percent of all vascular plants are found in tropical forests. Mangroves provide breeding grounds and nurseries for numerous species of fish and shellfish and help trap sediments that might otherwise adversely affect seagrass beds and coral reefs, which are habitats for many more marine species.

Forests cover 31 percent of the global land area but are not equally distributed around the globe. The total forest area is 4.06 billion hectares. More than half of the world's forests are found in only five countries (Brazil, Canada, China, Russian Federation and United States of America).

The largest part of the forest (45 percent) is found in the tropical domain, followed by the boreal, temperate and subtropical domains. These domains are further divided into terrestrial global ecological zones, 20 of which contain some forest cover.

Almost half the forest area (49 percent) is relatively intact, while 9 percent is found in fragments with little or no connectivity. Tropical rainforests and boreal coniferous forests are the least fragmented, whereas subtropical dry forest and temperate oceanic forests are among the most fragmented. Roughly 80 percent of the world's forest area is found in patches larger than 1 million hectares. The remaining 20 percent is

BOX 1 WHAT IS FOREST BIOLOGICAL DIVERSITY?

Forest biological diversity is a broad term that refers to all life forms found within forested areas and the ecological roles they perform. As such, forest biological diversity encompasses not just trees, but the multitude of plants, animals and microorganisms that inhabit forest areas and their associated genetic diversity.

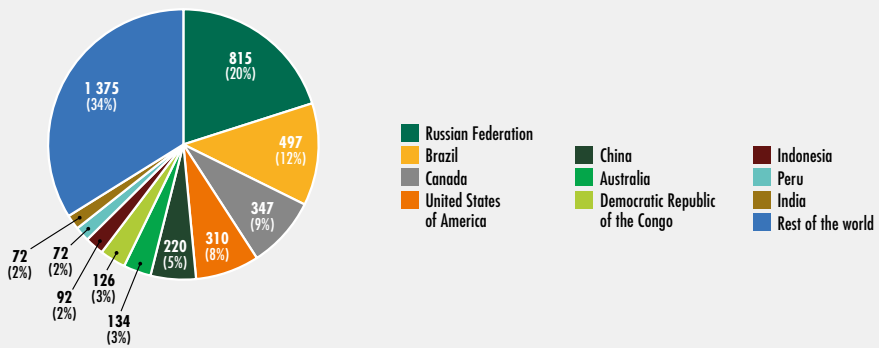
Forest biological diversity can be considered at different levels, including ecosystem, landscape, species, population and genetic. Complex interactions can occur within and between these levels. In biologically diverse forests, this complexity allows organisms to adapt to continually changing environmental conditions and to maintain ecosystem functions.

In the annex to Decision II/9 (CBD, n.d.a), the Conference of the Parties to the CBD recognized that:

"Forest biological diversity results from evolutionary processes over thousands and even millions of years which, in themselves, are driven by ecological forces such as climate, fire, competition and disturbance. Furthermore, the diversity of forest ecosystems (in both physical and biological features) results in high levels of adaptation, a feature of forest ecosystems which is an integral component of their biological diversity. Within specific forest ecosystems, the maintenance of ecological processes is dependent upon the maintenance of their biological diversity."

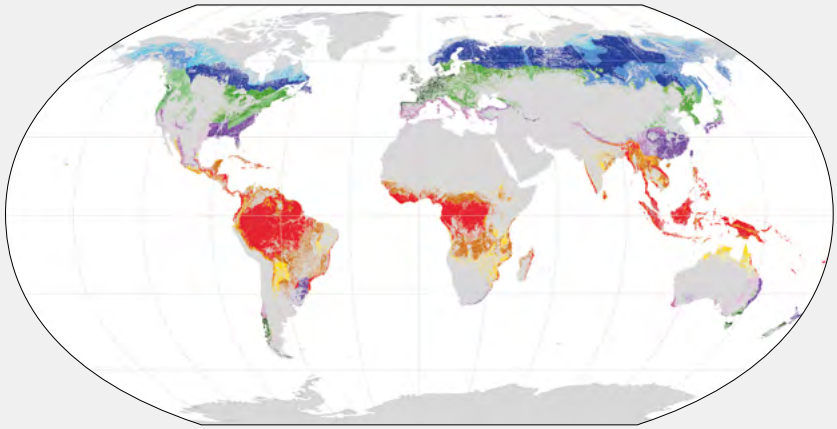
SOURCE: CBD n.d.b.

FIGURE 1 GLOBAL DISTRIBUTION OF FORESTS SHOWING THE TEN COUNTRIES WITH THE LARGEST FOREST AREA, 2020 (MILLION HECTARES AND % OF WORLD'S FORESTS)



SOURCE: FAO, 2020.

FIGURE 8 FOREST BY GLOBAL ECOLOGICAL ZONE



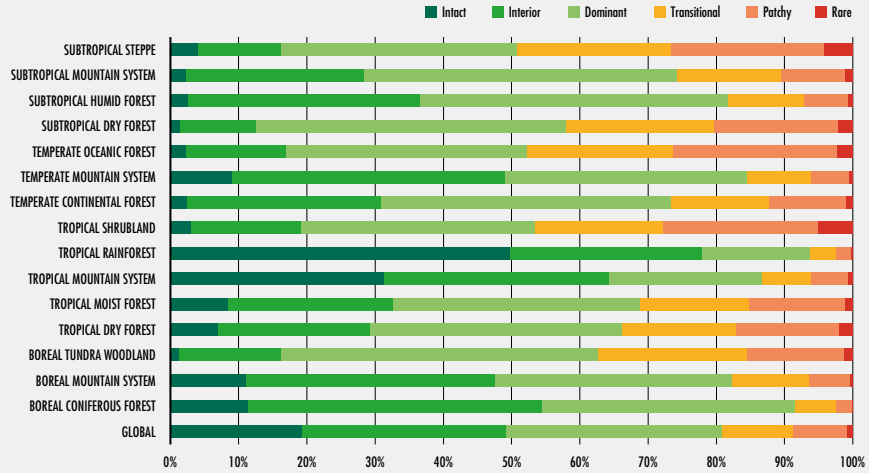
NOTE: The map depicts the distribution of forest with tree cover of at least 30 percent in 2015 according to the Copernicus moderate-resolution (100 m) land-cover map. Agricultural tree crop plantations are excluded from this map to the extent possible.
SOURCE: Prepared by FAO based on FAO global ecological zone map (FAO, 2012a) and global Copernicus Land Cover map for 2015 (Buchhorn *et al.*, 2019).

located in more than 34 million patches across the world – the vast majority less than 1 000 hectares in size.

More than one-third (34 percent) of the world's forests are primary forests, defined as naturally regenerated forests of native tree species where there are no clearly visible indications of human activity and the ecological processes are not significantly disturbed.

Deforestation and forest degradation continue to take place at alarming rates, which contributes significantly to the ongoing loss of biodiversity. Since 1990, it is estimated that some 420 million hectares of forest have been lost through conversion to other land uses, although the rate of deforestation has decreased over the past three decades. Between 2015 and 2020, the rate of deforestation was estimated at 10 million hectares per year, down from 16

FIGURE 12 PROPORTION OF FOREST AREA BY FOREST AREA DENSITY CLASS AND GLOBAL ECOLOGICAL ZONE, 2015



SOURCE: Study prepared by JRC and the United States Forest Service for this publication.

