APEC

Asia-Pacific Economic Cooperation

Advancing Free Trade
for Asia-Pacific **Prosperity**

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Achieving the APEC 2020 Forest Cover Goal
A synthesis of economy reports

APEC SOM Steering Committee on Economic and Technical Cooperation

October 2021

Contents

Tables

Figures

Box

Foreword

In 2007, leaders of Asia-Pacific Economic Cooperation (APEC) agreed on an aspirational goal to increase forest cover in the region by at least 20 million hectares of all types of forests by 2020.

The APEC 2020 Forest Cover Goal formed part of the Sydney Declaration on Climate Change, Energy Security and Clean Development at the fifteenth APEC Economic Leaders' Informal Meeting in Sydney, Australia. Since then, APEC economies have implemented diverse measures to collectively achieve the goal.

Echoing the theme of APEC 2019, "Connecting People and Building the Future", the APEC Senior Officials' Meeting Steering Committee on Economic and Technical Cooperation adopted the project, "Completion Assessment of the APEC 2020 Forest Cover Goal", in October 2019. The project's two objectives were to:

(1) Assess the extent of achievement of the APEC 2020 Forest Cover Goal.

(2) Review and document the activities undertaken in the region to support the goal, report on the outcomes achieved, and further stress to the APEC leaders the role of forests in addressing climate change, promoting sustainable growth and achieving the Sustainable Development Goals.

The completion assessment project, which the Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet) undertook in collaboration with the Food and Agriculture Organization of the United Nations (FAO), was completed in June 2021 after nine months of data collection, analysis and consultation.

The assessment estimates that the goal has been achieved and indeed exceeded, and most economies also increased their per-hectare and total forest growing stocks over the period. The APEC economies are to be congratulated for this achievement.

I am grateful to the APEC economies for their active involvement in the assessment process and for sharing with us their experiences and achievements in increasing and improving their forests.

I hope that readers find guidance and inspiration in this report. I look forward to working with all stakeholders to continue increasing forest cover and quality in the APEC region.

Dr Lu De
APFNet Executive Director

Acknowledgements

Abbreviations and acronyms

APEC	Asia-Pacific Economic Cooperation
APFNet	Asia-Pacific Network for Sustainable Forest Management and Rehabilitation
AUD	Australian dollar(s)
CAD	Canadian dollar(s)
FAO	Food and Agriculture Organization of the United Nations
FRA	Global Forest Resources Assessment
FSC	Forest Stewardship Council
GDP	gross domestic product
GHG	greenhouse gas
ha	hectare(s)
ITTO	International Tropical Timber Organization
m	metre(s)
NGO	non-governmental organization
NZETS	New Zealand Emissions Trading Scheme
PEFC	Programme for the Endorsement of Forest Certification
REDD+	reduced emissions from deforestation and forest degradation in developing countries
RFA	regional forest agreement (Australia)
RMB	Chinese renminbi
SDG	Sustainable Development Goal
SFM	sustainable forest management
UN	United Nations
UNFF	United Nations Forum on Forests
UN-REDD	United Nations Collaborative Initiative on Reducing Emissions from Deforestation and Forest Degradation

Executive summary

The Sydney Asia-Pacific Economic Cooperation (APEC) Leaders' Declaration on Climate Change, Energy Security and Clean Development, adopted at the fifteenth APEC Economic Leaders' Meeting in 2007, announced an APEC-wide aspirational goal of increasing forest cover in the region by at least 20 million hectares (ha) of all types of forests by 2020.

This report assesses the extent to which the APEC 2020 Forest Cover Goal was achieved. It updates a progress report, published in 2015, with information provided in 2021 by 12 of the 21 APEC economies and an analysis of the 2020 Global Forest Resources Assessment.[1]

Forest area in the APEC region increased by 27.9 million ha between 2007 and 2020. Over the same period, the area of forest in protected areas in APEC economies increased by almost 16 million ha and the area of planted forest increased by slightly more than 30 million ha.

Although, overall, the APEC economies achieved the 2020 Forest Cover Goal, not all economies reported an increase in forest area over the period. Forest area increased in nine economies, with the largest increases in China (26.5 million ha), Australia (5.0 million ha) and the United States (3.5 million ha). Conversely, forest area declined in ten economies in the region.

Key direct drivers of deforestation and forest degradation in APEC economies include agricultural expansion, forest product extraction (legal and illegal), infrastructure development, and biophysical factors (e.g. climate and extreme weather events, forest fire and invasive species). APEC economies identified poverty, population increases, demand for wood products, governance factors (e.g. a lack of coherent cross-sectoral policies) and urbanization as important indirect drivers of change.

Certain broad trends indicate that the quality of forest management is improving in most APEC economies. For example, most APEC economies increased or maintained their per-hectare and total forest growing stocks between 2010 and 2020. In terms of policy development, almost all economies are participants in either the International Tropical Timber Organization criteria and indicators process for tropical forests or the Montreal Process for temperate and boreal forests. There has been a significant devolution of forest ownership and forest management responsibilities away from governments towards the private sector, communities and households.

APEC economies implemented a diverse range of measures that contributed to the achievement of the 2020 Forest Cover Goal, including: the development of new legislation, policies and action plans to address concerns relating to climate change; the implementation of

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[1] Reports for 2020 were provided by Australia; Canada; China; Hong Kong, China; Japan; the Republic of Korea; Malaysia; New Zealand; Papua New Guinea; Peru; Thailand; and the United States.

governmental and voluntary planting programmes; enhanced conservation programmes; measures to promote forest restoration and rehabilitation, reduce deforestation, improve forest management and regulate forest harvesting; the strengthening of forest tenure and improvement of forest law enforcement and governance arrangements; participation in global and regional processes that support improved forest management; and increasing the area certified under the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification – to a total of 296 million ha in 2019. It is crucial to continue these efforts and to further develop policy, technical and financial mechanisms with the aim of fully achieving sustainable forest management and restoring and conserving the region's forests. To this end, the following recommendations are made.

Economies may wish to:

- Review forest-related policies and legislation with a view to identifying and removing impediments to forest restoration efforts and to identifying additional measures to increase forest area and reduce deforestation and forest degradation.

- Examine the direct and indirect key drivers of deforestation and forest degradation and implement further mitigation measures.

- Consider developing new, and expanding existing, programmes on forest restoration and rehabilitation around emerging initiatives, techniques and methodologies such as forest landscape restoration.

- Examine current rates of afforestation, reforestation and forest restoration and consider whether new direct incentives would encourage additional efforts.

- Explore opportunities for new and additional direct governmental, environmentally sensitive and socially responsible planting programmes and new voluntary planting programmes.

- Consider the merits of creating an enabling environment that supports investment in forests by removing structural impediments and operational constraints.

- Consider increasing finance for REDD+ initiatives through various channels, accelerating REDD+ readiness programmes in light of the potential advantages accruing to economies that qualify for results-based financing, and reviewing how self-determined contributions can be a key part of expanding forest cover.

- Review their programmes for reforming forest tenure or transferring forest property rights to identify and address impediments to successful implementation.

- Implement new and additional measures to improve forest governance and curb illegal logging.

- Consider enacting regulations or other instruments and tools to discourage imports of illegally sourced timber.

- Continue to improve data collection, monitoring and forest inventories, including through the use of advanced and emerging technologies.

1   Achieving the APEC 2020 Forest Cover Goal

Introduction

Asia-Pacific Economic Cooperation (APEC) comprises 21 member economies[2] in and around the Pacific Rim. These economies account for 46 percent of the global land area, are home to 38 percent of the global population, produce more than 60 percent of global gross domestic product (GDP), and, in 2019, were responsible for 47 percent of net global trade in merchandise goods and commercial services (APEC, undated). They are also responsible for 60 percent of global industrial roundwood production and about 45 percent, by value, of the global forest products trade (FAO, undated).

The APEC economies contain large areas of marginal agricultural land, degraded lands and other land potentially suitable for afforestation or forest restoration. Equally important is the region's economic dynamism: APEC contains the world's three largest economies (the United States, China and Japan, in descending order by GDP) and nine of the world's 20 largest economies. It also includes many of the world's fastest-growing economies. APEC is a centre of intellectual leadership in the development of new ideas and forward-thinking solutions.

The APEC economies are ideally placed to demonstrate the feasibility of a large-scale expansion of the global forest estate using a diverse range of policies, incentives, tools and programmes. The fifteenth APEC Economic Leaders' Meeting, held in Sydney, Australia, in 2007, adopted the Sydney Declaration on Climate Change, Energy Security and Clean Development. The Declaration noted, among other things, that "sustainable forest management and land use practices play a key role in the carbon cycle and need to be addressed in the post-2012 international climate change arrangement". The Declaration identified an "action agenda" that included an agreement to "work to achieve an APEC-wide aspirational goal of increasing forest cover in the region by at least 20 million hectares of all types of forests by 2020 – a goal which if achieved would store approximately 1.4 billion tonnes of carbon, equivalent to around 11 per cent of annual global emissions (in 2004)" (APEC, 2007).

At APEC 2019, the APEC Senior Officials' Meeting Steering Committee on Economic and Technical Cooperation adopted the project, "Completion Assessment of the APEC 2020 Forest Cover Goal", in October 2019. The project's two objectives were to:

1) Assess the extent of achievement of the APEC 2020 Forest Cover Goal.

2) Review and document the activities undertaken in the region to support the goal, report on the outcomes achieved, and further stress to the APEC leaders the role of forests in addressing climate change, promoting sustainable growth and achieving the Sustainable

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[2] The 21 APEC economies are: Australia; Brunei Darussalam; Canada; Chile; China; Hong Kong, China; Indonesia; Japan; the Republic of Korea; Malaysia; Mexico; New Zealand; Papua New Guinea; Peru; the Philippines; Russia; Singapore; Chinese Taipei; Thailand; the United States; and Viet Nam.

Development Goals (SDGs).

The assessment, which the Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet) undertook in collaboration with the Food and Agriculture Organization of the United Nations (FAO), was completed in June 2021 after nine months of data collection, analysis and consultation. It updates a progress report, published in 2015, with information provided in 2021 by 11 of the 21 APEC economies and an analysis of FAO's 2020 Global Forest Resources Assessment (FRA); for those APEC economies that provided no new information in 2021, the assessment has drawn on information provided for the progress report in 2015, where available. Note that unattributed data and information presented in this report were derived from materials provided by APEC economies in 2021.[3]

This document constitutes the full report of the assessment. The present chapter summarizes the significance of forests in APEC economies and identifies key drivers of change in forest area and quality. It also provides details on the status of forests and forest resources in the APEC region in relation to the APEC 2020 Forest Cover Goal (hereafter referred to as the APEC Forest Cover Goal), particularly referencing the extensive new forest data released as part of FRA 2020.

Chapter 2 describes the activities of APEC economies in the period 2007–2020 relevant to the APEC Forest Cover Goal. It outlines the policies, tools and programmes being implemented in APEC economies to expand forest area and improve forest quality, as well as efforts to reduce deforestation and forest degradation.

Chapter 3 charts a possible path forward beyond 2020, including likely developments, changes and expectations in relation to forest area. It makes recommendations that, if implemented by APEC economies, would support ongoing efforts to further increase forest cover and improve forest management. It also identifies impediments and risks that may hamper progress.

Status of forest area

The APEC economies encompass 2.21 billion hectares (ha) of forest, which is slightly more than 54.5 percent of the global forest area (FAO, 2020a). Of the total area, 82.5 percent (1.83 billion ha) are in just five economies – Australia, Canada, China, Russia and the United States (Figure 1). Conversely, the five economies with the smallest forest areas – Brunei Darussalam; Hong Kong, China; the Republic of Korea; Singapore; and Chinese Taipei – account for 0.4 percent of the APEC total (8.6 million ha). Forest area in the other 11 economies amounts to 17.3 percent of the total (379 million ha).

More than 40 percent of the land area is forested in nine APEC economies, led by Papua New Guinea (79.2 percent), Brunei Darussalam (72.1 percent) and Japan (68.4 percent). The lowest values for forest area as a proportion of land area are in Australia (17.4 percent), China (23.3

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[3] The economy reports received are listed in the references section of this report.

percent) and Chile (24.5 percent).

Figure 1. Proportion of forest area in the APEC region, by economy, 2020
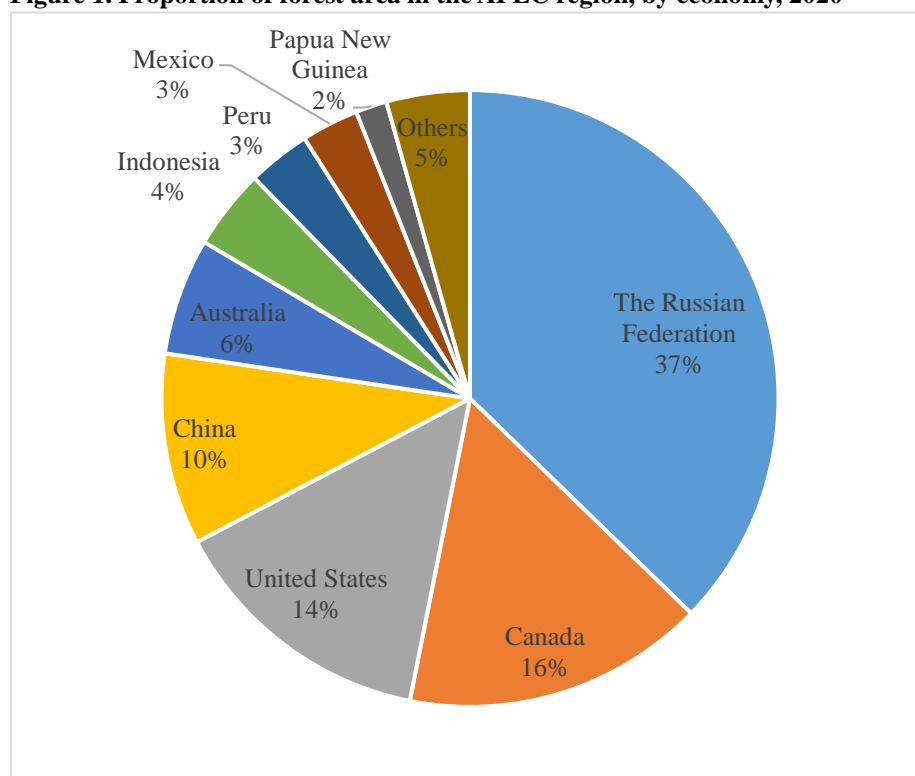
Source: FAO (2020a).

In general, the economies with the highest population densities also have the smallest areas of forest per capita, led by Singapore (0.003 ha per capita), Hong Kong, China (0.004 ha per capita), the Philippines (0.07 ha per capita) and Chinese Taipei (0.09 ha per capita). Canada has the largest forest area per capita, at 9.2 ha, followed by Russia (5.6 ha) Australia (5.3 ha) and Papua New Guinea (4.0 ha).

Table 1 categorizes APEC economies according to their total forest area, forest area as a proportion of land area, and forest area per capita. It shows that diverse forest situations exist in the APEC economies arising from a wide range of biogeographical, demographic, socioeconomic and, in some cases, historical, political and policy factors. For example, forest area is limited by aridity in Australia, Chile, Mexico, Peru and the southwest United States and in the tundra of Canada, Russia and Alaska, United States. In the small, predominantly urban economies of Singapore (21.9 percent forest area) and Hong Kong, China (23.8 percent forest area[4]), demographic pressures place significant limitations on the land area available for afforestation.

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[4]   This estimate is based on the Hong Kong, China 2015 economy report.