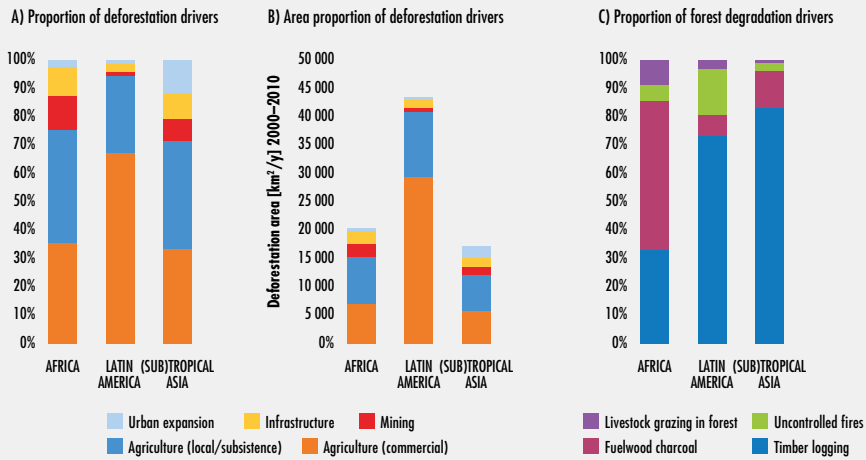
million hectares per year in the 1990s. The area of primary forest worldwide has decreased by over 80 million hectares since 1990. More than 100 million hectares of forests are adversely affected by forest fires, pests, diseases, invasive species drought and adverse weather events.

Agricultural expansion continues to be the main driver of deforestation and forest fragmentation and the associated loss of forest biodiversity. Large-scale commercial agriculture (primarily cattle ranching and cultivation of soya bean and oil palm) accounted for 40 percent of tropical deforestation between 2000 and 2010, and local subsistence agriculture for another 33 percent. Ironically, the resilience of human food systems and their capacity to adapt to future change depends on that very biodiversity – including dryland-adapted shrub and tree species that help combat desertification, forest-dwelling insects, bats and bird species that pollinate crops, trees with extensive root systems in mountain ecosystems that prevent soil erosion, and mangrove species that provide resilience against flooding in coastal areas. With climate change exacerbating the risks to food systems, the role of forests in capturing and storing carbon and mitigating climate change is of ever-increasing importance for the agricultural sector.

FIGURE 4 GLOBAL FOREST EXPANSION AND DEFORESTATION 1990–2020 (MILLION HECTARES PER YEAR)

SOURCE: FAO, 2020.

FIGURE 29 DRIVERS OF DEFORESTATION AND FOREST DEGRADATION BY REGION, 2000–2010



NOTE: Continental-level estimations of the relative area proportion (A) and absolute net forest area change (km²/year; FAO, 2010b) for the period 2000–2010 (B) of deforestation drivers; and of the relative disturbed forest area fraction of degradation drivers (C), based on data from 46 tropical and subtropical countries.
SOURCE: Hosonuma *et al.*, 2012.

The net loss of forest area has decreased substantially since 1990, but the world is not on track to meet the target of the United Nations Strategic Plan for Forests to increase forest area by 3 percent by 2030. While deforestation is taking place in some areas, new forests are being established through natural expansion or deliberate efforts in others. As a result, the net loss of forest area is less than the rate of deforestation and it too is decreasing: From 7.8 million hectares per year in the 1990s to 4.7 million hectares per year during 2010–2020. In absolute terms, the global forest area decreased by 178 million hectares between 1990 and 2020, which is an area about the size of Libya.

The biodiversity of forests varies considerably according to factors such as forest type, geography, climate and soils – in addition to human use. Most forest habitats in temperate regions support relatively few animal and plant species and species that tend to have large geographical distributions, while the montane forests of Africa, South America and Southeast Asia and lowland forests of Australia, coastal Brazil, the Caribbean islands, Central America and insular Southeast Asia have many species with small geographical distributions. Areas with dense human populations and intense agricultural land use, such as Europe, parts of Bangladesh, China, India and North America, are less intact in terms of their biodiversity. Northern Africa, southern Australia, coastal Brazil, Madagascar and South Africa, are also identified as areas with striking losses in biodiversity intactness.

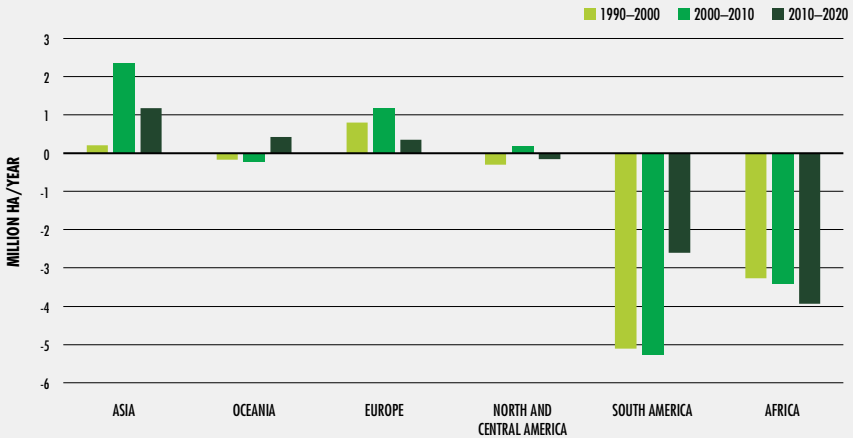
Progress on preventing the extinction of known threatened species and improving their conservation status has been slow. More than 60 000 different tree species are known, more than 20 000 of which have been included in the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, and more than 8 000 of these are assessed as globally threatened (Critically Endangered, Endangered or Vulnerable). More than 1 400 tree species are assessed as critically endangered and in urgent need of conservation action. Some 8 percent of assessed forest plants, 5 percent of forest animals and 5 percent of fungi found in forests are currently listed as critically endangered.

The forest-specialist index, based on 455 monitored populations of 268 forest mammals, amphibians, reptiles and birds, fell by 53 percent between 1970 and 2014, an annual rate of decline of 1.7 percent. This highlights the increased risk of these species becoming vulnerable to extinction.

On a positive note, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization has been ratified by 122 contracting Parties (an increase of 74 percent from 2016) and 146 Parties have ratified the International Treaty on Plant Genetic Resources for Food and Agriculture.

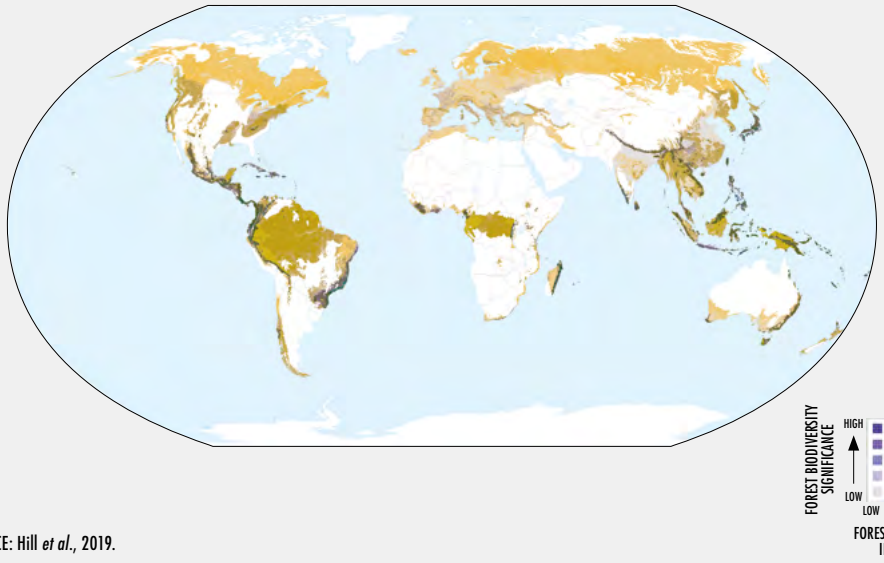
All people depend upon forests and their biodiversity, some more than others. Forests provide more than 86 million green jobs and support the livelihoods of

FIGURE 2 NET FOREST AREA CHANGE BY REGION 1990–2020 (MILLION HECTARES PER YEAR)



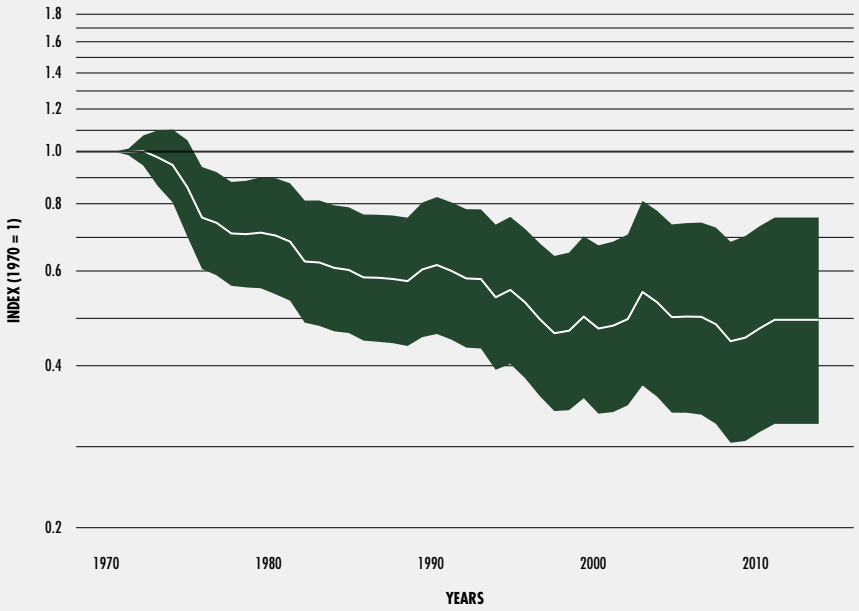
SOURCE: FAO, 2020.

FIGURE 22 BIVARIATE MAP OF FOREST BIODIVERSITY SIGNIFICANCE AND INTACTNESS WITHIN FOREST BIOMES, 2018



SOURCE: Hill *et al.*, 2019.

FIGURE 24 OVERALL DECLINE IN A FOREST-SPECIALIST INDEX FOR 268 FOREST VERTEBRATE SPECIES (455 POPULATIONS), 1970–2014

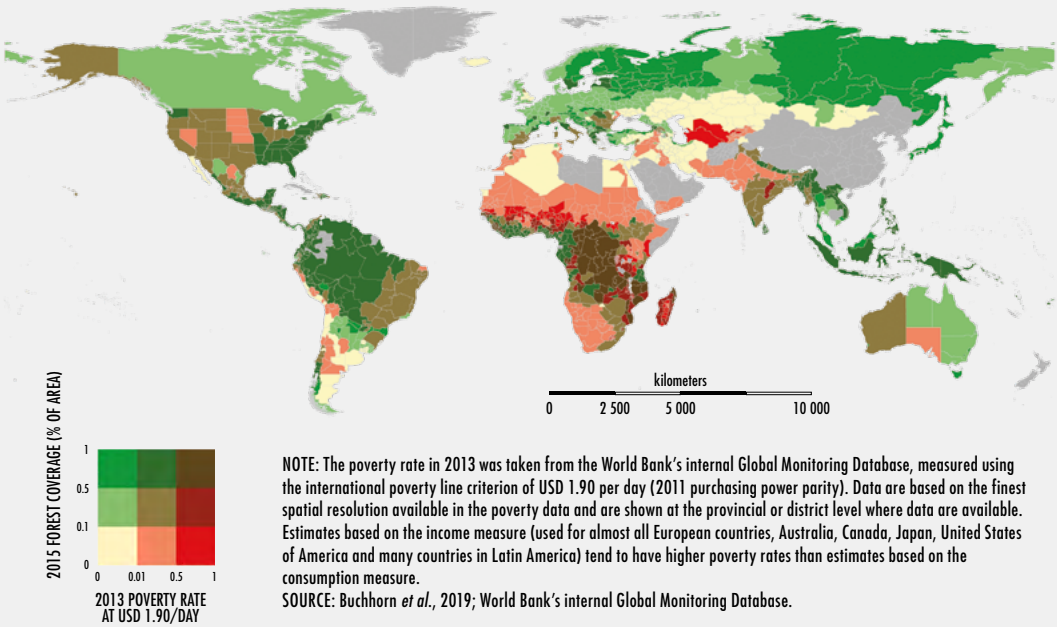


NOTE: Solid line shows the weighted index values; shaded region shows the 95 percent confidence interval for the index.
SOURCE: Green *et al.*, 2019a.

many more people. An estimated 880 million people worldwide spend part of their time collecting fuelwood or producing charcoal, many of them women. Human populations tend to be low in areas of low-income countries with high forest cover and high forest biodiversity, but poverty rates in these areas tend to be high. Some 252 million people living in forests and savannahs have incomes of less than USD 1.25 per day.

Feeding humanity and conserving and sustainably using ecosystems are complementary and closely interdependent goals. Forests supply water, mitigate climate change and provide habitats for many pollinators, which are essential for sustainable food production. It is estimated that 75 percent of the world's leading food crops, representing 35 percent of global food production, benefit from animal pollination for fruit, vegetable or seed production.

FIGURE 25 OVERLAY OF FOREST COVER AND POVERTY RATE



NOTE: The poverty rate in 2013 was taken from the World Bank's internal Global Monitoring Database, measured using the international poverty line criterion of USD 1.90 per day (2011 purchasing power parity). Data are based on the finest spatial resolution available in the poverty data and are shown at the provincial or district level where data are available. Estimates based on the income measure (used for almost all European countries, Australia, Canada, Japan, United States of America and many countries in Latin America) tend to have higher poverty rates than estimates based on the consumption measure.
SOURCE: Buchhorn *et al.*, 2019; World Bank's internal Global Monitoring Database.