Table 1. Categorizing APEC economies by their forest resources and other parameters

	> 100 million ha of forest		10 million–100 million ha of forest		< 10 million ha of forest	
	> 40% forest area as proportion of total land area	< 40% forest area as proportion of total land area	> 40% forest area as proportion of total land area	< 40% forest area as proportion of total land area	> 40% forest area as proportion of total land area	< 40% forest area as proportion of total land area
> 0.6 ha of forest per capita	Russia	Australia Canada United States	Malaysia Papua New Guinea Peru	Chile	Brunei Darussalam	New Zealand
< 0.6 ha of forest per capita		China	Indonesia Japan Viet Nam	Mexico Thailand	Chinese Taipei Republic of Korea	Hong Kong, China The Philippines Singapore

Source: FAO (2020a).

Drivers of change in forest area and quality, 2007–2020

Drivers of change can have either positive or negative effects on forest area and quality. Negative drivers are those that lead to deforestation and forest degradation; positive drivers, on the other hand, can promote afforestation and reforestation, forest conservation and sustainable forest management (SFM).

Drivers of change can also be direct or indirect. Direct drivers comprise human activities that directly increase or decrease forest area or degrade or restore forests. Indirect drivers, which may occur at different scales (local to global), comprise a wide range of economic, social, political, cultural and technological factors that influence direct drivers. Human population growth, demographic trends and economic development have long been acknowledged as the primary drivers of environmental change by generating pressures that directly affect forests. Such pressures can, for example, lead to habitat change, loss and degradation; unsustainable agricultural practices; the spread of invasive species; low resource-use efficiency; and overexploitation, including illegal logging and wildlife trade (FAO, 2020b). Climate change is exacerbating the impacts of these pressures (FAO, 2020b).

Drivers of deforestation and forest degradation

The conversion of forests to agriculture is a common theme driving deforestation in most APEC economies. In Papua New Guinea, for example, the agriculture sector is the main driver of forest change or loss. Given that almost 80 percent of Papua New Guinea's population lives in rural areas, subsistence agriculture – particularly shifting cultivation – has historically been the major driver of forest change. Since 2001, the conversion of forests to oil-palm plantations has accounted for about 32 percent of deforestation in Papua New Guinea and subsistence agriculture for 64 percent. Forest degradation is also a major concern: between 2001 and 2015,

almost 28 percent of the total forest area was disturbed (degraded) by human activities, including commercial timber harvesting, gardening[5] and fire.

Thailand and Viet Nam participated in a recent study of drivers affecting forest change in the Greater Mekong Subregion (Costenbader *et al.*, 2015). In Thailand, the study found that the major factors driving declines in forest area were connected to policy gaps and forest management approaches that lag behind international best practices. Moreover, conflicts of interest and other controversies over the use of forest resources have constrained the development of integrated land-use policies while driving deforestation and forest degradation. Forest encroachment remains a significant challenge: it arises from both direct and indirect factors such as agricultural expansion, tourism development, illegal logging and land speculation, rural poverty, population growth and development policies. For example, some major government-initiated projects have caused large-scale forest disturbance through the construction of roads, dams, power transmission lines and associated infrastructure.

In Viet Nam, the major direct drivers of deforestation are the conversion of forests for agriculture (particularly industrial perennial crops); the development of hydroelectric facilities and other infrastructure; unsustainable logging; and fire. Persistent poverty is an important indirect driver of deforestation in Viet Nam, particularly among ethnic minorities who live in upland forested areas and constitute 44.7 per cent of Viet Nam's poor. Livelihood pressures drive the poor to convert forest land to alleviate poverty, often through shifting cultivation.

In some economies, especially where the private sector dominates forest and land ownership, financial returns and the regulatory environment pertaining to competing land uses is often a key driver of deforestation and a major limiting factor for afforestation. In some economies, especially where the private sector dominates forest and land ownership, financial returns and the regulatory environment pertaining to competing land uses is often a key driver of deforestation and a major limiting factor for afforestation. In New Zealand, for example, high profitability in the dairy farming sector drove conversions of some planted forests to dairying from 2000 to 2015. However, the net trend is afforestation, particularly since 2015 as a result of higher carbon prices, and a reduction in dairy conversions as a result of policies to address the environmental impacts of dairying on water quality.

Several economies reported that climate change is likely to have an increasing impact on forest health. Australia noted that climate change is potentially damaging to forest health and vitality, including as a result of drought and extreme climatic events such as windstorms and cyclones. The frequency and extent of fire in Australia's forests is exacerbated by climate change as well as by anthropogenic ignition events, such as accidents and arson.

Canada reported that climate change is leading to more frequent and severe natural disturbances and that scientists predict that climate change could alter the location, regularity and intensity of outbreaks of native and invasive alien insect species. Furthermore, shifting patterns of hot,

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[5] The term commonly used for slash-and-burn subsistence agriculture in Papua New Guinea.

dry and windy weather may greatly increase the incidence and impacts of wildfires. Canada's forest sector is anticipating and preparing to face ongoing climate-change challenges. In the future, changes in the Canadian landscape will likely involve an increase in forest in some parts of the economy and a decrease in others. In some regions, the impacts of climate change on Canada's forests could result in higher tree mortality, more fires, and insect outbreaks.

The Republic of Korea reported that climate change is predicted to shrink coniferous forests and expand broadleaved forests. The United States noted that the increasing incidence and severity of forest disturbance events, notably fire and insect infestations, could substantially affect forest health and potentially forest area, particularly in the face of climate change.

In Peru, a study and vulnerability map of critical ecosystems and habitats for 2050 and 2070 in the face of climate change indicates that the regions of Loreto, Ucayali and Madre de Dios have the greatest vulnerability to climate change.

In the United States, the net driver of deforestation is suburban and exurban development, which, in turn, is driven by long-term increases in population and income; it is typically irreversible, with minimal reversion of developed land to forest use.

Drivers of afforestation, forest rehabilitation and enhanced forest management

Several APEC economies identified positive drivers of change.

An expansion of Australia's forest area has occurred primarily due to the revegetation of previously cleared native forest and an increase in the area of planted forest. New planted forests are usually established on agricultural land, thereby increasing both Australia's planted forest estate and total forest area. The expansion of the planted forest estate is driven largely by market forces, including the relative opportunity costs of alternative land uses. Since 2014, Australia's 20 Million Trees Program, which is focused on increasing native vegetation, has planted more than 25 million trees in green corridors, urban forests and threatened ecological communities.

Substantial increases in China's forest area have been supported by a range of policy instruments, including quota management of forest logging since 1987 that keeps annual forest consumption lower than growth and the State Council's requirements to strengthen the protection of natural forests and stop commercial logging of natural forests. Through the requirements of ecological civilization, China encourages reforestation, silviculture and forest protection in collective commercial planted forests.

In Hong Kong, China, social and economic development has altered perceptions of forests and driven changes in afforestation objectives and strategies. A focus on soil and water conservation from the late nineteenth century through to the 1980s has now shifted towards the prioritization of recreation, biodiversity conservation and landscape appreciation.

Over time, the policy drivers of afforestation and forest rehabilitation in the Republic of Korea

have shifted from erosion control, greening and planting towards a focus on tending forests and sharing forest benefits. To help deliver this policy, the Korea Forest Service provides a wide range of forest welfare services – such as forest recreation, forest education and forest healing – that encourage societal support for forest management. The Korea Forest Service is in the progress of introducing digital and "untact" (contact-free) forestry technologies to improve the use of forest data and facilitate forest management.

In Malaysia, the government is committed to keeping at least 50 percent of its land area under forests and tree cover; while focusing on economic growth and development, the government gives equal emphasis to the conservation of the economy's natural resources and to addressing social and environmental issues. The forest sector also realizes that forest management needs to address emerging issues such as climate change, ensuring food security and sustaining livelihoods. These issues can be powerful drivers of forest restoration and SFM.

In Thailand, positive drivers of forest change include community forestry, public participation, the European Union Forest Law Enforcement, Governance and Trade initiative, technological improvements, income and employment generation, and REDD+.[6]

In the United States, the area of forest use on public lands is stable, with harvested forest stands subject to natural and active regeneration. A long-standing dynamic in patterns of land-use change the United States involves shifts back and forth between crop, pasture and forest lands on the one hand and steady growth in development on the other. On balance, these changes have favoured forest over the last century, with the natural expansion of forests on abandoned agricultural land and active afforestation offsetting loses to suburban and exurban development. The United States has a robust institutional and policy framework to support forest management at the federal, state and local levels (McGinley and Cubbage, 2020). For public forests in particular, this framework is augmented by the active engagement of civil-society organizations (including industry, non-governmental organizations – NGOs – and civilian groups) in forest management activities. The United States has long-established forest monitoring capacity, a legally mandated periodic assessment report, and a requirement of state-level assessments to obtain access to federal funding.

Status of forest management

A detailed assessment of the status of forest management in APEC economies is beyond the scope of this report. Nonetheless, we include here a broad qualitative commentary on some key trends for which information and indicators suggest ongoing overall improvement in forest resource management in the region.

Forest ownership

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[6] The term REDD+ refers to "policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation" in developing economies "… and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks" (Decision 1/CP.18, 13th Conference of the Parties to the United Nations Framework Convention on Climate Change, Bali, Indonesia, 3–15 December 2007).

Figure 2 shows the distribution of private and public forest ownership, by APEC economy. Forest ownership provides a broad indication of who is responsible for managing forest resources. In general, when forests are under private ownership, forest management responsibility also usually accrues to the private sector. In Papua New Guinea, the vast majority of forests is under customary ownership; this may be viewed as a form of private ownership, but the government plays a key role in approving and allocating such forests as timber harvesting concessions. In many economies with high state ownership of forests, private-sector entities conduct forest management (especially timber harvesting) in production forests and the government performs an oversight and regulatory role.

There has been a significant devolution of forest ownership and forest management responsibilities away from governments towards the private sector, communities and households. Australia, Chile and New Zealand have all embarked on extensive forest privatization programmes; other APEC economies, such as China, the Philippines, Thailand, and Viet Nam, have developed programmes to transfer forest property and user rights from government entities to households and communities.

Figure 2**. Forest ownership in APEC economies, 2020 (in descending order of public ownership)**
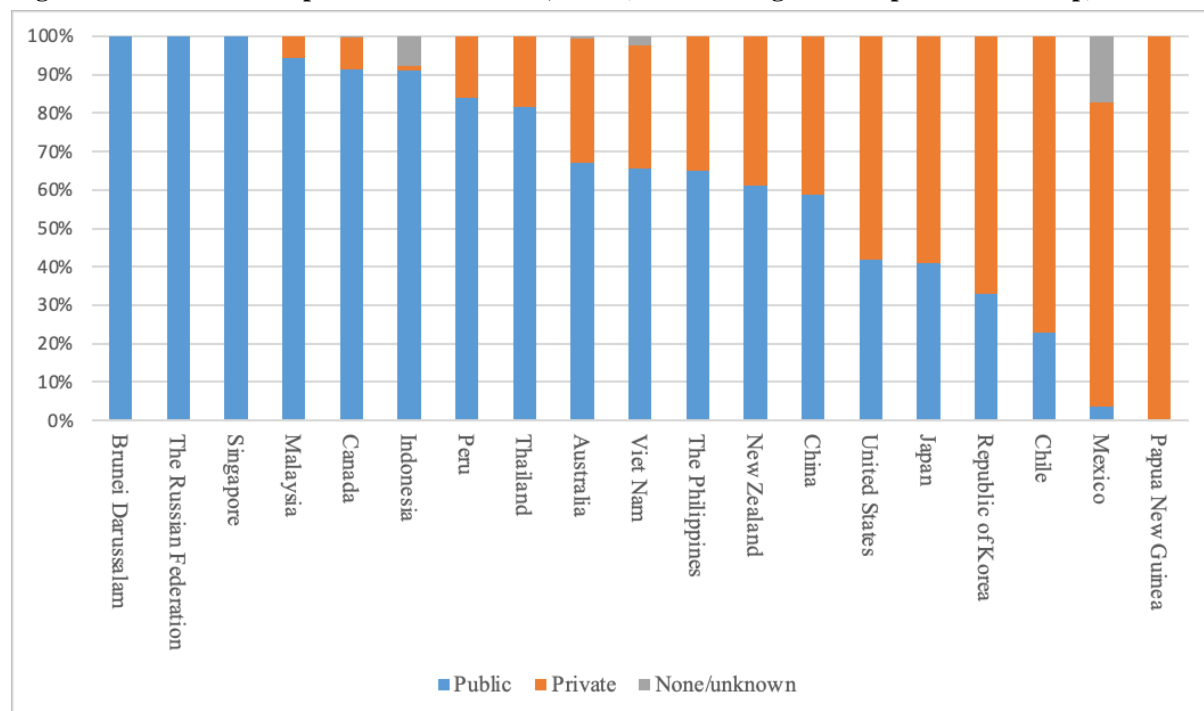
Source: FAO (2020a).

Forest classification

In several APEC economies, forests have formally been segregated according to their primary designated management objectives. As of 2018, Malaysia's total forest area of 18.27 million ha has been designated as follows: 10.92 million ha as permanent reserve forest or permanent forest estate; 3.31 million ha as totally protected areas; and 4.04 million ha as "stateland" forest. In Papua New Guinea, forests were classified in 1996 under the economy's first National Forest Plan

into production forests, protection forests, reserve forests and salvage forests.

Most economies draw a distinction between forests in protected areas and in production forests; some further segregate forests according to, for example, cultural and spiritual values, the provision of ecosystem services, and (as a subset of ecosystem services) soil and watershed protection. Forest management may vary between these forest classifications; this is especially so for production forests, which are usually subject to more intensive silviculture (including logging) compared with protection forests.

Criteria and indicators for sustainable forest management

Almost all APEC economies are participants in either the International Tropical Timber Organization (ITTO) criteria and indicators process for tropical forests or the Montreal Process for temperate and boreal forests; Peru is also a member of the Tarapoto Process for Amazonian forests (Table 2). These processes identify overarching criteria for SFM and develop indicators against which progress can be measured. Criteria generally relate to the following seven elements (for example, after the Montreal Process): (1) biodiversity conservation; (2) the maintenance of the productive capacity of forest ecosystems; (3) the maintenance of forest ecosystem health and vitality; (4) the conservation and maintenance of soil and water resources; (5) the maintenance of the contribution of forests to global carbon cycles; (6) the maintenance and enhancement of long-term multiple socioeconomic benefits to meet the needs of societies; and (7) the legal, institutional and economic framework for forest conservation and SFM.

Economies use criteria and indicators to monitor and report on progress towards SFM. In 1995, Canada and the 11 other economies that formed the Montreal Process agreed to use a common set of science-based indicators that would provide a way of consistently defining, assessing, monitoring and reporting progress on the sustainable management of their forests, which collectively accounted for 90 percent of the world's boreal and temperate forests.

Table 2. International criteria and indicators processes

Criteria and indicators process	Participating APEC economies
ITTO Criteria and Indicators for the Sustainable Management of Tropical Forests	Indonesia, Malaysia, Mexico, Papua New Guinea, Peru, the Philippines, Thailand, Viet Nam
Montreal Process (Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests)	Australia, Canada, Chile, China, Japan, Republic of Korea, Mexico, New Zealand, Russia, United States
Tarapoto Proposal of Criteria and Indicators for Sustainability of the Amazon Forest	Peru

Certification

Forest certification is a voluntary instrument implemented through two separate but linked processes: SFM certification and chain-of-custody certification. SFM certification provides third-party assurance that forests are being managed in line with environmental, social and economic requirements. Chain-of-custody certification tracks forest-based products from their source to the final product (PEFC, undated).

The world's two largest forest certification schemes are those operated by the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC). Under the PEFC, economies can develop their own certification schemes (e.g. the Malaysian Timber Certification Scheme, the Korea Forest Certification Council and Lembaga Ekolabel Indonesia).

Combined, the FSC and the PEFC have certified more than 297 million ha of forest in the APEC region. As shown in Figure 3, three economies are responsible for the bulk of this forest area: Canada (56.1 percent of the total), Russia (18.2 percent) and the United States (12.8 percent); combined, these three economies account for at least 259 million ha of certified forest. APEC economies with the highest proportions of certified forests are Canada (48.1 percent of the economy's total forest area), Malaysia (20.8 percent), New Zealand (13.1 percent), Chile (12.8 percent) and the United States (12.3 percent).

Canada had about 167 million ha of independently certified forest in 2019, more than any other economy worldwide. Three internationally recognized certification systems are used in Canada – the FSC, the Canadian Standards Association and the Sustainable Forestry Initiative (the latter two are both endorsed by the PEFC). Certification provides added consumer assurance that a forest company is operating legally and sustainably and complies with internationally accepted standards for SFM.

In New Zealand, approximately 65 percent of planted forests have FSC certification and 20 percent have PEFC certification; all planted forests with PEFC certification also have FSC certification.

Figure 3**. Area of forest certified by the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification in APEC economies, 2019 (in order of area covered)**
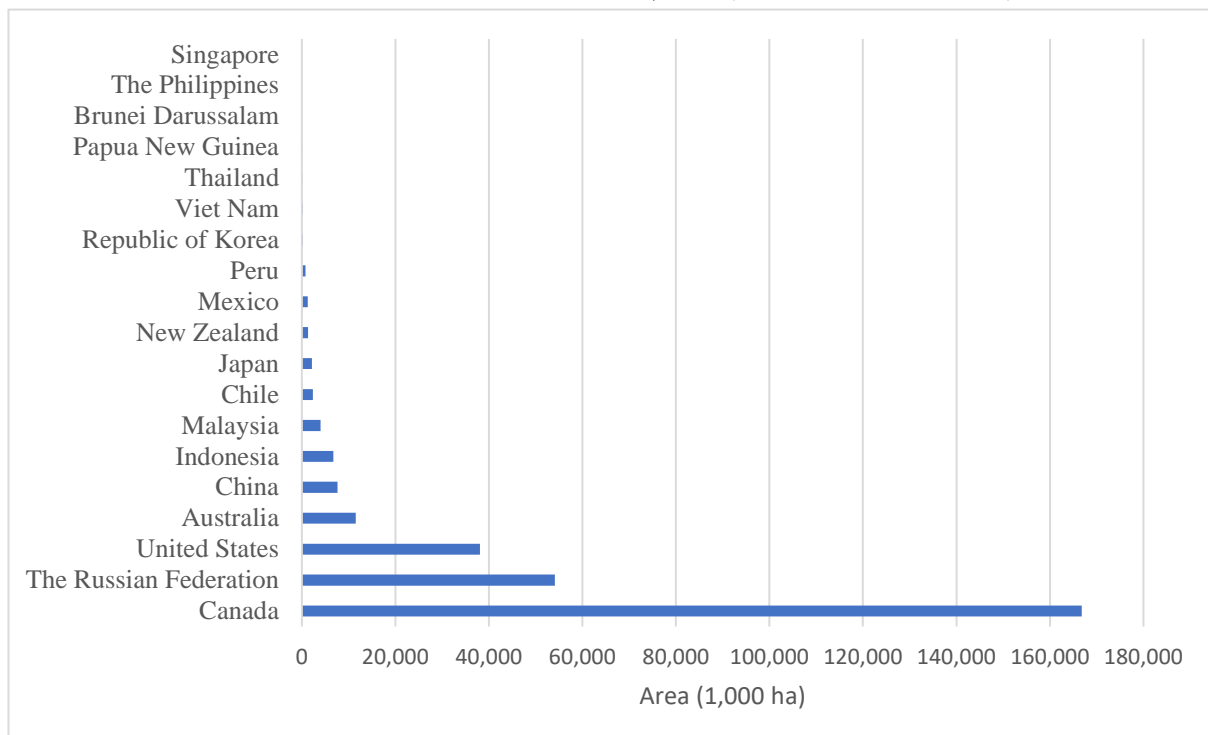
Change in forest area

Forest area increased by 27.9 million ha in the APEC region between 2007 and 2020, from 2,185 million ha to 2,213 million hectares (FAO, 2020a) (but see Box 1).

The contributions of APEC economies to this increase varied markedly. Figure 4 shows that the largest increases in forest area between 2007 and 2020 were in China (26.5 million ha), Australia (5.0 million ha) and the United States (3.5 million ha). Conversely, forest area declined in ten economies, with the largest losses occurring in Indonesia (−8.0 million ha), Peru (−2.1 million ha) and Mexico (−1.6 million ha).[7]

Figure 4. Change in forest area, by APEC economy, 2007–2020 (in order of area change)
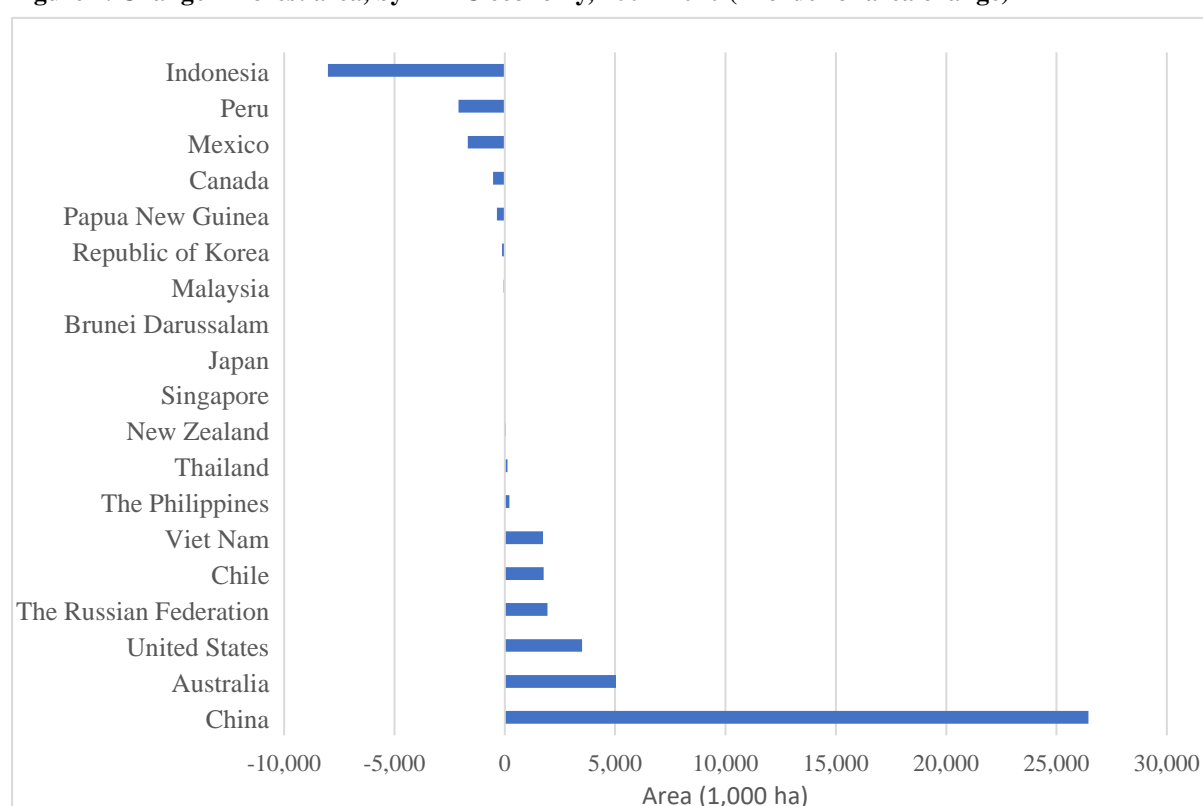
Sources: FAO (2020a); for Australia, Canada and the United States, estimates for 2007 were obtained from their economy reports.

Box 1. A note on forest measurement
Given that the total forest area in APEC economies in 2007 was estimated at 2.18 billion ha, an increase of 20 million ha (as per the APEC Forest Cover Goal) would amount to slightly less than 1 percent of the forest area. Ascertaining the actual increase in forest area in APEC economies in the period 2007–2020 is a challenging exercise because few (if any) economies

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[7]   Data for 2007 were derived by interpolating from FRA data for 2000 and 2010, except for Australia, Canada and the United States, which provided data for 2007.

will have conducted comprehensive forest inventories in both 2007 and 2020. Similarly, forest inventory methodologies can vary markedly, even in provinces and states within the member economies. In some instances, different agencies within an economy may compile significantly different data. The data cited in this report are based on those reported to the FAO Global Forest Resources Assessment (FRA), which strives for overall consistency in reporting; note that forest area for 2007 was estimated through linear interpolation of the FRA data points of 2000 and 2010, with the exception of Australia, Canada and the United States, which provided their own estimates. Even the straightforward extrapolation used to derive 2007 data may vary significantly from the forestry statistics of some economies. A final accounting to measure the achievement of the APEC Forest Cover Goal would require economies to ensure consistency in and agreement on the baseline forest data used.

Economies in which forest area increased between 2007 and 2020

Australia reported that its total forest area increased by 5.0 million ha between 2007 and 2018. This change was the net result of several processes, including land-use change for urban development and agriculture; plantation establishment and the removal of non-commercial plantations; the natural expansion of forests in areas not previously forested; and short-term factors such as the impacts of drought and fire followed by recovery from these events.

In Chile, an expansion in planted-forest area was driven largely by market forces, assisted by extensions of a long-running planted-forest subsidy programme under Decree Law 701. A significant increase in the area of primary forests between 2000 and 2020 in Chile reported to FRA 2020 (FAO, 2020a) appears to have been the result of an expansion of open forests in arid and semiarid regions.

China implemented a set of key forestry programmes between 2007 and 2020 that helped increase forest area, although this was partly offset by forest losses in some geographic regions of the economy, resulting in a net increase in forest area of 26.5 million ha over the period.

A long-term trend of deforestation was evident in the Philippines until 2010; for example, total forest area decreased from 7.31 million ha in 2000 to 6.84 million ha in 2010. Forest degradation was also apparent in the conversion of closed forests to open forests and in a reduction in the proportion of canopy cover in both closed and open forests. The deforestation trend has reversed since 2010, however, with total forest area estimated at 7.15 million ha in 2020.

Since the 1950s, Russia has experienced a general trend of increasing forest area, due mainly to the gradual rejuvenation of forests after harvesting and fire and especially to the reversion of marginal agricultural lands to immature forests.

Forest area as a proportion of total land area in Thailand declined from an estimated 53.3 percent in 1961 to 25.3 percent in 1998. By 2019, however, forests were estimated to cover 38.9 percent of the total land area (FAO, 2020a), although much of the increase is attributable to the use of satellite imagery to provide more precise measurement.

Forest area in the United States increased by approximately 3.5 million ha between 2007 and 2020 due to increases in the area of both naturally regenerated forests and planted forests. A significant proportion of the increase in forest area was driven by the net transition of crop and pastureland to forest (conversely, the transition of forest to developed land was the major source of forest loss).

Forest area in Viet Nam amounted to 14.3 million ha in 1943 but only 9.38 million ha in 1990. Forest area has increased since 1990, however, through afforestation efforts and the rehabilitation of natural forests driven by various government projects and policies. Viet Nam's forest area was 14.6 million ha in 2020.

Several other APEC economies achieved increases in forest area over the period 2007–2020, as follows:

- Hong Kong, China, which increased forest area from 24,700 ha in 2007 to 27,600 ha in 2019. In the longer term, the economy increased its proportion of forest area from 4 percent of the total land area in the 1950s to 24.8 percent in 2019.

- New Zealand, which reported a net increase in forest area of 44,460 ha over the period (plantation forests increased by 60,160 ha and indigenous – or native – forests decreased by 15,700 ha). A large proportion of New Zealand's native forests is in protected areas, and stringent regulations are in place governing the harvesting and clearing of native forests outside protected areas.

- Chinese Taipei, which increased forest area by 31,600 ha to 2.18 million ha in 2015, including through governmental reforestation efforts and support for private-sector efforts.

Forest area was stable in Malaysia between 2007 and 2018, primarily because of the wider application of SFM. However, an increasing population (projected to reach nearly 40 million people by 2040), combined with increased demand for food and for transportation and other infrastructure, is putting pressure on forests, which are continuously at risk of being cleared for other land-use purposes.

Japan's total forest area remained stable over the period.

Economies in which forest area decreased between 2007 and 2020

Deforestation and forest degradation continue to be significant in Indonesia, with FRA data suggesting that forest area in this economy declined by 8.0 million ha over the period 2007–2020 (FAO, 2020a).

Forest area in Brunei Darussalam decreased by about 5,000 ha between 2007 and 2020, due to forest conversion to land uses such as agriculture and other development. Nevertheless, Brunei Darussalam is still among the world's most heavily forested economies; maintaining a high level of forest area as an international exemplar for addressing global issues such as climate

change, biodiversity conservation and food security is a significant element of the economy's forest management agenda.

Canada has maintained a relatively steady amount of forest area in recent decades: the annual (permanent) deforestation rate is less than 0.02 percent of the total forest area, and this rate has been declining for more than 25 years because of Canada's robust forest management system. Canada's forest area was estimated at 347,456,000 ha in 2007 and 346,965,000 ha in 2019. Agricultural expansion is the leading cause of deforestation in Canada, with significant areas of forest also cleared for oil and gas resource development and urbanization. Forests temporarily affected by timber harvesting, forest fire and insect infestations are not included in Canada's definition of deforestation because such areas will be replanted or will naturally regenerate.

There has been a net loss of forest area over a long period in Mexico but, in recent times, the rate of loss has slowed markedly. Deforestation was estimated at 221,000 ha per year from 1990 to 2000, 144,000 ha per year from 2000 to 2010 and 129,000 ha per year from 2007 to 2020. The main cause of forest loss in Mexico is conversion to agriculture, particularly for livestock grazing and seasonal and irrigation crops. Forest fires, most of which are caused by human activity, are another major source of deforestation and forest degradation.

The Republic of Korea has experienced forest area loss in the past 45 years, due mainly to rapid economic growth, industrialization and urbanization. Forests have been cleared for agriculture and urban and industrial development. The economy's forest area declined by about 127,000 ha between 2007 and 2020.

In Papua New Guinea, forest area is estimated to have declined by approximately 353,000 ha over the period 2007–2020. Most of this deforestation resulted from the conversion of forests to large-scale oil-palm plantations. Forest conversion for subsistence agriculture has also contributed to deforestation over a long period.

Forest area declined in Peru by an estimated 2.10 million ha between 2007 and 2020, primarily a result of clearing Amazonian forests for agriculture. Notably, Peru grants property rights to forest dwellers who provide evidence of long-term settlement. Other causes of deforestation include legal and illegal logging, road development that provides access to previously inaccessible areas, mining, and oil exploration.

Changes in forest growing stock

Change in forest growing stock in APEC economies provides a broad indication of change in forest quality. An increase in total growing stock may be indicative of an increase in forest area, the growth of existing forest vegetation (either in natural or planted forests) or an improvement in the quality of forest management. Conversely, a reduction in total forest growing stock may indicate a reduction in forest area, the replacement of mature vegetation with younger vegetation (e.g. through the harvesting and subsequent replanting of planted forests) or a reduction in the quality of forest management.