Worldwide, around 1 billion people depend to some extent on wild foods such as wild meat, edible insects, edible plant products, mushrooms and fish, which often contain high levels of key micronutrients. The value of forest foods as a nutritional resource is not limited to low- and middle-income countries; more than 100 million people in the European Union (EU) regularly consume wild food. Some 2.4 billion people – in both urban and rural settings – use wood-based energy for cooking.

Human health and well-being are closely associated with forests. More than 28 000 plant species are currently recorded as being of medicinal use and many of them are found in forest ecosystems. Visits to forest environments can have positive impacts on human physical and mental health and many people have a deep spiritual relationship to forests. Yet,

BOX 28 LINKS OF FORESTS AND TREE-BASED SYSTEMS TO DIETARY DIVERSITY

Access to forests and tree-based systems is linked to consumption of fruits and vegetables and to dietary diversity, while forest loss is linked to a reduction in the nutritional quality of local diets (Ickowitz *et al.*, 2014). Dietary diversity – the number of different foods or food groups consumed over a given period – of individuals or households can be used as an indicator of nutritional status, including adequacy of micronutrient availability, energy and child growth (Jamnadass *et al.*, 2015). In a study in the United Republic of Tanzania, greater consumption of forest foods was correlated with higher dietary diversity, greater consumption of foods sourced from animals and more nutrient-dense diets (Powell, Hall and Johns, 2011). Ickowitz *et al.* (2014) paired satellite images of tree cover with dietary information across 21 African countries and found that the diversity of children's diets was higher where tree cover was higher; consumption of fruits and vegetables increased with tree cover up to a peak of 45 percent tree cover. Similarly, across 27 countries in Africa, association with forests was correlated with an increase in children's dietary diversity of at least 25 percent (Rasolofoson *et al.*, 2018).

Loss of forest cover can also have negative nutritional consequences. In a geospatial analysis of 15 countries in sub-Saharan Africa, Galway, Acharya and Jones (2018) observed a link between deforestation and reduced dietary diversity in young children, in particular lower consumption of legumes, nuts, fruits and vegetables. They found the relationship to be strongest in West Africa.

BOX 31 ECONOMIC VALUE OF FOREST WILD POLLINATION SERVICES TO SMALLHOLDER FARMERS IN THE UNITED REPUBLIC OF TANZANIA

The United Republic of Tanzania, like most countries in sub-Saharan Africa, relies heavily on agriculture for livelihoods, income and food security. Most farmers in the country are smallholders who are dependent on naturally available ecosystem services for their subsistence and agricultural productivity. A national assessment revealed that forests have an important role in agriculture as the natural habitats of wild pollinators (Tibesigwa *et al.*, 2019). The results showed a substantial productivity (and revenue) benefit from proximity to the forest for pollinator-dependent crops, which constitute the majority of crops in the country. This benefit was seen to decline exponentially with the distance between the farm plot and the forest and was non-existent more than 2 to 3 km from the forest. Furthermore, a reduction of forest cover was seen to lead to a reduction in crop revenue. The study demonstrated the importance of forest conservation in agricultural landscapes.

BOX 51 HUMAN–WILDLIFE CONFLICT

Human–wildlife conflict (HWC) occurs when animals pose a direct and recurring threat to the livelihood or safety of people, often leading to the persecution of that species. In many regions these conflicts have intensified as a result of human population growth and changes in land use. In general, the consequences of HWC include destruction of crops, reduced farm productivity, competition for grazing lands and water, livestock predation, injury and death to farmers, damage to infrastructure and increased risk of disease transmission from wildlife to livestock. HWC often triggers negative sentiments towards conservation, especially when protected areas are being established or expanded.

HWC is of major concern to wildlife conservation and human well-being in Africa. For example, in 2017 more than 8 000 HWC incidents were reported in Namibia alone (World Bank, 2019). Hyenas killed more than 600 cattle in the Zambezi Region of Namibia between 2011 and 2016 and there were more than 4 000 incidents of crop damage, mostly caused by elephants moving through the region (NACSO, 2017a). HWC has also become a major problem in many countries in Asia and the Pacific. In Sri Lanka, for example, each year as many as 80 people are killed by elephants and more than 230 elephants are killed by farmers. The Sri Lankan elephant is listed as endangered, and only 2 500–4 000 individuals remain in the wild (IIED, 2019).

With specific reference to forests, a high density of large ungulates, for example deer, can cause severe damage to the forest and can threaten regeneration by trampling or browsing small trees, rubbing themselves on trees or stripping tree bark. This behaviour can have important economic implications and can lead to polarization between forest and wildlife managers (CPW, 2016).

Many responses have been developed to prevent and mitigate HWC, broadly categorized as lethal and non-lethal. They range from methods that require expensive infrastructure (e.g. electric fences) and government involvement (e.g. compensation and insurance schemes) to methods that can be carried out by individuals with low-cost tools (e.g. guarding of livestock, burning chilli pepper bricks) (Nyhus, 2016). Beehive fences, which are relatively affordable to build and maintain, are an innovative approach to human–elephant conflict that has been willingly adopted by farmers in Kenya. These fences are a natural deterrent that takes advantage of elephants' instinctive avoidance of African honey bees while providing pollination services and "elephant-friendly" honey (King *et al.*, 2017; Save the Elephants, 2019).

To grapple with the challenge, many countries are starting to explicitly include HWC in national policies and strategies for wildlife management, development and poverty alleviation. At the national level, cross-sectoral collaboration between forestry, wildlife, agriculture, livestock and other relevant sectors is key. FAO actively supports the efforts of member countries to better manage HWC by facilitating cross-sectoral dialogue, providing technical assistance in the development of national policies and legal frameworks and helping to share information on good practices and tools. For example, an HWC toolkit was developed in 2010 (Le Bel, Mapuivre and Czudek, 2010) for use by farmers and local communities in southern Africa and has now been adapted and translated into French for use in Central Africa (Nguinguiri *et al.*, 2017).

SOURCE: CBD n.d.b.

CASE STUDY 8

Sustainable, panda-friendly use of wild medicinal plants in China

Despite the gains made from plant domestication, it is estimated that 60 to 90 percent of marketed medicinal and aromatic plant (MAP) species are still collected from the wild. Wild plants collected in and near forests provide important raw materials for the health care, cosmetic and food sectors, supporting the livelihoods of millions of people. However, overharvesting, land conversion and pollution are a major threat to wild species and their collectors in many regions of the world: One in five MAP species is threatened with extinction (Jenkins, Timoshyna and Cornthwaite, 2018).

Many wild plants share landscapes with other threatened species. Thus, sustainable wild harvesting and trade in plant ingredients underlies holistic management for other species and ecosystems at large.

China is a leader in international trade of MAPs, accounting for a reported export volume of 1.3 million tonnes valued at USD 5 billion in 2013 (15.6 percent of the world's exports of MAPs). Wild-collected material may have contributed as much as USD 1.8 billion of this value (ITC, 2016). Most of this trade is linked to resources used in traditional Chinese medicine, over 70 percent of which come from wild medicinal plants. Chinese licorice (*Glycyrrhiza uralensis*), caterpillar fungus (*Cordyceps sinensis*), Barbary wolfberry or goji (*Lycium barbarum*), *Poria cocos* mushroom and *Ligusticum jeholense* root alone have an export value of USD 180 million a year.