Significant increases have been observed in per-hectare growing stock in several APEC economies, indicating a relative maturing of forests or improved forest management. In economies such as the Philippines and Viet Nam, a reduction in per-hectare growing stock is likely a function of a significant expansion in forest area, thereby increasing the proportion of very young forests.

Forest growing stock is expected to remain relatively stable in Canada.

Indonesia's forest growing stock is estimated to have declined by about 10 percent between 2007 and 2020.

Japan's total forest growing stock increased from 1.9 billion m^3 in 1966 to 5.2 billion m^3 in 2017. Since 1990, the growing stock has increased at an average of about 80 million m^3 per year, almost equivalent to Japan's annual wood consumption. The ratio of planted forests in the total growing stock rose from 30 percent to 63 percent between 1990 and 2017, and the growing stock of natural forests continued to increase.

In the Republic of Korea, efforts to reverse the historical devastation of forests and forest growing stock accelerated in the 1960s through large-scale reforestation efforts. In the 1970s, a 30-year plan was developed with the aim of establishing 2.7 million ha of planted production forests by 2010. The success of these afforestation efforts is reflected in significant ongoing increases in the economy's forest growing stock – up from 624 million m^3 in 2007 to 1,020 million m^3 in 2019. The forest growing stock is projected to continue rising, although the growth rate is expected to slow due to declining annual increment in old forests and increased timber harvesting for supply.

In the United Sates, growing stock has grown by almost 60 percent since 1953. Although the increase in forest area appears to have plateaued, growing stock continues to rise. Nevertheless, there are several areas of concern regarding the health and sustainability of forests, including fragmentation due to development and especially the increasing frequency and severity of forest disturbance events, notably fire. The number of forest-dependent species of flora and fauna determined to be at risk of extinction is increasing.

Forests in protected areas

A positive sign for the improving status of forests in the last decade is an increase in the area of forests in protected areas. According to FRA 2020, the area of forest in protected areas in APEC economies increased by about 15.8 million ha between 2010 and 2020 (FAO, 2020a). The largest net increases were in Peru (6.4 million ha), China (2.9 million ha) and Australia (1.8 million ha); Canada, Mexico and the United States also recorded substantial increases in forests in protected areas over that period (FAO, 2020a). Figure 5 shows the net change in forests in protected areas between 2010 and 2020 in selected APEC economies.

Figure 5. Net change in forest area in protected areas, 2010–2020, selected APEC economies (in order of area change)
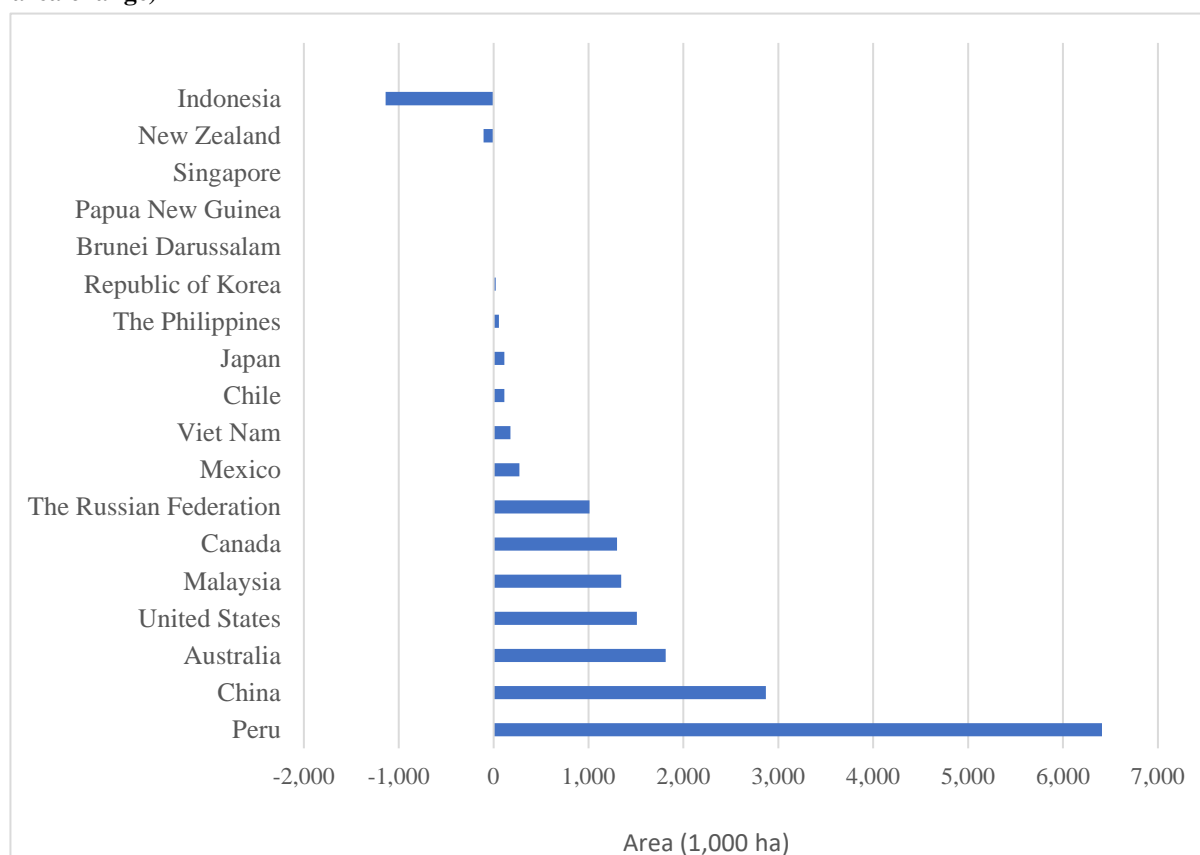
Source: FAO (2020a).

Significant changes in policies governing ecological protection in China between 2007 and 2020 included the following: "Decision on Various Issues on Overall Deepening Reform" in 2013, which requires the delineation of "red lines" for ecological protection, including in forests and forest lands; the State Council's "Opinion on Quickening Construction of Ecological Civilization", issued in 2015, which requires enhanced efforts in efficient resource use, the protection of natural ecosystems, and the improvement of the natural environment, with forests having prominent roles in all these; and China's Thirteenth Five-Year Plan (2016–2020), which includes a requirement to strengthen the protection of natural forests and completely stop commercial logging of natural forests. According to China's Master Plan for Major Ecosystem Protection and Restoration Projects (2021–2035), forest cover should reach 26 percent by 2035, with a standing growing stock of 21 billion m^3.

Production forests

The area of designated production forest in APEC economies increased overall by 40.2 million ha between 2010 and 2020 but decreased in some economies. Three major dynamics appear to be occurring: (1) increases in production forest, due largely to the establishment of new planted forests; (2) decreases in production forest area due to the withdrawal of forests from the production forest estate; and (3) decreases in production forest area due to deforestation. Figure 6 shows the net change in the area of designated production forest in APEC economies in the

period 2010–2020.

Figure 6. Net change in the area of designated production forest in APEC economies, 2010–2020 (in order of area change)
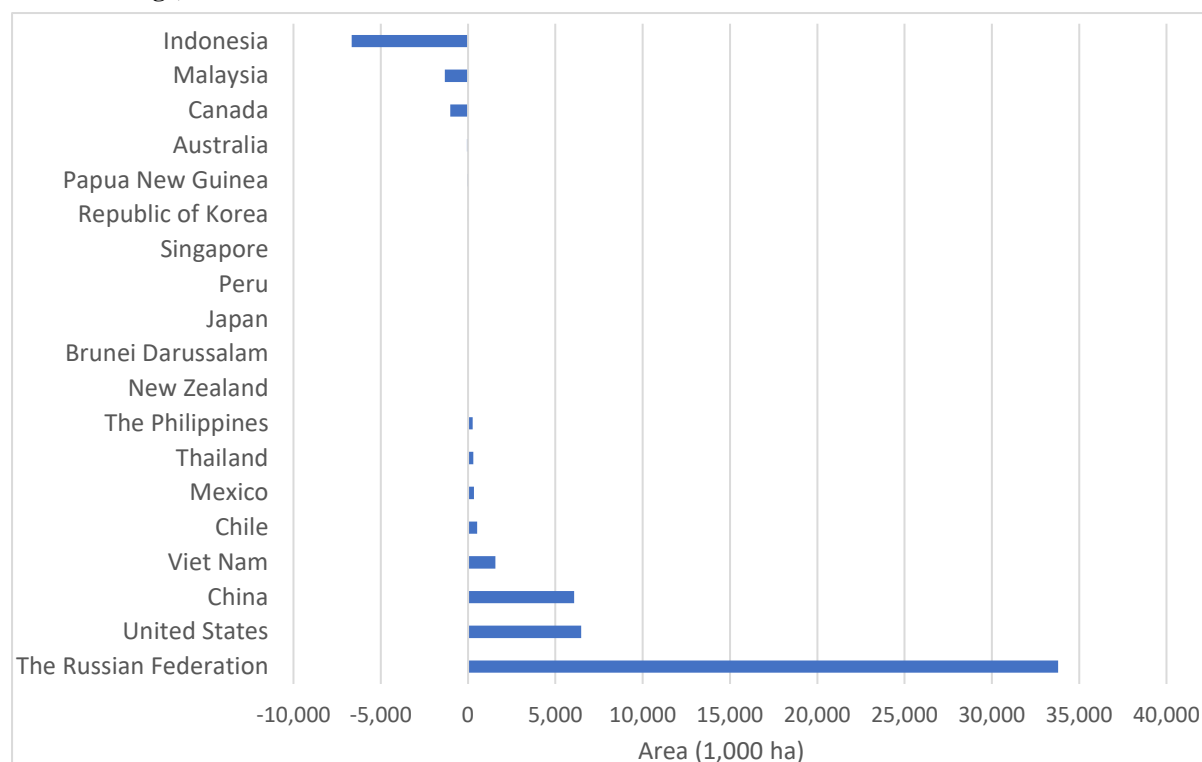
Source: FAO (2020a).

Planted forests

The area of planted forest in the APEC region increased by slightly more than 30 million ha between 2007 and 2020, making a major contribution to meeting the APEC Forest Cover Goal (Figure 7). China recorded the largest increase, at 16.9 million ha of new planted-forest area, followed by Canada (+5.5 million ha), the United States (+2.9 million ha) and Viet Nam (+1.6 million ha).

Figure 7. Change in planted-forest area in APEC economies, 2007–2020 (in order of area change)
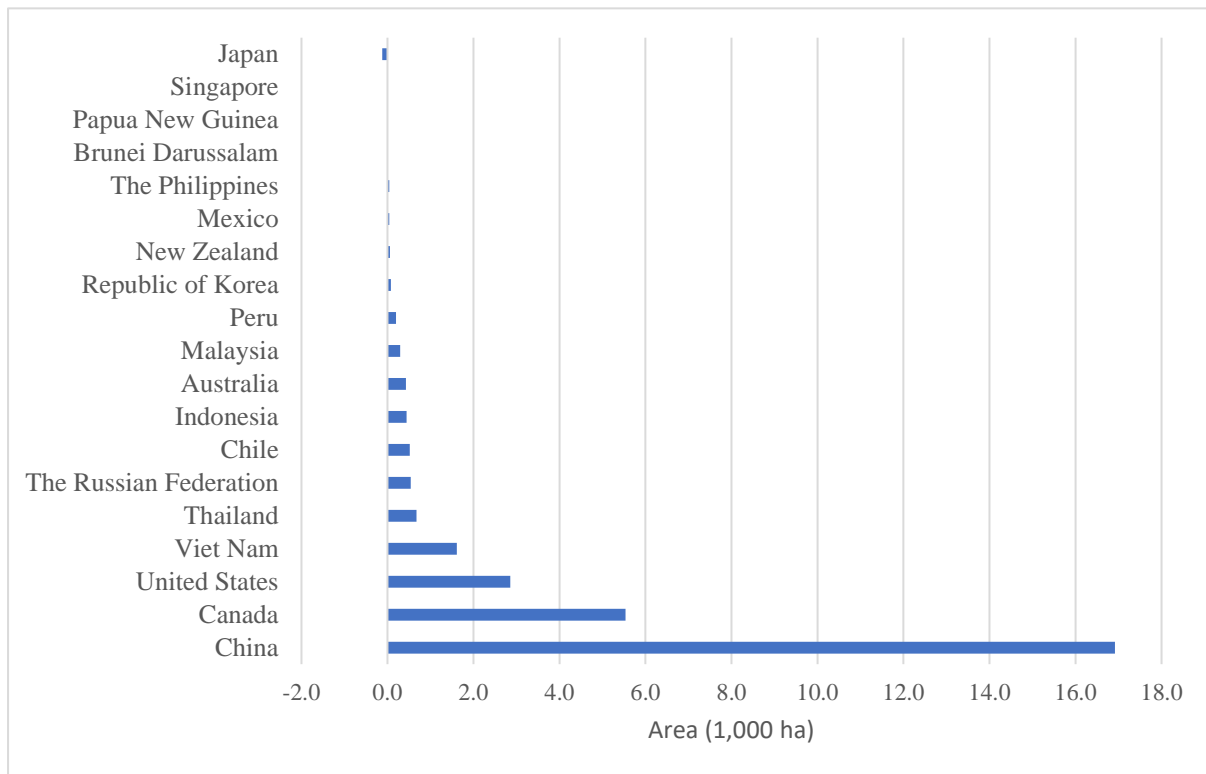
Source: FAO (2020a).

2   Activities that supported achievement of the 2020 APEC Forest Cover Goal

In general, all APEC economies have well-defined forest policies and programmes that are underpinned by objectives relating to SFM and sustainable development and also take on board the important role that forests play in mitigating the effects of climate change. Many of these policies and programmes have been in place for an extended period and continue to promote forest expansion, enhance forest management and discourage deforestation.

Since 2007, APEC economies have variously implemented a diverse range of other measures that have supported achievement of the APEC Forest Cover Goal. For example, economies have:

- Developed legislation, policies and action plans.

- Implemented direct governmental and voluntary planting programmes.

- Implemented conservation and protection programmes.

- Undertaken forest restoration and rehabilitation.

- Imposed measures to reduce deforestation and regulate forest harvesting.

- Implemented forest-related climate-change programmes.

- Provided direct incentives for reforestation and improved forest management.

- Strengthened forest tenure.

- Improved forest law enforcement and governance arrangements.

- Participated in global and regional processes that support improved forest management.

This chapter elaborates on some such activities.

Forest legislation, policies and action plans

Several APEC economies are participants in global and regional arrangements that complement the APEC Forest Cover Goal by promoting forest restoration and SFM. For example:

- **APFNet**, which was created in 2008 and is based in Beijing, China, is committed to helping the economies and people of the Asia-Pacific region by promoting and improving SFM and rehabilitation. Seventeen of APEC's 21 economies are members of APFNet. APFNet's objectives are in accordance with the United Nations Forum on Forests (UNFF)'s Global Forest Goals (UNFF, undated[a]).

- The **United Nations (UN) Strategic Plan for Forests 2017–2030**, which was created under the auspices of the UNFF and adopted by the UN General Assembly in 2017, provides an ambitious vision for global forests in 2030. It features six Global Forest Goals and 26 associated targets to be reached by 2030, including a target to increase forest area worldwide by 3 percent by 2030 (UNFF, undated[b]). Several APEC economies – Australia, Canada, China, Indonesia, New Zealand, Russia and Thailand – have announced voluntary contributions to the plan (UNFF, undated[c]).

- The **Bonn Challenge** is a global goal to bring 150 million ha of degraded and deforested landscapes into restoration by 2020 and 350 million ha by 2030. Launched by the Government of Germany and the International Union for Conservation of Nature in 2011, the Bonn Challenge surpassed the 150-million-hectare milestone for pledges in 2017. Among APEC members, Mexico, Peru and the United Sates have made pledges in support of the Bonn Challenge.

- Commitments to the **SDGs**, the **Paris Agreement on climate change**, the **Aichi Biodiversity Targets**, and the **land degradation neutrality goal**.

Australia is committed to SFM policy goals and to funding tangible actions to increase tree cover, including through its 20 Million Trees Program and the implementation of the 2018 National Forest Industries Plan.

Brunei Darussalam's Forest Act (Amendment) Order of 2007 emphasizes the importance of forest protection, biodiversity conservation, bioprospecting, forest access and benefit-sharing.

In 2019, the Canadian Council of Forest Ministers developed the following vision for Canada's forests: "Canada's SFM practices maintain resilient, healthy forests that support vibrant communities, stronger collaborations with Indigenous Peoples and competitive economies" (Canadian Council of Forest Ministers, 2019). The vision reflects Canadian values and priorities and the SDGs.

Given the overall significance of China's contribution to achieving the APEC Forest Cover Goal, one of the most important policy measures to increase forest cover was the "Decision on Accelerating Forestry Development" issued by the State Council of China in 2003. This clearly outlined an intention to change the orientation of forest management in China from timber production to ecological rehabilitation. Four key roles were specified for forestry: (1) significantly contribute to broad sustainable development strategies; (2) play a primary role in ecological conservation and rehabilitation; (3) support development in western China; and (4) assist in mitigating the impacts of climate change. To stimulate the involvement of the public in afforestation, reforestation and forest restoration efforts, the State Council of China issued a series of policies and guidelines on forest tenure reform in 2008 and on state-owned forest areas reform and state-owned forest farms reform in 2015.

China has implemented a wide range of additional measures to increase its forest area and

improve the quality of its forests and forest management. Among its key forestry initiatives, China is implementing programmes related to natural forest protection; the conversion of croplands to forest; desertification control for areas in the vicinity of Beijing and Tianjin; shelterbelt forest development in the Three Norths region and Yangtze River Basin; and voluntary planting, including the greening of flatlands and the development of gallery forests.

The Chinese Government's Plan of Forestland Protection and Utilization (2010–2020) gives priority to improved forest management through comprehensive silvicultural interventions; rigorous adherence to allowable cuts; the intensification of enforcement efforts to reduce illegal forest activities; strengthened efforts to prevent forest fires; and the enhancement of biosecurity measures to prevent and control outbreaks of forest pests and diseases. To guide China's forest management for the next 35 years, the Forest Management Plan of China (2016–2050) was issued in 2016; its aims are to make China's forest harvest and utilization adaptable to sites and local conditions, encourage larger-diameter timber production, promote the application of multifunctional forest management concepts and technologies, and maintain healthier and more stable forest ecosystems.

Japan's Forest and Forestry Basic Act (2001) sets the primary objective of forest management as "fulfilment of the multifunctional roles of forests in a sustainable manner". The law lists a range of policy measures for the proper management of forests and the development of the forestry and wood products industry. Operational implementation of the Basic Act is conducted through the Basic Plan for Forest and Forestry, the National Forest Plan, prefectural forest plans and municipal forest plans. The Basic Plan for Forest and Forestry specifies the maintenance of the forest area of 25 million ha and an increase in the growing stock from 5,410 million m^3 to 6,180 million m^3 by 2040. Under the Forest Management Act (2019), municipalities are entrusted with the management of those forests that are no longer being managed by their owners. Japan's Long-Term Strategy under the Paris Agreement as a Growth Strategy promotes the appropriate management of forests, such as planting after harvest and thinning, including the creation of wildlife corridors, to enhance the resilience of ecosystems in the face of climate change (Forestry Agency of Japan, 2019).

The Eleventh Malaysia Plan (2016–2020) identifies the mainstreaming of environmental and natural resource management as one of the main thrusts for Malaysia's vision of achieving advanced, high-income economic status by 2020. The economy published its overarching forestry policy in 2020, known as 'Malaysia Policy on Forestry', and it is currently undergoing a review of forestry legislation.

Papua New Guinea adopted four new policies in 2020, as follows: (1) revised logging code of practice; (2) strategies for downstream processing; (3) strategies for reforestation and afforestation; and (4) a timber legality standard. The aims are to encourage SFM, increase downstream processing, expand forest plantations and ensure the legal compliance of logging.

Peru enacted Forest and Wildlife Law No. 29763 in 2015. This law emphasizes a multiple-use framework for forests, the promotion of planted forests, the provision of forest goods and

ecosystem services, and protection of the rights of various users of forest resources and wildlife, including Indigenous Peoples.

The Forest Code of Russia, which came into force in 2007, establishes three categories of forest: protective, industrial and reserved. The key objectives of the code are to preserve biodiversity, especially in high-conservation-value forests, and to reduce illegal logging and forest loss due to wildfire.

Singapore updated its National Biodiversity Strategy and Action Plan in 2019. This identifies the following five key strategic objectives: (1) safeguard our biodiversity; (2) consider biodiversity issues in policy and decision-making; (3) improve knowledge of our biodiversity and the natural environment; (4) enhance education and public awareness; and (5) strengthen partnerships with all stakeholders and promote international collaboration.

Chinese Taipei's afforestation efforts are focused on water conservation and economic functions. Restoration is mostly in landslide areas, overdeveloped lands, forest-fire areas and thinned forest areas (Forestry Bureau, undated).

Reducing deforestation and improving conservation and protection

Several APEC economies have implemented either full or partial bans on logging. In Thailand, for example, a ban on logging in natural forests has been in place since 1989. Although there is no formal ban in New Zealand, a very high proportion of natural forests is in protected areas; moreover, those natural forests not in protected areas are subject to rigorous provisions that restrict harvesting; more than 99 percent of wood production is sourced from planted forests.

In Australia, codes of forest practice and externally accredited environmental management systems provide a structured approach to the planning and management of environmental protection. Australia's submitted report on the APEC Forest Cover Goal notes that, "Codes of forest practice vary in their legal status and coverage, but generally provide specific operational guidance for SFM practices in public and private forests available for wood production, including plantations. In Tasmania, there is a code of practice for the management of nature conservation reserves, including forested nature conservation reserves".

Canada's low rate of deforestation reflects a strong commitment to SFM through the implementation of strict laws, policies and regulations that require every tree harvested to be regenerated through natural or assisted processes.

The President of Indonesia signed a Presidential Instruction in 2011 that put in place a deforestation moratorium on more than 43 million ha of primary forests and peatlands. The aim of the moratorium was to curb the impacts of climate change and conserve remaining tropical forest biodiversity. The President extended the moratorium for a further two years in 2013.

Since 2009 and more recently in 2020, the Government of Papua New Guinea issued policy

directives that the purpose of any new timber concessions would be to supply domestic downstream processing operations only and not for roundwood exports. However, existing concessions are allowed to continue operations under their negotiated terms, which allows the export of approximately 80 percent of the economy's harvest as roundwood.

Various logging restrictions have been in place in the Philippines for the past 40 years. A broad logging moratorium since 2011 prohibits the issuance or renewal of logging contracts and tree-cutting permits in all natural and residual forests and requires the closure of all logging concessions operating in natural and residual forests. Additionally, the moratorium authorizes the shutdown of any sawmill unable to present proof that logs for processing are from legal and sustainable sources. Forest protection has been further strengthened by the adoption of a law on a forest and biodiversity protection system and a strategy on forest and biodiversity protection through Department of Environment and Natural Resources Administrative Order No. 2018-21.

Several APEC economies prescribe maximum allowed harvesting levels in given areas of public land over specified periods. In Brunei Darussalam, for example, timber harvesting is governed by an economy-wide maximum annual allowable cut of 100,000 m^3, which has been in force since 1990. All logging activity is carried out under strict supervision by the Forestry Department to ensure that harvesting complies with standards set in the Brunei Selective Felling System. In Canada, provincial governments regulate harvest levels and practices on public lands by specifying an annual allowable cut, which forest companies are legally required to abide by. In Malaysia, the National Land Council sets annual allowable cuts, which each Malaysian state government is required to enforce and report against.

Efforts to make forestry more profitable are likely to also enhance afforestation. In New Zealand, the Resource Management Act Regulations (2018) provide a legal basis for implementing the National Environmental Standard for Plantation Forestry. The objectives of the standard are to maintain or improve the environmental outcomes associated with plantation forestry and to increase the efficiency and certainty of managing plantations. The standard will reduce compliance costs for forestry companies and enhance profitability.

Forest rehabilitation and restoration

A wide range of techniques to rehabilitate and restore forests are being implemented in APEC economies at many scales. The most common technique is undoubtedly natural regeneration after harvesting and wildfire and on abandoned agricultural lands. Artificial regeneration (i.e. planting or deliberate seeding) is also widely used in many economies. Assisted natural regeneration techniques are increasingly being used with the aim of assisting, through tending, naturally regenerated seedlings and expediting their growth. Assisted natural regeneration is particularly promising as a means for regenerating forests in large areas of degraded *Imperata cylindrica* grasslands in East and Southeast Asia.

Enrichment planting is a specific form of assisted natural regeneration that is widely used in

degraded forests and to add diversity to planted forests. For example, enrichment planting has been carried out in logged-over production forest in Brunei Darussalam since 1997. An enrichment planting project has been under way in Hong Kong, China since 2009 to speed up the transformation of exotic pioneer planted forests into more diverse forest habitats and picturesque landscapes.

Forest restoration at the landscape scale has attracted significant recent attention; for example, the Bonn Challenge aims to restore 350 million ha of degraded and deforested landscapes by 2030.

As of 2020, the United States had placed 20.45 million ha under restoration (this is a cumulative total for 2011–2020), thus surpassing by more than 5 million ha its original commitment of 15 million ha under the Bonn Challenge. These restoration efforts include reforestation, the removal of invasive species, wildlife habitat improvements and treatments to reduce the risk of catastrophic wildfires. The United States achieved around 10 percent of its Bonn Challenge accomplishments through the United States Forest Service's Collaborative Forest Landscape Restoration Program, which brings together community members across the economy to propose projects based on a shared vision of large landscapes of healthy, resilient forests and communities at less risk of catastrophic fire.

Activities to rehabilitate and regenerate forests on degraded lands have significant potential to increase forest area, build the capacity of forests to sequester carbon and enhance the provision of ecosystem services.

In Peru, two programmes have been developed to guide forest rehabilitation and development:

(1) The **Sustainable, Inclusive and Competitive Development Programme in the Peruvian Amazon** is designed to rehabilitate and conserve natural forests in the Amazon region. The programme involves strengthened inventory and mapping work; forest law enforcement and monitoring; forest management in relation to climate change; conservation, agroforestry and ecotourism; value-chain development; and participatory programmes.

(2) The **Programme for the Management and Sustainable Promotion of Forest Production in Peru** promotes sustainable forest production and the establishment of planted forests and agroforestry.

The Papua New Guinea Forest Authority has developed guidelines for natural reforestation with the aim of encouraging the regeneration of natural forests. The economy has also expanded its planted forest estate, including by planting more than 3 million trees in 2011 for the International Year of Forests. There are aims to establish another 740,000 ha of planted forest to meet Papua New Guinea's Vision 2050 (Government of Papua New Guinea, 2009). Generally, conditions in Papua New Guinea's forest ecosystems are highly favourable for rapid regeneration; moreover, supportive government policies that promote forest replenishment and the management of natural forests facilitate restoration. The Government of Papua New Guinea

is encouraging landowners to use their land to plant trees for economic returns as well as for environmental benefits as part of the global agenda on climate change under the programme, *Operation Painim Graun, Planim Diwai.*[8]

The Great East Japan Earthquake and Tsunami in 2011 caused severe damage to forests and forest infrastructure in 15 prefectures, wreaking havoc on 164 km of coastal disaster-prevention forests. Ninety-eight percent of recovery works for forest infrastructure such as forest roads and disaster control facilities had been completed by January 2020. The damaged coastal disaster-prevention forests have been rehabilitated in cooperation with local residents, private companies and not-for-profit organizations.

Singapore's greening policy is guided by a mission to make Singapore a "city in a garden". Singapore has been assisting forest regeneration since 1991 by planting saplings and removing aggressive weeds in nature reserves and surrounding areas to accelerate succession and promote the development of late-secondary forest with primary-forest components.

In Chinese Taipei, a project to regenerate degraded forest land has been implemented. Priority has been given to areas that pose a potential risk to public safety, such as areas vulnerable to landslides, areas affected by forest fire, areas that have previously been leased out for private use, and areas of illegally cleared forest land. Chinese Taipei is also giving attention to the rehabilitation and regeneration of coastal forests to protect against the detrimental effects of salt spray, strong winds and sand encroachment.

Planting programmes

In several APEC economies, governments play major operational roles in forestry, including afforestation, reforestation and forest rehabilitation.

In Chile, the National Forestry Corporation has been administering the "Trees for Chile" planting programme since 2010. The aim is to plant more than 1.5 million trees in residential areas to "green" communities and create new woodlands.

The National Forestry and Grassland Administration of China has responsibility for several forest expansion programmes. The economy also encourages its citizens to participate in voluntary tree-planting initiatives, with the expectation that every able-bodied citizen above the age of 11 should plant 3–5 trees per year.

Despite its predominantly urban characteristics, Hong Kong, China has carried out significant tree-planting work. Since 2010, the planting strategy has focused on increasing forest cover in badly eroded areas and fire-damaged habitats, enhancing the ecological values and biodiversity of woodlands, and promoting the sustainable use of woodlands. More than 540,000 seedlings were planted each year between 2007 and 2019. As a result, forest area in the economy

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[8]   Literally, "Operation Look for Land and Plant Trees".

increased over the period from 24,700 ha to 27,600 ha.

Hong Kong, China has been implementing a programme since 2009 to progressively remove exotic pioneer trees to provide space for in-planting with native trees. The main objectives of the programme are to accelerate the transformation of exotic pioneer planted forests into more diverse woodland habitats, enhance biodiversity, reduce the risk of pest and disease outbreaks, and create more picturesque landscapes. Community support plays an important role in woodland conservation work, and, since 2016, the programme has been extended to engage experienced NGOs in the enrichment work. These NGOs also conduct publicity programmes to promote the objectives and benefits of the programme to the public. The programme provides good opportunities for NGOs, the private sector, government and the public to build synergies in conservation and public education. Under the programme, about 58,000 exotic pioneer trees of mainly *Acacia* and *Eucalyptus* species and *Lophostemon confertus* have been removed and more than 140,000 seedlings of 80 native species have been planted in the thinned areas.

In Indonesia, there has often been a lack of rehabilitative forest management in logged-over concessions, which, as a result, have been open to encroachment, illegal logging and conversion to other land uses. The Ecosystem Restoration Concessions Programme was launched in 2004 with a view to rehabilitating degraded logging concessions through private funding. By 2014, almost 500,000 ha of forests had been licensed under 12 ecosystem restoration concessions and indicative allocations of an additional 2.7 million ha of forests had been made to the programme. The Industrial Community Forest Plantation Programme (*Hutan Tanaman Rakyat*) was planned for implementation between 2007 and 2016 with the aim of allocating property rights to 5.4 million ha of degraded production forest, especially in areas already facing tenurial disputes.