In villages of the Upper Yangtze ecoregion, sale of medicinal plants contributes up to 60 percent of household income (Jenkins, Timoshyna and Cornthwaite, 2018). A decade of experience in the region with a panda-friendly model for conservation of Southern magnolia vine (*Schisandra sphenanthera*) has provided strong evidence that standards and norms can be effective in promoting sustainable resource management while boosting incomes and health of local and rural communities, particularly those that are poor and marginalized (Brinckmann *et al.*, 2018).

The vine is found in deciduous mountain forests that also provide habitats for the giant panda (*Ailuropoda melanoleuca*). Its berries are used in the indigenous medicine of ethnic minorities in Sichuan as well as in traditional Chinese medicine. The EU–China Biodiversity Programme on Sustainable Management of Traditional Medicinal Plants supported the application of existing sustainability standards such as the United States Department of Agriculture's wild crop harvesting practice standard (USDA, n.d.a) and FairWild (FairWild Foundation, 2019), and the development of new Standards for Giant Panda Friendly Products (WWF China, 2012). Collectors were also trained in methods for sustainable harvesting of *Schisandra* berries; for example, they learned to pick berries from the lower two-thirds of the vine, leaving the rest for birds and wildlife that spread the seeds through the

CASE STUDY 8

forest. The application of the standards attracted long-term fair-trade agreements between the newly formed local trading cooperative and international companies, generating prices 30 percent higher than before. The model was expanded to 22 villages, increasing the number of households involved from 48 to 300, with a sixtyfold increase in wild *Schisandra* harvesting since 2009 to 30 tonnes of dried berries in 2017 (see Figure A).

Increased income provided communities with an incentive to harvest the berries sustainably and to maintain secondary forest habitats outside giant panda conservation areas (Brinckmann *et al.*, 2018). The giant panda population has now stabilized and is even increasing in parts of its range (Sichuan Forestry Department, 2015, cited in Brinckmann *et al.*, 2018), and its status on the IUCN Red List has shifted from Endangered to Vulnerable.

FIGURE A
TRENDS IN SCHISANDRA HARVEST, UPPER YANGTZE ECOREGION, 2009–2017

SOURCE: Adapted from Brinckmann *et al.*, 2018.

BOX 38 HALTING DEFORESTATION: RECOMMENDATIONS OF A GLOBAL CONFERENCE

In February 2018, the Collaborative Partnership on Forests (a voluntary arrangement between 15 international organizations and secretariats with significant forest-related programmes, established almost 20 years ago and chaired by FAO) convened the global conference, "Working Across Sectors to Halt Deforestation and Increase Forest Area: From Aspiration to Action". Approximately 300 participants from governments, international organizations, the scientific community, the private sector, civil society and farmer organizations attended. The conference listed the following actions that need to be taken to halt and reverse deforestation:

- As forest regulators and often large-scale forest owners, governments at all levels must take the lead in putting in place the enabling conditions needed to ensure all forests are sustainably managed and to attract long-term financing and investment to this end. This includes establishing participatory, inclusive and transparent processes for involving community and corporate stakeholders in land-use planning and decision-making.
- Agribusiness should meet its commitments to zero-deforestation from the production and processing of agricultural commodities by 2020. Companies that have not made zero-deforestation commitments should do so. Commodity investors should adopt business models that are environmentally and socially responsible and involve and benefit local/community producers, distributors and other value chain actors through, for example, extension programmes and the joint design of sustainable land-use plans on corporate land.
- The forest products industry should ensure legal and sustainable value chains for forest-based commodities, including through forest management and chain-of-custody certification, and work with local communities in the process.
- Civil society organizations serve as watchdogs and agents of change by holding governments and business to account. Non-governmental groups should increase their voice and influence through multistakeholder initiatives and platforms that promote understanding and recognition of the roles, contributions and interests of actors, both men and women, along value chains and across enterprises.
- Public and private actors should fully tap into the potential of civil society, particularly women and youth. Youth can facilitate collective action, engagement, innovation, capacity-building, networking and partnerships, as well as providing a long-term perspective.

SOURCE: FAO and CPF, 2018.

forests also pose health risks. Forest-associated diseases include malaria, Chagas disease (also known as American trypanosomiasis), African trypanosomiasis (sleeping sickness), leishmaniasis, Lyme disease, HIV and Ebola. The majority of new infectious diseases affecting humans, including the SARS-CoV2 virus that caused the current COVID-19 pandemic, are zoonotic and their emergence may be linked to habitat loss due to forest area change and the expansion of human populations into forest areas, which both increase human exposure to wildlife.

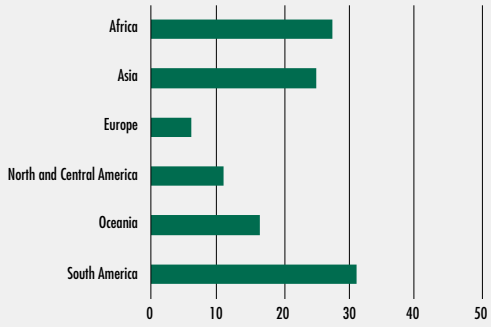
In view of the inextricable connection of human, animal and environmental health, the "One Health" approach aims to improve health and well-being through risk prevention and mitigation at the interface between humans, animals and their various environments. In Africa, for example, FAO, WHO and World Organisation for Animal Health (OIE) are jointly implementing One Health programming that brings together professionals and policymakers in forestry, natural resources, agriculture, livestock and public health to ensure balance among all the relevant sectors and disciplines.

The aim of achieving optimal health outcomes for human communities should be taken into account in forest management and planning, not only for rural areas but also for peri-urban and urban areas and for both developed and developing countries. Land-use planning for urban or agricultural expansion should also take into account the importance of buffers that would mitigate potential impacts associated with higher contact rates between wildlife, livestock and people.

Solutions that balance conservation and sustainable use of forest biodiversity are critical – and possible. Not all human impacts on biodiversity are negative, as shown by the many concrete examples in *SOFO 2020* of recent successful initiatives to manage, conserve, restore and sustainably use forest biodiversity.

Actions to combat deforestation and illegal logging have gathered pace over the past decade – as have international agreements and results-based payments. So far, seven countries have reported reduced deforestation to the United Nations Framework Convention on Climate Change (UNFCCC) and countries are now accessing payments based on reducing emissions from deforestation and forest degradation from the Green Climate Fund and similar financing mechanisms. Efforts to address illegal logging are spearheaded by trade regulations in consumer countries that require importers to demonstrate that timber has been harvested legally. Many tropical timber-producing countries are making corresponding efforts to strengthen legal compliance and verification. Fifteen of them are developing national systems to assure legality of timber operations under the EU Forest Law Enforcement, Governance and Trade mechanism. As part of this mechanism, countries are

FIGURE 37 PERCENTAGE OF FOREST IN LEGALLY PROTECTED AREAS, 2020



NOTE: Data for Europe include the Russian Federation. If the Russian Federation is excluded, 18 percent of Europe's forest area is in protected areas.
SOURCE: FAO, 2020.

between 1992 and 2015 found that more than 30 percent of tropical rainforests, subtropical dry forests and temperate oceanic forests were within legally protected areas (IUCN categories I-VI) in 2015. The study also found that subtropical humid forest, temperate steppe and boreal coniferous forest should be given priority in future decisions to establish new protected areas since less than 10 percent of these forests are currently protected. Areas with high values for both biodiversity significance and intactness, for example the northern Andes and Central America, southeastern Brazil, parts of the Congo Basin, southern Japan, the Himalayas and various parts of Southeast Asia and New Guinea, should likewise be given high priority.

required to also implement measures to prevent illegal hunting.