The Indonesian Government has set various ambitious planting targets supported by events such as Indonesia's Tree Planting Day and National Tree Planting Month. In 2009, the President of Indonesia urged the planting of 4 billion trees by 2020 and 9.2 billion trees by 2050. In support of this target, the Ministry of Forestry launched the "One Man, One Tree" planting programme in 2009 to help combat the impacts of climate change and conserve forests. In 2014, the new government made a commitment to reforest 2 million ha of degraded land annually.

Malaysia's Forest Plantation Development Programme includes a target to plant 130,000 ha of selected species; as of September 2020, 124,767 ha had been established. Malaysia has developed and implemented several other tree-planting programmes that have also helped increase forest area. The Tree Planting Programme with Mangrove and Other Suitable Species along the National Coastlines was initiated in 2005 in response to the destruction caused by the 2004 Indian Ocean tsunami. Malaysia planted 6.8 million mangrove seedlings and other suitable tree species between 2005 and 2020, encompassing nearly 3,000 ha of coastal land.

In the Philippines, two major forestry policies have provided the foundation for forest

protection and rehabilitation since 2011: a logging moratorium in natural and residual forests, and the National Greening Programme. The National Greening Programme addresses broad socioeconomic and environmental priorities, including poverty reduction, resource conservation and protection, productivity enhancement and climate-change mitigation and adaptation. The programme aimed to plant 1.5 billion trees on about 1.5 million ha of open, denuded and degraded forest lands between 2011 and 2016.

Urban-forest development is an ongoing theme in Singapore through the intensive management of roadside urban forests and tree plantings and ongoing voluntary urban afforestation schemes.

A cornerstone of Viet Nam's reforestation efforts was the Five Million Hectares Reforestation Programme, which established targets and provided subsidies with the aim of achieving an overall forest area of 43 percent by 2010. Of the planned 5 million ha, 2 million ha were to be protection forests and 3 million ha were earmarked as production forests. Although the programme resulted in significant reforestation, it fell short of the 5-million-ha target; it has now been supplemented by the Programme in Support for Development of Forest Plantations (2007–2015), which focuses on the establishment of planted production forests. Viet Nam is also implementing several large-scale projects and programmes directed at specific regions and forest types, supported by international development assistance and reciprocal capital. These include the Viet Nam Forests and Deltas Programme; Protection Forests Restoration and Sustainable Management; and Sustainable Management of Forests and Biodiversity to Reduce CO_2 Emissions.

Direct incentives

Incentives are policy instruments designed to increase the comparative advantage of a particular activity and thereby stimulate investment in it. Subsidies have been the most evident direct incentives offered to encourage increased forest area in several APEC economies since 2007.

In Chile, Decree Law 701 introduced subsidies for establishing planted forests in 1973; this law has been one of the primary drivers of Chile's extensive development of planted forests. The law is still in force, although its focus has shifted towards smallholder afforestation rather than providing support for large forest companies. More recently, the Fund for the Conservation and Sustainable Management of Native Forests has been established to support smallholders in carrying out natural forest restoration.

China has offered financial subsidies since 2009 to farmers who return their cultivated land to forests, based on verified area. By the end of 2012, this subsidy had a cumulative value of RMB 324.7 billion and had benefited 120 million farm households (Convention on Biodiversity, 2019).

The Government of Malaysia established the National Conservation Trust Fund in 2015, which provides financial support for efforts to enhance SFM and conserve biodiversity. The Eleventh

Malaysia Plan (2016–2020) includes a focus on "conserving natural resources for present and future generations", including reforestation. Indigenous and local communities have also been empowered and involved in various biodiversity conservation programmes.

The Government of New Zealand introduced the One Billion Trees Programme in 2018 to increase the rate of tree-planting to reach at least 1 billion trees by 2028. As of 8 March 2021, 258 million trees had been planted. The operational programme, which is led by Te Uru Rākau (New Zealand's Forestry Ministry), is intended to grow both indigenous and exotic tree species. The One Billion Trees Programme encourages landowners to plant and establish trees and native regeneration. It includes direct grants to support tree-planting initiatives and partnership funding aimed at organizations and community groups.

In 2008, Chinese Taipei formulated "measures for the encouragement and guidance of forestation work", under which direct subsidies of up to USD 18,460 per hectare over 20 years are available for private-sector reforestation. Priority is given to steeplands, reservoir catchment areas, areas that have suffered from forest fire and other land zoned for forestry.

In the United States, the Conservation Reserve Program makes annual rental payments to farmers who agree to remove environmentally sensitive lands from agricultural production and plant tree species to enhance ecosystem health. The Conservation Reserve Enhancement Program, an offshoot of the Conservation Reserve Program, targets high-priority conservation issues identified by governments and NGOs. The Emergency Conservation Program and the Emergency Forest Restoration Program both provide funding for farmers and ranchers to restore farmland damaged by natural disasters.

Climate-change-related programmes

Given the importance of climate change on the international forest agenda, it is unsurprising that most APEC economies have developed forest programmes relating to climate change.

A significant focus in developing economies is on REDD+. Of the APEC economies, Chile, Indonesia, Malaysia, Mexico, Papua New Guinea, Peru, the Philippines and Viet Nam are all partners in the United Nations Collaborative Initiative on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD). Indonesia, Papua New Guinea, the Philippines and Viet Nam have obtained financial support through UN-REDD for their internal REDD+ programmes, and the others have engaged in UN-REDD through knowledge-sharing and capacity-building activities.

Examples of activities related to REDD+ and self-determined contributions in APEC economies include the following:

- The Indonesian Government's Medium Term Development Plan (2015–2019) renews a commitment to reduce greenhouse-gas (GHG) emissions by 26 percent by 2020 through internal efforts and by an additional 41 percent with support from external development partners. The plan aims to achieve more than 60 percent of the target for emission

reductions through reductions in deforestation and forest degradation associated with REDD+. Indonesia has pledged to implement large-scale tree-planting programmes.

- REDD+ plays an important role in fulfilling Malaysia's pledge of maintaining 50 percent forest cover and achieving its self-determined contribution. Malaysia intends to reduce its GHG emissions intensity of GDP by 45 percent by 2030 relative to the emissions intensity of GDP in 2005, 10 percent of which is subject to climate finance, technology transfer and capacity building from developed economies.

- Mexico's 2020 self-determined contribution update noted that the economy intends to reduce GHG emissions by 22 percent by 2030 compared with the business-as-usual baseline, with conditional contributions aimed at a reduction of up to 36 percent of GHG emissions. The self-determined contribution includes aims to achieve net-zero deforestation by 2030 and to promote actions to prevent the establishment, control and eradication of invasive species, diseases and pests, the impacts of which are exacerbated by the effects of climate change.

- Papua New Guinea's self-determined contribution focuses on REDD+ activities that provide opportunities for forest-dependent landowning communities to conserve their forests and protect biodiversity.

- Thailand has conducted preliminary work to identify forest areas that could be eligible for REDD+ project initiation. The Royal Forest Department notes that Thailand has the potential and capacity to carry out REDD+ projects in many parts of the economy, although obstacles exist as a result of misconceptions, lack of technical knowledge and lack of clarity over benefit-sharing and carbon rights. Thailand intends to reduce its GHG emissions by 20 percent by 2030.

- Two phases of REDD+ have been completed in Viet Nam, with REDD+ managed through a state steering committee chaired by the Deputy Prime Minister. Viet Nam plans to reduce GHG emissions by 8 percent by 2030 or by up to 25 percent with international support. Mitigation measures include managing and developing sustainable forests; enhancing carbon sequestration and environmental services; the conservation of biodiversity associated with economic development; and increasing the incomes of forest-dependent communities and people.

Climate change is playing a role in stimulating forestry activities in other economies.

Australia's Emissions Reduction Fund supports voluntary actions across the economy to reduce GHG emissions. Eligible forest activities include new plantations, farm forestry, permanent plantings, shifts to longer-rotation plantations, regenerating native vegetation, and protecting native forest from clearing for agriculture. The Australian Government has contracted to purchase carbon credits from forest projects representing about 125 million tonnes of carbon-dioxide-equivalent (as of October 2019) and has announced the creation of

an AUD 2 billion "climate solutions fund" to extend government purchases of carbon credits under the Emissions Reduction Fund.

In Chile, the government has established a platform for generating and trading carbon credits for the forest sector; the aim is to provide a foundation for developing state-of-the-art forest carbon trading in Chile.

An emissions trading scheme was enacted in New Zealand in 2008, with forestry the first sector to which the scheme was applied. The New Zealand Emissions Trading Scheme (NZETS) was reformed through the Climate Change Response (Emissions Trading Reform) Amendment Act (2020), the aim of which is to increase certainty for business, increase accessibility and improve the scheme's administration. The NZETS is a way of meeting New Zealand's international obligations around climate change by putting a price on GHGs and thereby provide an incentive to reduce emissions. Under the scheme, pre-1990 forests are treated as New Zealand's baseline carbon storage: they cannot be registered in the NZETS to earn units, but forest owners must surrender units to the government if those areas are deforested. Post-1989 forests are treated as carbon sinks. Owners of post-1989 forests can voluntarily register their forest in the NZETS to earn units as the forest grows. Under the scheme, owners must pay back a portion of their units if the forest is harvested and all their units if the forest is cleared. Under current settings, the NZETS is projected to be a driver of increased afforestation in coming decades.

The United States noted that, in the longer term, climate may increasingly determine the area of forest use, particularly in drier regions of the economy where forests exist at the forest–shrubland interface. Losses of forest land in these areas are certainly possible. Increasing recognition of the role of forests in providing climate mitigation, carbon sequestration and a host of other ecosystem services and outputs is driving policy and management innovation at all levels.

Tenure reform

The distribution of forest ownership and forest management responsibilities affects the approaches of governments in directly or indirectly influencing forest-cover change. Tenure reforms, therefore, under which ownership or user rights to forests and forest lands may be transferred from the government to individuals, communities or the private sector, can have significant impacts on forest establishment, restoration and management.

For example, collective forest tenure reform has been a major development in China. In 2008, China released the "Opinion on Comprehensively Promoting Collective Forest Tenure System Reform", under which property rights to collective forest lands would be transferred to households.

In Papua New Guinea, almost all land is under customary ownership. Thus, the government must seek approval and agreement from landowners to develop forest resources or establish forest plantations.

Community forestry has been a cornerstone of Thailand's approach to forest management. As of January 2021, the Royal Forest Department had established more than 10,422 community forests covering 886,905 ha. Community forestry is a key measure for encouraging participation in SFM.

More than 1 million households are estimated to be living in national parks, wildlife sanctuaries and forest reserves in Thailand. Under Thai law, these people are illegal occupants in protected areas. To date, finding a suitable balance between forest resource protection and the social, cultural and economic functions of forests has proved elusive and is a major source of friction and distrust.

In Viet Nam, a series of laws, policies and decrees has been issued since 1993 to transfer user rights for state-owned forestry lands to households. By 2006, land-use rights certificates to 55 percent of forest lands had been issued to households. Forest land allocation programmes have been hampered, however, by funding shortages and the overlapping mandates of the Ministry of Natural Resources and Environment, which oversees land allocation, and the Ministry of Agriculture and Rural Development, which is in charge of forest land.

Forest law enforcement and governance measures

Weak capacity for forest law enforcement and forest governance is a major cause of forest degradation and deforestation in some APEC economies. Consequently, efforts to improve forest governance systems can affect forest cover.

In Indonesia, for example, a key government focus is on strengthening forest governance, with measures including a moratorium on granting new harvesting licences in primary forests, improvements in the forest licensing system, and greater recognition of the rights of Indigenous Peoples and local communities.

Illegal logging and associated challenges related to governance and land tenure are significant concerns in Mexico, where an estimated 30 percent of lumber is produced from illegally logged timber. Preventing illegal logging was a key strategy in Mexico's National Forest Programme (2014–2018).

The monitoring of illegal logging in Russia is challenging due to the scale of the forest resource. Estimates of the scale of illegal logging in the economy range from less than 1 percent of the total wood harvest (according to official Rosleshoz data) to up to 20 percent of all logging (about 35 million m^3) (according to the World Bank and the World Wide Fund for Nature Russia).

Dedicated attention to forest law enforcement and illegal logging can be effective, as shown in the Philippines. There, after implementation of the logging moratorium, the government's intensive forest protection and law enforcement initiative led to a 60 percent decline in illegal logging activity, as indicated by reductions in the apprehension of illegal loggers and the confiscation of illegally logged forest products.

Several economies have adopted measures to discourage trade in illegally logged timber. In the United States, amendments to the Lacey Act in 2008 make it a crime to import into the United States any tree species illegally obtained in the economy of origin and any product (wood, paper or pulp) containing illegally obtained tree material. In the period 2007–2020, enforcement of the US Lacey Act resulted in three federal criminal prosecutions that led to criminal fines, forfeitures and community service valued in excess of USD 14 million.

In Australia, the Illegal Logging Prohibition Act (2012) makes it a criminal offence to import timber and timber products containing illegally sourced timber into Australia or to process Australian logs that have been harvested illegally.

The Government of Japan has taken a different path, in which it promotes the use of appropriately produced wood products based on a basic philosophy of "not using wood products from illegal logging". Based on its Basic Guidelines for Green Purchasing, the Government of Japan uses wood products with certified legality and sustainability in its procurements. Japan also introduced the Act on Promotion of Use and Distribution of Legally-harvested Wood and Wood Products (the Clean Wood Act) in May 2017. The Objective of the Clean Wood Act is to promote the use and distribution of wood and wood products made from trees harvested in compliance with the laws and regulations of Japan and the economies of origin.

Data collection, monitoring and forest inventories

Recognizing the importance of assessing forest change and evaluating progress towards SFM, several APEC economies are developing and implementing forest inventory systems and other means for capturing forest data. Initiatives among APEC economies include the following:

- Canada's forests are monitored by the National Forest Inventory, which maintains a network of 20,000 sampling points across the economy. The National Forest Inventory is a collaborative effort involving federal, provincial and territorial government agencies that provides information on the state of Canada's forests and a continuous record of forest change, with adjustments made annually based on area loss (deforestation) and gain (afforestation).

- The Republic of Korea has introduced forest policies to implement smart forest management and to improve the competitiveness of the forestry industry, including by introducing high-tech tools such as drones, artificial intelligence, untact [no contact] and information communication technologies. The economy is using advanced technologies and equipment in various fields, such as forest fire prevention.

- Malaysia provides an example of an economy that is using advanced information technologies in forestry and biodiversity to improve forest management. Tools employed include remote sensing, geographical information systems, radio frequency identification, hyperspectral airborne sensing and global positioning systems.

- In Peru, the National Service for Forestry and Wildlife is implementing a range of information-related measures to improve forest management, including updating forest inventories and information systems, addressing land-use issues such as zoning and land registration, monitoring forestry licences, employing certification and verification systems to prevent illegal logging, and building the capacity of officials and forest-dependent people. Data on forest cover is generated through the Forest Cover Monitoring Module, which is one of six modules in the National Forest and Wildlife Information System (known as SNIFFS).

- In the Philippines, the Forest Management Bureau is conducting a ground-based forest resource inventory and the National Mapping and Resource Information Authority is engaged in the comprehensive mapping of the economy's forest and land cover.

APEC economies have been implementing diverse initiatives, including the following:

- In Australia, regional forest agreements (RFAs) are long-term bilateral agreements between the Australian Government and state governments that seek to balance economic, social and environmental demands on forests by setting obligations and commitments for the sustainable management and conservation of Australia's native forests. RFAs cover 16 percent of Australia's forest area, including 92 percent of the area of tall open eucalypt forests and 41 percent of the area of medium open eucalypt forests, which are major wood-production forest types.

- In Mexico, the National Forestry Commission (CONAFOR) has promoted the development of forest and chain-of-custody certification systems to promote the development and marketing of products from sustainably managed forests. As well as carrying out inspection and surveillance, CONAFOR highlights the use of compensation mechanisms through the granting of payments for ecosystem services to support actions to reduce deforestation and forest degradation.

- Viet Nam has made a significant effort to develop schemes to encourage payments for forest ecosystem services. The initial focus was on capturing the value of watershed protection services provided by intact forests at two pilot sites in Lam Dong and Son La provinces. Based on the success of these pilots, the Government of Viet Nam issued the Policy on Payment for Forest Environmental Services in 2010, under which carbon sequestration and conservation are considered to be forest services. This policy provides an important legal foundation for implementing REDD+ in Viet Nam.

The impact of the COVID-19 pandemic

Eight APEC economies reported on the impacts of the COVID-19 pandemic on their forest sectors. Overall, the collective effect of COVID-19 restrictions and health impacts is yet to be determined, but some general observations, given below, provide an indication of the situation and likely future scenarios.

The COVID-19 pandemic has created uncertainty and triggered fluctuations in the global demand for forest products.

Australia noted that it is difficult to differentiate the combined impacts of the pandemic and widespread wildfires on Australia's production forests (native and plantation). Australia does not anticipate an increase in illegal logging or loss of forest cover due to the pandemic. There may have been a reduction in harvesting due to a decrease in demand for forest products because of the pandemic, and some related international supply-chain instability, but detailed analysis has not yet been undertaken.

In Canada, the pandemic created uncertainty and triggered unexpected fluctuations in global demand for forest products. Nevertheless, Canada's forest sector has played an important role in the unprecedented situation by providing the materials needed to produce certain critical supplies; as such, forestry was declared an essential service. The materials produced include packaging, building supplies, household products such as toilet paper, and personal protective equipment such as medical gowns and non-medical masks, which have been required in large quantities in the past year. The forest sector also contributed to Canada's response to the pandemic by doing its part to reduce the spread of COVID-19. There were no reported cases of COVID-19 in tree-planting camps in 2020.

Like the rest of the economy and the world, the Canadian forest sector experienced challenges related to employment because of the pandemic. As of June 2020, more than 100 facility closures or curtailments had occurred in the forest sector, affecting close to 20,000 workers, although most of these impacts are thought to be temporary.

In Malaysia, economic indicators have shown a worrying trend, with many companies struggling to survive in the face of supply-and-demand interruptions in both overseas and domestic markets. The impacts of the pandemic include the following: the jobs and incomes of an estimated 7,031 forest-sector workers and 23,562 wood-based industry workers affected; decreased government (federal and state) revenue; a decline in the average production of timber raw materials of 333,000–375,000 m^3; and ecotourism activities affected. Port controls and restrictions imposed by importing economies have caused the stranding of some consignments at ports, the cancellation of orders and consequent interruptions to production, and increased operational costs. Initial fears of a drastic drop in exports proved unfounded, however.

In New Zealand, the pandemic has significantly disrupted the forest sector. All non-essential businesses closed and all public gatherings were prohibited during lockdowns due to the pandemic, and forestry and wood processing were not categorized as essential services. New Zealand forestry exporters experienced substantial decreases in export revenue.

In Papua New Guinea, the pandemic has affected more than 70 percent of forest business activities, the forest industry and the communities in which forest activities are undertaken. The reduction of forest business activity has affected employment and caused a decrease in production and the loss of income in both the industry and those rural communities that receive

royalties.

In Thailand, the pandemic has had direct impacts on the forest sector, with the closure of sawmills, paper mills and furniture factories. The loss of tourism has caused unemployment in the labour forces of national parks and related service sectors.

The United States noted that the impacts of the pandemic on the global society and economy have been multifaceted, profound and sometimes counterintuitive. In the forest sector, the most obvious channels of impact are related to the supply of and demand for wood products, and these, in turn, are related to macro and sector-specific impacts. At the macro level, the United States economy shrank by 3 percent in 2020 relative to 2019, a result of mandated closures of businesses and interruptions to manufacturing and retail supply chains. Perhaps most evident in the United States were wood-product supply contractions due to temporary mill shutdowns and other COVID-19 related actions. Nevertheless, demand for wood products by the construction industry remained relatively robust, due in part to low interest rates and an upward spike in residential remodelling and renovation.

3 The way forward

The APEC economies demonstrated over the period 2007–2020 that increasing forest cover is achievable and beneficial. The lessons learned from the achievement of the APEC Forest Cover Goal provide a sound basis for designing and implementing new and additional plans, programmes and policies to support forest restoration, achieve SFM, curb deforestation and forest degradation, and contribute to the mitigation of climate change.

This chapter describes some of the initiatives and plans developed by APEC economies that may provide useful guidance for continuing to increase forest cover and improve forest management. It provides general recommendations for potential additional actions to enhance these efforts, which jointly provide a basis for an action plan to support further increases in forest cover.

Recommendations for further increasing forest cover and improving forest management

A wide range of policies, programmes and initiatives has supported the achievement of the APEC Forest Cover Goal. Many of these remain operational and will continue to support forest-area gains or curb losses beyond 2020. Such existing initiatives can provide an overall framework and key elements of an action plan for further increasing forest area and improving forest management in APEC economies.

Enhancing legislation, policies and action plans

Several APEC economies have developed legislation, policies and programmes to help increase forest area and improve forest management. Changing societal expectations, economic opportunities and the biophysical impacts of climate change may require many economies to further adapt and develop such laws, policies and action plans.

Under its National Master Plan for Major Ecosystem Protection and Restoration Projects (2021–2035), China aims to achieve a total forest area of 26 percent by 2035 and a forest growing stock of 21 billion m^3. The economy also aims to further improve logging quota management to maintain forest resources and ecological security. China will continue to implement a ban on commercial logging in natural forests and to strengthen the management of logging in state-owned forests, natural forests, public-welfare forests and key regions.

In the Republic of Korea, a declining population and the growing number of elderly people in rural areas is leading to changes in demand for forest services, including recreation. Forest policies will be influenced by this as well as by environmental issues such as particulate air pollutants, infectious diseases and climate change.

In Malaysia, efforts will be made to improve policies, legislation and institutional frameworks for, among other things, biodiversity conservation and the sustainable use of natural resources; implement biodiversity strategies and action plans; expand the forest inventory to assess flora

and fauna; undertake collaborative research with relevant stakeholders; develop a list of invasive alien species; review and improve management plans for protected areas; review and prioritize corridors; and pursue a conservation action plan for threatened habitats.

Papua New Guinea commenced a dialogue in 2019 to review its Forestry Act with the aim of ensuring that the Act addresses identified gaps in forest management, particularly those relating to deforestation and degradation.

Under Peru's Programme for the Promotion and Sustainable Management of Forest Production, 3.2 million ha of natural forests in the economy will be managed under models of good practice, 30,000 ha of new commercial forest plantations will be established, and 70 million ha of forest will be zoned and allocated for specific uses.

Thailand aims to achieve a forest cover of at least 40 percent of the total land area, including conservation, economic and community forests. A forest policy committee will be established to formulate a forest resource policy and forest management plans.

The United States will continue to pursue policy innovations to help secure carbon sequestration benefits and contribute to an effective climate-change response. Ongoing policy initiatives will be directed at forest restoration, legality, funding for fire response, and tree-planting.

- **Recommendation for additional action on legislation, policies and action plans:** economies may wish to review forest-related policies and legislation with a view to identifying and removing impediments to forest restoration efforts and to identifying additional measures to increase forest area and reduce deforestation and forest degradation.

Measures to reduce deforestation and regulate forest harvesting

APEC economies have put in place a range of measures to reduce deforestation and regulate forest harvesting, such as logging bans and restrictions, annual allowable cuts, reduced-impact logging, and forest codes of practice designed to reduce deforestation and damage to residual forests.

In China, the government will urge all localities to crack down on deforestation and cropland encroachment in accordance with the law and to supervise logging to maintain forest resources and ecological security.

The Government of Malaysia estimates that it needs almost USD 1 billion to achieve SFM. Moreover, financing for SFM cannot be discussed within the confines of the economy's boundaries alone. In its report, the Government of Malaysia noted that developing economies still urgently require intensive financial assistance from developed economies. It recommended that the Future of Forests instrument devise a credible funding platform by establishing a dedicated global forest fund for SFM.

New Zealand's Fit for a Better World Roadmap highlights the unique role that the forest sector can play in creating sustainable outcomes, such as through low-emissions biofuels processed from wood residues; sustainable wood-derived products; and opportunities to increase the efficient production and use of long-lived wood products.

The aim of the Programme for the Promotion and Sustainable Management of Forest Production in Peru is to reduce the deforestation rate in Loreto and Ucayali by 30 percent by 2030.

- **Recommendation for additional action to reduce deforestation and regulate forest harvesting:** economies may wish to examine the direct and indirect key drivers of deforestation and forest degradation and implement further mitigation measures.

Forest restoration and rehabilitation

Various approaches and initiatives on forest restoration and rehabilitation are being implemented in all APEC economies. One such approach is forest landscape restoration (FLR),[9] the aim of which is to regain ecological functionality and enhance human well-being in deforested and degraded landscapes (GPFLR, 2021). In support of FLR, the Global Partnership on Forest and Landscape Restoration responds directly to the Bonn Challenge to restore 150 million ha of deforested and degraded land by 2020 and 350 million ha by 2030 (GPFLR, 2021). Also, in support of landscape approaches, the Global Landscapes Forum provides a knowledge-led platform focused on creating sustainable landscapes that are productive, prosperous, equitable and resilient (GLF, 2021).

The UN Decade on Ecosystem Restoration (2021–2030) provides an opportunity for APEC economies to build on the achievement of the APEC Forest Cover Goal by supporting global efforts to protect and revive ecosystems worldwide for the benefit of people and nature (United Nations, undated). The aim of the Decade is to build a strong, broad-based global movement to ramp up restoration and put the world on track for a sustainable future; FLR is one of various approaches it is promoting.

Several APEC economies are committed to the UN Global Forest Goals through voluntary contributions (UNFF, undated[a]).

Most APEC economies are already involved in a range of economy-level, regional and global efforts to restore and rehabilitate forests. Economies could initiate further action on forest restoration, learning from the experiences in achieving the APEC Forest Cover Goal and from numerous other ongoing efforts.

Approaches to forest restoration and rehabilitation differ among economies according to specific contexts. In the Republic of Korea, for example, agricultural and other lands are becoming idle because of the ageing of the population; over time, such areas are projected to

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[9]   Also known as forest and landscape restoration.

be converted into forests, with forest cover expected to increase to 6.47 million ha by 2050 (from 6.29 million ha in 2020).

- **Recommendation for additional action of forest restoration and rehabilitation:** economies may wish to consider developing new, and expanding existing, programmes on forest restoration and rehabilitation around emerging initiatives, techniques and methodologies such as FLR.

Planting programmes

Several APEC economies have announced tree-planting targets, some linked to specific planting programmes.

Australia continues to work to reduce barriers to forest expansion and tree-planting and to support commercial plantation expansion in the right places, at the right scale and with appropriate species. With an area of 1.94 million ha, the plantation estate occupies 1.5 percent of Australia's forest area. The forest sector has projected that, to meet future wood demand, Australia needs to establish an additional 400,000 ha of plantation (approximately 1 billion trees).

Brunei Darussalam has a long-term objective to establish 30,000 ha of planted forests to supply the economy's timber requirements. It is envisaged that timber harvesting in natural forests will be phased out, with wood production gradually relocated to the planted forests.

Canada launched a plan in 2020 to plant 2 billion trees over ten years, with an investment of CAD 3.16 billion. The Two Billion Trees initiative will support Canada in achieving several environmental objectives, such as improving air and water quality, conserving biodiversity and reducing carbon pollution.

In China, various well-defined strategies and programmes are in place that, in the last decade, have led to a major increase in China's forest area and the significant enhancement of forest quality, biodiversity and ecology.

Hong Kong, China plans to continue increasing forest cover steadily in coming years. Key priorities include the management, conservation and enhancement of woodlands, public involvement in woodland conservation work, and the use of woodland resources for conservation education, nature interpretation and landscape appreciation.

The Republic of Korea aims to plant 30,000 ha of new forest per year, seeking to balance the age-class distribution of the forest estate to ensure stable wood production and supply and to replace damaged broadleaved trees, older trees and trees affected by diseases and insect pests with economically useful trees.

Malaysia launched the Greening Malaysia Programme through the 100 Million Tree-planting Campaign on 5 January 2021. The campaign was launched simultaneously at the state level

with the theme, "Greening Malaysia: Our Trees, Our Life". It is expected that about 100 million trees will be planted throughout Malaysia by the end of 2025.

The New Zealand government projects that afforestation will continue in New Zealand. Under current policy settings, it is estimated that an additional 0.74 million–1.46 million ha of land will be afforested by 2050. The One Billion Trees Programme will continue its afforestation activities, with a further 741 million trees to be planted in eight years.

Papua New Guinea plans to increase its planted-forest area from 60,000 ha to 800,000 ha by 2050. The National Strategies for Reforestation and Afforestation in Papua New Guinea provide guidance and support to achieve this target.

The One Trillion Tree Initiative is the newest and potentially most ambitious programme in the United States, mandating a major tree-planting effort across the entire economy, including urban trees and plantings on developed lands and in agricultural settings. The initiative may contribute to forest area defined by either use or cover but also to tree cover in non-forest areas.

- **Recommendation for additional action on planting programmes:** economies may wish to explore opportunities for new and additional direct governmental, environmentally sensitive and socially responsible planting programmes and new voluntary planting programmes.

Direct incentives

Several APEC economies offer incentives for afforestation, reforestation and forest restoration, including Australia, Chile, China, Malaysia, New Zealand, Peru, Chinese Taipei, and the United States.

In Peru, for example, the Direct Financing Programme for Forest Plantations is expected to contribute to the establishment of 16,000 ha of new planted forests.

- **Recommendation for additional action on direct incentives:** economies may wish to examine current rates of afforestation, reforestation and forest restoration and consider whether new direct incentives would encourage additional efforts. Economies may also wish to consider the merits of creating an enabling environment that supports investment in forests by removing structural impediments and operational constraints.

Forest-related climate-change programmes

All APEC economies are implementing initiatives to reduce GHG emissions, sequester carbon and adapt to climate change. Most economies specifically include roles for forests. Self-determined contributions, among other international commitments, can help economies identify and develop enabling conditions for stimulating forest restoration.

Canada's forest sector, for example, is anticipating and preparing for ongoing climate-change challenges. In the future, changes in the Canadian landscape will likely involve increases in

forest in some parts of the economy and decreases in others. The rate of projected climate change is expected to be 10–100 times faster than the ability of forests to adapt naturally. The impacts of climate change on Canada's forests may result in some regions with higher tree mortality, more forest fires, and increased insect pest outbreaks.

The REDD+ mechanism creates a financial value for the carbon stored in forests by offering incentives for developing economies to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. To constrain the impacts of climate change within limits that society will reasonably be able to tolerate, global average temperatures must be stabilized at an increase of no more than 2 degrees Celsius above pre-industrial levels. This will be practically impossible to achieve without reducing emissions from the forest sector, in addition to other mitigation actions.

Chile, Indonesia, Malaysia, Mexico, Papua New Guinea, Peru, the Philippines and Viet Nam have all participated in UN-REDD and have developed "REDD+ readiness" programmes to capitalize on future opportunities to improve forest management arising from REDD+. Other economies have developed other instruments and mechanisms encompassing forests and forestry.