Aichi Biodiversity Target 11 (to protect at least 17 percent of terrestrial area by 2020) has been exceeded for forest ecosystems as a whole. However, protected areas alone are not sufficient to conserve biodiversity. Globally, 18 percent of the world's forest area, or more than 700 million hectares, fall within legally established protected areas such as national parks, conservation areas and game reserves (IUCN categories I–IV).

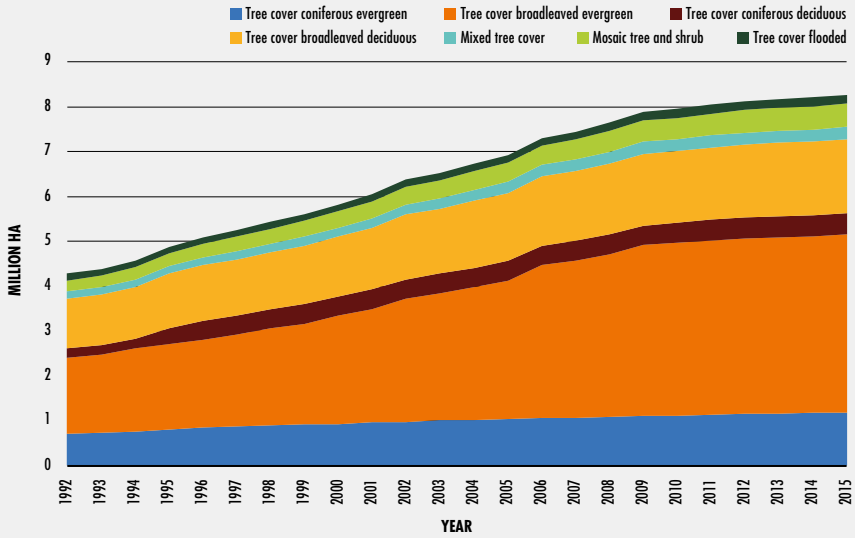
However, these areas are not yet fully representative of the diversity of forest ecosystems. A special study conducted for *SOFO 2020* on trends in protected forest area by global ecological zones (GEZs)

Limited progress has been made to date on classifying specific forest areas as other effective area-based conservation measures, but guidance on this category is being developed and has significant potential for forests.

Aichi Biodiversity Target 7 (by 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation) has not been met for forests, but the management of the world's forests is improving. The area of forest under long-term management plans has increased significantly in the past 30 years to an estimated 2.05 billion hectares in 2020, equivalent to 54 percent of the global forest area.

Current negative trends in biodiversity and ecosystems will undermine progress towards the

FIGURE 39 INCREASE IN FOREST AREA WITHIN PROTECTED AREAS BY FOREST TYPE, 1992–2015 (MILLION HECTARES)

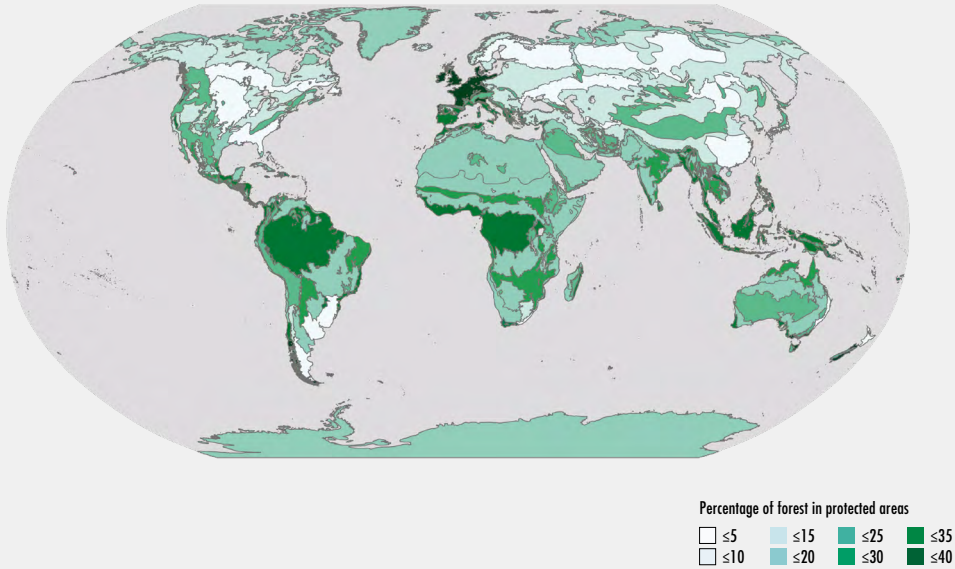


SOURCE: Study prepared by UNEP-WCMC for this publication.

Sustainable Development Goals (SDGs). The world's biodiversity underpins life on Earth, but despite some positive trends, the loss of biodiversity continues at a rapid rate. Transformational change is needed in the way we manage our forests and their biodiversity, produce and consume our food and interact with nature. It is imperative that we decouple environmental degradation and unsustainable resource use from economic growth and associated production and consumption patterns and that land-use decisions take the true value of forests into account.

Ensuring positive outcomes for both biodiversity and people requires a careful balance between conservation goals and demands for resources that support livelihoods. There is an urgent need to ensure that biodiversity conservation be mainstreamed into forest management practices in all forest types. To do so, a realistic balance must be struck between conservation goals and local needs and demands for resources that support livelihoods, food security and human well-being. This requires effective governance; policy alignment between sectors and administrative levels; land-tenure security; respect for the

FIGURE 41 PERCENTAGE OF FOREST WITHIN PROTECTED AREAS BY GLOBAL ECOLOGICAL ZONE, 2015



SOURCE: Study prepared by UNEP-WCMC for this publication.

rights and knowledge of local communities and indigenous peoples; and enhanced capacity for monitoring of biodiversity outcomes. It also requires innovative financing modalities.

We need to transform our food systems to halt deforestation and the loss of biodiversity. The biggest transformational change is needed in the way in which we produce and consume food. We must move away from the current situation where the demand for food is resulting in inappropriate agricultural practices that drive large-scale conversion of forests to agricultural production and the loss of forest-related biodiversity. Adopting agroforestry and sustainable production practices, restoring the productivity of degraded agricultural lands, embracing healthier diets from sustainable food systems and reducing food loss and waste are all actions that urgently need to be scaled up. Agribusinesses must meet their commitments to deforestation-free commodity chains and companies that have not made zero-deforestation commitments should do so. Commodity

BOX 49 MAINSTREAMING BIODIVERSITY CONSERVATION IN SUSTAINABLE MANAGEMENT OF FOREST LANDSCAPES IN MONGOLIA

Mongolia is an impoverished country highly dependent on its natural resources. The majority of the population is spread across small urban centres and the vast steppes, where the predominant activity is herding cattle, sheep, goats, horses, yaks and camels. This, together with community forestry, provides employment, alleviates poverty and enables marginalized communities to participate in the national economy. Sustainable management of forests in Mongolia represents an alternative revenue source for many of the country's poor, and participatory forest management has recently been piloted and introduced in the country.

The FAO-GEF-Government of Mongolia project "Mainstreaming biodiversity conservation, sustainable forest management and carbon sink enhancement into Mongolia's productive forest landscape" aims at improving the management of over 460 000 hectares of forests, which include important habitats of endangered species such as musk deer (*Moschus moschiferus*) and saker falcon (*Falco cherrug*). The project, implemented by the Mongolian Ministry of Environment and Tourism in collaboration with provincial and district governments and with assistance from FAO and financial support from GEF, works directly with 101 Forest User Groups. All forest management plans developed with support from the project include biodiversity conservation objectives and wildlife-monitoring activities.

In addition to activities designed to enhance forest health, productivity and carbon stocks (e.g. pest control, fire prevention, forest-stand enhancement), the project promotes income-generating activities based on fuelwood, small crafts and NWFPs; these have opened up opportunities for multipurpose forest management by the Forest User Groups. Project monitoring data available to date indicate that the number of some wildlife species, including musk deer and wild boar, have increased in the project area.

investors should adopt business models that are environmentally and socially responsible. These actions will, in many cases, require a revision of current policies – in particular fiscal policies – and regulatory frameworks.

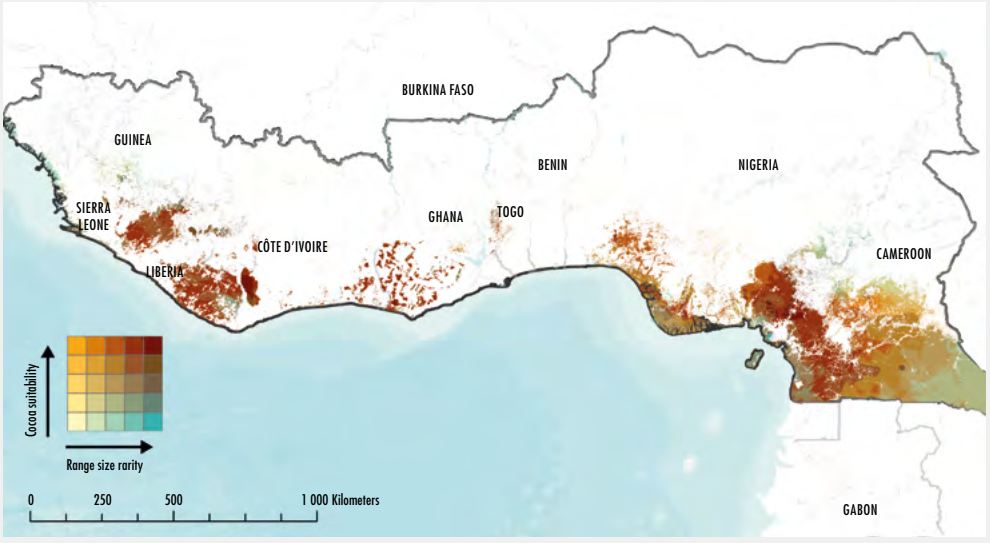
Large-scale forest restoration is needed to meet the SDGs and to prevent, halt and reverse the loss of biodiversity. While 61 countries have, together, pledged to restore 170 million hectares of degraded forest lands under the Bonn Challenge, progress to date is slow. Forest restoration, when implemented appropriately, helps restore habitats and ecosystems, create jobs and income and is an effective nature-based solution to climate change. The United Nations Decade on Ecosystem Restoration 2021–2030, announced in March 2019, aims to accelerate ecosystem restoration action worldwide.

BOX 37 DEFORESTATION-FREE COMMODITY CHAINS: INTEGRATING COCOA AND FORESTS IN WEST AFRICA

About 70 percent of global cocoa supply originates from West African smallholder farmers, and cocoa is a major cash earner in the areas that produce it (Gayi and Tsowou, 2016). However, cocoa has historically been an important driver and direct cause of deforestation (Ruf and Zadi, 1998). Expansion into forests is often driven by low cocoa yields from established plantations, since soils freshly cleared of natural vegetation are often more fertile.

Governments and the private sector have made a suite of commitments to end deforestation in cocoa supply chains so as to safeguard biodiversity and ecosystem services while avoiding revenue loss and impacts on local livelihoods (Carodenuto, 2019). Recent public–private initiatives such as the Cocoa Forest Initiatives in Ghana and Côte d'Ivoire (World Cocoa Foundation, 2017) and the Green Cocoa Landscape Programme in Cameroon (IDH, 2019) aim to support the sustainable intensification and climate resilience of cocoa production, the prevention of further deforestation and the restoration of degraded forests. They often align with national REDD+ policies and plans.

FIGURE A
BIVARIATE MAP SHOWING COCOA SUITABILITY AGAINST BIODIVERSITY IMPORTANCE IN FORESTS



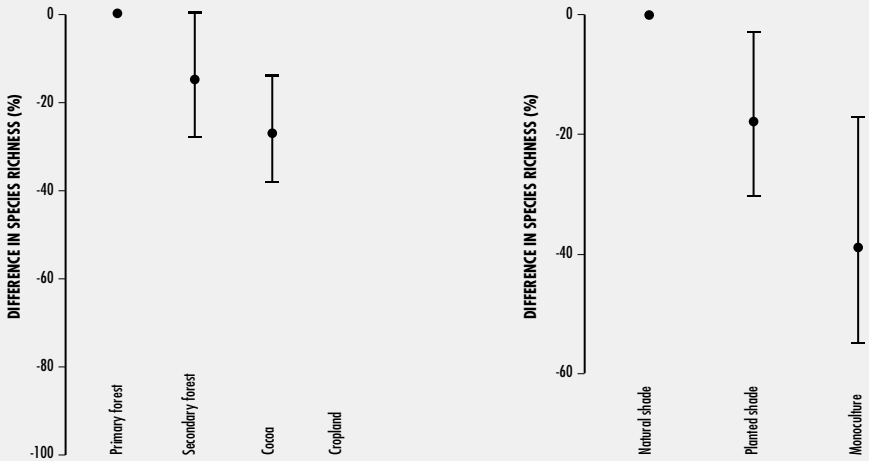
SOURCE: Data from Schroth *et al.*, 2016; IUCN, 2017; and ESA CCI, 2017.