The Korea Forest Service will support the Republic of Korea's declared aim of achieving carbon neutrality by 2050, including by enhancing the role of forests as a carbon sink and increasing the use of timber and forest biomass.

The New Zealand Climate Change Commission noted that forests have a role in meeting government commitments to reach net zero emissions of long-lived gases and reduce biogenic methane emissions by 24–47 percent by 2050.

- **Recommendation for additional action on forest-related climate-change programmes:** economies may wish to consider increasing finance for REDD+ initiatives through various channels, accelerating REDD+ readiness programmes in light of the potential advantages accruing to economies that qualify for results-based financing, and reviewing how self-determined contributions can be a key part of expanding forest cover.

Forest ownership and tenure

Programmes to reform forest tenure and transfer property or use rights to forests to communities and households are ongoing in several APEC economies, such as China, Peru, the Philippines, Thailand and Viet Nam.

Thailand, for example, aims to promote and support efficient community forest management for the benefit of communities while raising people's awareness of forest conservation and sustainable forest resource development.

- **Recommendation for additional action on forest ownership and tenure:** economies already implementing programmes for reforming forest tenure or transferring forest

property rights may wish to review these programmes to identify and address impediments to successful implementation.

Improved forest law enforcement and governance arrangements

Illegal logging and issues related to weak forest governance and law enforcement have been identified as significant factors in several APEC economies, including China, Indonesia, Malaysia, Mexico, Papua New Guinea, Peru, the Philippines, Russia, Thailand and Viet Nam. Most of these economies have implemented significant measures to improve the situation, but major challenges remain.

Malaysia has committed to strengthen the implementation of sustainable forest management and improve monitoring and enforcement activities in combatting illegal logging. New Zealand will strengthen the integrity of its forestry supply chains and support a continuous, predictable, long-term supply of timber. Thailand aims to promote forest certification in accordance with domestic and international certification standards

- **Recommendation for additional action on forest law enforcement and governance arrangements:** economies may wish to implement new and additional measures to improve forest governance and curb illegal logging. Major importing economies may wish to consider enacting regulations or other instruments and tools to discourage imports of illegally sourced timber.

Improving data collection, monitoring and forest inventories

The Canadian Forest Service is conducting world-class research in key areas of forest management, including climate change, wildland fire, pathology, phytosanitary standards, entomology, forest monitoring and remote sensing. Researchers and foresters are using innovative genomics and selective breeding to replant harvested sites with trees more capable of adapting to future climatic conditions, thereby enabling forests to thrive in a changing environment.

Canada will also launch the WildFireSat in 2025, the world's first satellite designed specifically to monitor and fight wildfires. WildFireSat will significantly enhance situational awareness and understanding of wildfire behaviour and how this is changing as the climate changes.

The Korea Forest Service is introducing digital forest services combined with forest data and cutting-edge technologies, including support for a new bioindustry based on forests and for tourism.

A forest inventory will be carried out in Malaysia, and existing forest management plans will be reviewed and improved.

- **Recommendation for improving data collection, monitoring and forest inventories:** economies may wish to continue to improve data collection, monitoring and forest inventories, including through the use of advanced and emerging technologies.

Risks to increasing forest cover and improving forest management

The major risks to the maintenance and further increase of forest cover in APEC economies are associated with climate change, natural disturbances and the impacts of the COVID-19 pandemic. They include immediate risks from wildfire and storms and mid- to long-term risks arising from climate change. Another immediate risk is that restrictions on the access of rural communities to goods and services produced in urban centres due to the pandemic might lead to increased forest degradation and removal as rural people strive to sustain their daily lives.

Climate-related risks

Climate-induced forest degradation and loss is likely to be the greatest risk factor to the ongoing increase in forest cover and improvement of forest management. Prolonged and more frequent droughts and storms and changes in temperature and precipitation could all lead to significant forest losses.

Forests in most APEC economies are susceptible to damage from severe storms. For example, Typhoon Morakot, which struck Chinese Taipei in August 2009, brought up to 2,500 mm of rain and resulted in landslides affecting almost 26,000 ha, including forested areas. Super-typhoon Haiyan, which hit the Philippines in 2013, and severe tropical cyclone Yasi, which struck northern Australia in 2011, also caused widespread damage to forests.

The World Risk Index 2020 estimates that several APEC economies have among the highest risk levels of all economies worldwide for exposure to extreme natural events, with Brunei Darussalam, Papua New Guinea and the Philippines ranked seventh, eighth and ninth, respectively, in the index (Behlert *et al*., 2020).

With global climate change apparently occurring more rapidly than in the past, forests in the APEC region could be altered in new and significant ways. For example, some economies have experienced increases in the frequency and severity of wildfires and outbreaks of forest pests and diseases. Australia reported that, in recent decades, climate change has exacerbated the impacts of drought, fire and pests and weeds on forest ecosystems.

Forest fire

Forest fire is a major source of forest loss in many APEC economies (Table 3). Fire is an integral part of many natural forest ecosystems in Australia and the United States; human-initiated fires contribute significantly to the area burnt each year, in addition to ignitions caused by lightning. Both economies have suffered devastating and widely reported forest fires in recent years.

During the 2019–20 fire season in southern and eastern Australia, referred to as the Black Summer bushfires, extensive and extended wildfire affected 8.3 million ha of forest. A total of 130,000 ha of commercial plantations and 1.9 million ha of multiple-use public native forest

was burnt during the 2019–20 fire season.[10]

In Canada, wildfire is the predominant cause of temporary forest-cover loss. In the period 2007–2013, wildfires burnt an average of 2.1 million ha of forest per year in Canada. More than 80 percent of the forest area burnt in Canada is due to fire caused by lightning strikes.

Forest fires are a significant cause of forest loss in China, despite significant efforts to build fire-prevention and firefighting capacity. The annual incidence of forest fire in China declined by 58 percent between 2007 and 2013, from 9,260 to 3,929 fire ignitions, and the annual area of forest damage declined from 29,286 ha in 2007 to 13,724 ha in 2013.

In years of extreme seasonal drought – at least once every ten years – fires cause catastrophic damage to forests in Russia. A relatively high proportion of forest fires (77 percent) in Russia are attributable to human carelessness, with lightning strikes accounting for an additional 19 percent. Catastrophic fires cause major socioeconomic and ecological damage to forest resources in affected areas.

In the United States, wildland fire area (predominantly in forests) has increased in recent decades, as has fire severity. Fire was once much more common in United States forests, particularly in the western part of the economy, albeit at lower intensities and with less resultant damage. Widespread fire suppression in the last century greatly reduced the incidence and spread of forest fire; this led to increased fuel loadings and other alterations in forest ecosystems and affected the health and resilience of forests. Increased fuel loadings, in combination with changing precipitation and temperature patterns associated with climate change, are considered to be the major drivers of rising fire incidence and severity. The government engaged with various stakeholders to develop the National Wildland Fire Management Strategy, the principal objectives of which are to restore ecosystems on a landscape scale, focusing on fire adaptations in ecosystems and human communities to better manage the economy's expanding wildland–urban interface. Key elements of the strategy are reducing hazardous fuels and biomass and continued investment in fire suppression.

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[10] Widespread low-intensity dry-season fires in northern Australia largely account for the vastly larger areas of burnt forest shown in Table 3.

Table 3. Area of forest affected by fire in selected APEC economies, 2000–2017 (1,000 ha)

Economy	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australia	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	11,279.8	8,272.9	7,309.5	10,275.8	3,221.2	26,076.0	26,682.5	15,179.9	20,946.3	14,774.4	n.d.	n.d.
Brunei Darussalam	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Canada	665.3	626.4	2,770.4	1,743.4	3,183.8	1,671.5	2,250.8	1,542.2	1,712.1	775.0	3,052.5	2,428.8	2,003.3	4,210.1	4,563.3	3,861.7	1,416.1	3,371.8
Chile	4.2	2.3	53.5	10.8	16.9	16.4	4.0	27.5	17.2	32.6	25.3	18.7	41.9	4.6	53.0	75.0	11.9	371.8
China	90.1	46.2	47.6	451.0	142.2	73.7	408.3	29.3	52.5	46.2	45.8	27.0	14.0	13.7	19.1	12.9	6.2	24.5
Indonesia	3.0	14.3	35.5	3.5	3.3	5.5	4.2	7.0	6.8	3.9	3.5	2.6	8.3	4.8	44.5	n.d.	n.d.	n.d.
Japan	1.5	1.8	2.6	0.7	1.6	1.1	0.8	0.7	0.8	1.1	0.8	2.1	0.4	1.0	1.1	0.5	0.4	n.d.
Republic of Korea	26.0	1.0	4.5	0.1	1.6	2.1	0.3	0.2	0.2	1.4	0.3	1.1	0.1	0.6	0.1	0.4	0.4	1.5
Malaysia	0.0	0.3	1.4	1.3	1.3	2.2	1.3	1.4	0.1	1.5	2.5	0.0	0.5	1.4	5.2	0.9	20.9	0.2
Mexico	40.5	18.8	32.0	88.3	10.5	32.7	42.1	15.2	26.6	42.8	12.3	71.3	281.6	350.3	108.1	59.1	205.4	604.8
New Zealand	0.3	0.2	0.3	0.2	0.3	0.4	0.5	1.0	0.7	1.0	0.7	0.6	0.5	0.4	0.6	1.5	0.9	0.5
Papua New Guinea	2.0	2.0	0.0	n.d.	n.d.	2.0	n.d.	1.9	n.d.	n.d.	1.9	3.9	2.0	n.d.	2.0	3.9	n.d.	n.d.
Peru	n.d.	n.d.	n.d.	1.7	0.0	71.4	1.9	2.6	11.6	0.8	2.9	1.4	16.8	18.7	20.6	22.4	24.3	26.2
The Philippines	4.9	0.8	2.5	1.0	1.4	2.7	3.0	0.9	0.1	1.2	1.6	0.4	5.8	0.7	1.2	3.0	1.8	4.4
Russia	1,328.6	896.8	1,369.5	2,122.8	543.3	845.3	1,493.5	1,036.1	2,069.8	2,111.6	2,027.8	1,408.4	2,101.2	1,157.1	3,190.7	2,748.9	2,508.3	3,282.1
Singapore	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Thailand	26.6	27.0	40.5	15.8	32.3	30.3	8.6	18.8	11.3	9.8	13.3	4.1	13.1	11.9	10.5	16.6	30.2	18.1
United States	2,992.2	1,445.2	2,907.7	1,603.0	3,277.2	3,516.6	3,995.9	3,775.1	2,141.9	2,396.6	1,385.2	3,525.5	3,774.3	1,748.1	1,455.1	4,097.7	2,229.9	4,057.6
Viet Nam	1.8	n.d.	6.6	1.8	5.6	5.1	1.5	2.3	0.8	1.0	4.6	1.2	1.4	0.5	n.d.	n.d.	n.d.	n.d.

Note: n.d. = no data.

Source: FAO (2020a).

Dry-season fires are a significant factor in deforestation and forest degradation in Thailand, where a major cause is clearing forest for agriculture, including shifting cultivation. Hill fires are among the major challenges faced by Hong Kong, China in its woodland conservation efforts.

Pests and diseases

Outbreaks of forest pests and diseases can be a major cause of forest disturbance, although only the most severe outbreaks result in substantial forest-cover loss.

In Canada, insect outbreaks affect a larger area of forest than any other form of disturbance. Insect damage affected 16.9 million ha of forest in 2018 (in comparison, fires burnt almost 1.8 million ha of forest in 2019). Insect disturbances are part of the natural cycle of forest regeneration in Canada, but climate change is leading to more frequent and severe outbreaks. Scientists predict that climate change could alter the location, regularity and intensity of outbreaks of native and invasive alien insect species. Insect infestations and forest fire do not constitute deforestation in Canada because the affected areas will be replanted (as required by law) or will regenerate naturally.

In the United States, forest pests and diseases have caused billions of dollars' worth of damage to ecosystems in the past decade. There have been major outbreaks of native beetles in the western states in recent years, with substantial spikes in tree mortality affecting an area exceeding that affected by fire. Underlying causes include climate change and management legacy. Added to this is tree mortality caused by invasive insects such as the emerald ash borer (*Agrilus planipennis*), resulting in a total area of tree mortality approaching 5 million ha in some years.

Most other APEC economies are also affected by forest pests to a greater or lesser extent.

Policy shortfalls

This report has shown that achieving an increase in forest cover is feasible but also that several APEC economies still face substantial challenges in addressing deforestation and forest degradation; moreover, despite increases in average growing stock per hectare, many forests are of relatively low quality. All economies can expect forests to be affected increasingly by climate change and natural disasters, suggesting the need to review and update policies and practices that enable evidence-based, active and adaptive forest management that increase the resilience of forests and forest-dependent communities.

A specific case of policy failure that might compromise forest restoration and SFM would be a breakdown in efforts to curb illegal forest clearing and logging in a major forest economy. Another possibility in some economies is a failure to provide an enabling environment that encourages non-governmental and private-sector actors to participate in efforts to increase forest cover and improve forest management.

A notable feature of the achievement of the APEC Forest Cover Goal was the relatively high proportion of increased forest area attributable to policies that promote the establishment of plantations. Several economies face significant challenges in further expanding forest cover through plantations, however, due to competition for land for urbanization, agriculture and industrialization.

Moreover, the frequency and intensity of serious natural disasters in some economies is causing substantial forest damage and loss. The COVID-19 pandemic has highlighted the interconnectedness of forest trade and the risk that a major global recession could curb afforestation and SFM efforts in several APEC economies.

Policies that do not account for changing societal and biophysical dynamics are likely to lead to unintended negative outcomes for forests.

Conclusion

Judging by the range of economy-level, regional and global efforts focused on forests, it is reasonable to conclude that the multiple values and benefits of forests are increasingly recognized. The role of forests in providing ecosystem services that support human societies, and the importance of forest biodiversity, have gained significant attention, including the role of forests in climate-change mitigation and adaptation.

The increase in forest cover in the APEC region between 2007 and 2020 was achieved largely through an increase in planted-forest area; meanwhile, significant areas of primary forests and other naturally regenerated forests have been lost or degraded. Clearly, planted forests are not perfect substitutes for natural forests, and different types of forests may have markedly different ecological, cultural and economic values.

There are significant challenges in maintaining and increasing forest cover and improving forest quality, including the impacts of climate change, the increasing effects of wildfire, drought, storms, pests and diseases, and the failure to mitigate other drivers of negative change.

The loss of primary forests and other naturally regenerated forests and the distribution of losses across the APEC region should remain an issue of substantial concern to APEC leaders, forest stakeholders and broader societies.

The following four of the six Global Forest Goals (UNFF, undated[a]) provide a useful reference point for addressing deforestation and forest degradation. They are:

(1) Reverse the loss of forest cover worldwide through SFM, including protection, restoration, afforestation and reforestation, and increase efforts to prevent forest degradation and contribute to the global effort of addressing climate change.

(2) Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest-dependent people.

(3) Increase significantly the area of protected forests worldwide and other areas of sustainably managed forests, as well as the proportion of forest products from sustainably managed forests.

(4) Mobilize significantly increased new and additional financial resources from all sources for the implementation of SFM and strengthen scientific and technical cooperation and partnerships.

Successfully addressing deforestation and forest degradation and restoring forests requires harnessing the knowledge, capacity and initiative of all sectors of society.

This synthesis report of the APEC Forest Cover Goal provides an indication of the range of actions that governments, the private sector and local communities are taking to achieve SFM and restore and conserve forests. It is crucial to continue these efforts and to further develop policy, technical and financial mechanisms.

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