BOX 37 (CONTINUED)

To support policy and planning for cocoa development and sustainable intensification, a study by the CocoaSoils research and outreach programme (Sassen, Arnel and van Soesbergen, forthcoming) identified forest areas that are both important for biodiversity (based on a metric using IUCN Red List species range data, refined to include only areas of suitable habitat) and currently suitable for cocoa (based on a model developed by Schroth *et al.* [2016]), and therefore potentially at risk of deforestation (dark brown areas in Figure A).

The study also analysed how biodiversity responds to changes in land use associated with different cocoa systems, using data from studies in Africa, Asia, the Americas and Oceania taken from the Projecting Responses of Ecological Diversity in Changing Terrestrial Systems (PREDICTS) database (Hudson *et al.*,

FIGURE B
COMPARING SPECIES RICHNESS BETWEEN LAND-USE TYPES AND SHADING TYPES IN COCOA



SOURCE: Data from PREDICTS database (Hudson *et al.*, 2017).

BOX 37 (CONTINUED)

2017). The results showed that in terms of species richness and community composition, the impacts of establishing cocoa were less severe than those associated with cropland and that naturally shaded agroforestry systems have significantly higher species richness than cocoa monocultures (Figure B, p. 27). Over time, cocoa agroforestry systems become more similar to forest, although they never fully recover the original forest community within the life cycle of a productive cocoa plantation (approximately 25 years). Thus, although cocoa agroforests cannot replace natural forests, they are a valuable tool for conserving and protecting biodiversity while maintaining high levels of productivity in agricultural landscapes (see also Schroth *et al.*, 2004).

The combined results highlight different risks and opportunities for different areas within the West African cocoa zone. Where land that is highly suitable for cocoa overlaps with remaining forests and high-biodiversity values (e.g. Liberia and Cameroon), there is a need to protect existing conservation areas and to limit further cocoa development in unprotected forests through careful planning. Here, supporting smallholder farmers to develop sustainable, deforestation-free cocoa production in diversified production systems is of crucial importance.

Where much of the original forest has already been converted to agriculture, as in Côte d'Ivoire and Ghana, cocoa agroforestry systems might play a role in efforts to increase tree cover in agricultural landscapes and restore degraded lands (e.g. under REDD+). These systems can help to maintain at least some biodiversity and support local and global ecosystem services as well as livelihood diversification.

Financial mechanisms to incentivize sustainable cocoa production (e.g. credits, payments for environmental services or carbon finance) are also needed, as smallholder farmers are unlikely to be able to bear the costs associated with changing their practices.

Forests are increasingly recognized for their role as a nature-based solution to many sustainable development challenges, as manifest in strengthened political will and a series of commitments to reduce rates of deforestation and to restore degraded forest ecosystems. **We must build on this momentum to catalyse bold actions to prevent, halt and reverse the loss of forests and their biodiversity, for the benefit of current and future generations.** ■

CASE STUDY 1

Large-scale dryland restoration for the resilience of small-scale farmers and pastoralists in Africa

Action Against Desertification (AAD), implemented by FAO and partners and funded by the European Commission and the Secretariat of the African, Caribbean and Pacific Group of States, provides on-the-ground support to the Great Green Wall for the Sahara and Sahel initiative. Its objective is to strengthen the resilience of dryland communities and agrosilvipastoral ecosystems critically affected by climate variability and change through large-scale restoration of degraded lands, thus reducing poverty and achieving food, feed and nutrition security and enhanced resilience. The programme contributes to the achievement of the 2030 Agenda on Sustainable Development by delivering multiple environmental and socio-economic benefits.

AAD's blueprint for large-scale restoration of drylands emphasizes plant-based solutions and includes:

- investment in large-scale land preparation through mechanized ploughing and enrichment planting;
- obstruction of sand encroachment through biophysical and biological interventions for land stabilization;
- promotion of natural regeneration wherever the soil seed bank and remnant plants allow it;
- mobilization of high-quality seeds and planting materials from the rich dryland plant biodiversity;
- development of NWFP value chains for income generation in rural areas, benefiting women, men and youth;
- inexpensive, participatory systems for information dissemination; and
- innovative biophysical and socio-economic monitoring systems for assessment of progress.

In five years, AAD has brought 53 000 hectares of degraded agrosilvipastoral lands under restoration, planting 25 million trees using native tree species commonly used by rural communities. A total of 100 tonnes of seeds of 110 woody and herbaceous fodder species have been collected and planted in nine countries, bringing huge positive economic and environmental returns. For instance, plots of planted herbaceous fodder in Burkina Faso and the Niger yielded an average of 1 200 kg of biomass per hectare just one year after planting, generating revenues of USD 40 per hectare, equivalent to half the country's monthly minimum wage; thus, the 10 000 or more hectares under restoration in Burkina Faso could potentially yield USD 400 000 per year for local farmers. In Senegal, villagers that harvested fodder in the dry season (November to May) from about 4 000 hectares of degraded lands planted for restoration earned USD 2 per donkey cart or USD 4 per carload (about 100 kg of fodder). At an estimated biomass production of 1 tonne

CASE STUDY 1

per hectare, this operation generated on average USD 80 000 per annual harvest for the communities from 2017 to 2019. Furthermore, it is estimated that restoring the land with native trees will sequester 7.15 tonnes of CO_2-equivalent per hectare per year in the Sahel, based on an extrapolation of the results three years after planting to 20 years.

AAD's approach to land restoration for resiliency places communities and plant knowledge at the heart of the interventions. Factors contributing to the success of ADD's operations include:

- social mobilization and the support of local communities for the interventions in their communal lands;
- use of plant knowledge and expertise to prioritize well-adapted plant species useful to the communities, ensuring their buy-in; and
- a combination of well-tested methodologies and traditional knowledge to overcome technical and research challenges, such as identifying and planting the right species in the right place and at the right time to obtain maximum benefit from rainwater and maximize the chance of plant survival and growth under harsh conditions.

This approach is highly adaptable to varying ecological and socio-economic conditions and therefore very suitable for replication and scaling up in Africa and beyond, sustained investments permitting. AAD has recently begun expanding its interventions to southern Africa, where the countries of the Southern African Development Community (SADC) have launched a Great Green Wall under SADC coordination and with support from the African Union Commission.

SOURCE: FAO, 2019h.

THE STATE OF THE WORLD

2020
THE STATE OF THE WORLD'S FORESTS

FORESTS, BIODIVERSITY AND PEOPLE

As the United Nations Decade on Biodiversity 2011–2020 comes to a close and countries prepare to adopt a post-2020 global biodiversity framework, this edition of *The State of the World's Forests (SOFO)* examines the contributions of forests, and of the people who use and manage them, to the conservation and sustainable use of biodiversity.

Forests cover just over 30 percent of the global land area, yet they provide habitat for the vast majority of the terrestrial plant and animal species known to science. Unfortunately, forests and the biodiversity they contain continue to be under threat from actions to convert the land to agriculture or unsustainable levels of exploitation, much of it illegal.

The State of the World's Forests 2020 assesses progress to date in meeting global targets and goals related to forest biodiversity and examines the effectiveness of policies, actions and approaches, in terms of both conservation and sustainable development outcomes. A series of case studies provide examples of innovative practices that combine conservation and sustainable use of forest biodiversity to create balanced solutions for both people and the planet.

The State of the World's Forests 2020
(full text)