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# ASIA-PACIFIC FORESTS AND FORESTRY TO 2020

Asia-Pacific Forestry Sector Outlook Study II



ASIA-PACIFIC FORESTRY COMMISSION

ASIA-PACIFIC FORESTS AND FORESTRY TO 2020

REPORT OF  
THE SECOND ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY

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## FOREWORD

Twelve years after the publication of the first Asia-Pacific Forestry Sector Outlook Study in 1998, FAO welcomes this opportunity to once again contribute, at the behest of the Asia-Pacific Forestry Commission, to the regional forestry dialogue. Countries and their forestry sectors are becoming ever more closely linked as economic liberalization and regional integration accelerate. Since the first outlook study, it has become increasingly clear that a regional perspective is essential in negotiating a better position for forestry and the values with which it is associated. With the advancement of globalization some of the most important effects on forests and forestry in many countries in the region are the result of international and regional developments.

Heightened awareness of the values of forests and their greater inclusion in international climate change agreements has increased the importance of linking spatial levels and broadening understanding of issues and opportunities likely to affect forestry in the coming years. Identification of key trends in forestry – both physical and political – and construction of scenarios for the future adds a valuable dimension to regional forestry discussions. Building responsiveness into institutional mechanisms and adapting to change constitutes one of the most important steps in creating a robust sector in a fast-evolving world.

Great changes have occurred and major advances have been made in Asia-Pacific forestry since the first outlook study was published. Significant challenges remain in many parts of the region and it is increasingly evident that countries cannot develop forestry policies in isolation – rights and responsibilities are increasingly spilling across borders and across sectors as populations increase, demands on resources heighten and economies integrate. The collegial nature of the process through which this outlook study was developed gives credence to the success of collaborative regional action and sharing in a common future. By openly contributing information, the countries and organizations involved in the outlook study have demonstrated their commitment to the future of forests and forestry and their desire to improve upon the benefits from forests that the current generation has received.

Many organizations and individuals have put huge effort into this study and have gone to considerable lengths to share the fruits of their experiences. In bringing together this regional report, nearly 50 country reports, thematic studies and subregional papers have been prepared. The first Asia-Pacific Forestry Sector Outlook Study provided a benchmark in regional and global forestry and was followed by a series of regional outlook studies around the world. We hope that this study will be as well received as the first and that this contribution to the region's forestry sector is both timely and appropriate and will challenge countries to build forests that future generations will value.



**Hiroyuki Konuma**

Assistant Director-General and Regional Representative for Asia and the Pacific  
Food and Agriculture Organization of the United Nations



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## ACRONYMS AND ABBREVIATIONS

AKF	Aga Khan Foundation
ANZCERTA	Australia and New Zealand Closer Economic Relations Trade Agreement
APFC	Asia-Pacific Forestry Commission
APFISN	Asia-Pacific Forest Invasive Species Network
APFSOS	Asia-Pacific Forestry Sector Outlook Study
ASEAN	Association of Southeast Asian Nations
ATL	Advanced Tariff Liberalization (of the WTO)
CBD	Convention on Biological Diversity
CBFM	Community Based Forest Management
CCTF	Conversion of Cropland to Forest and Grass Programme
CDM	Clean Development Mechanism
CIFOR	Center for International Forestry Research
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COP	Conference of the Parties
CPRS	Carbon Pollution Reductions Scheme
CSPABT	Combating Sandification around Beijing and Tianjin Programme
DPRK	Democratic People's Republic of Korea
EIA	Environmental Investigation Agency
ETS	Emission Trading Scheme
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
FECOFUN	Federation of Community Forestry Users, Nepal
FGHYFP	Programme for Fast-Growing and High-Yielding Forest in Key Areas
FLEG	Forest Law Enforcement and Governance
FLEGT	Forest Law Enforcement, Governance and Trade
FRA	Global Forest Resources Assessment
FRLHT	Foundation for Revitalization of Local Health Traditions
FSC	Forest Stewardship Council
FUGs	Forest User Groups
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GLASOD	Global Assessment of Soil Degradation
ICT	Information and Communication Technology
IIFM	Indian Institute of Forest Management
ILO	International Labour Organization
ITTO	International Tropical Timber Organization
JFM	Joint Forest Management
KFP	Key Forestry Programme
LEI	Lembaga Ekolabel Indonesia
MDF	Medium Density Fibreboard
MESCOT	Model Ecologically Sustainable Community Tourism
MRC	Mekong River Commission
MTCC	Malaysian Timber Certification Council
NFPP	National Forest Protection Programme
NGO	Non-governmental Organization
NTM	Non-tariff Measure
NWFP	Non-wood Forest Product
OECD	Organisation for Economic Co-operation and Development

PEFC	Programme for Endorsement of Forest Certification
PES	Payments for Ecosystem Services
PNG	Papua New Guinea
PPP	Purchasing Power Parity
PV	Photovoltaic
REDD	Reducing Emissions from Deforestation and Degradation
RIL	Reduced Impact Logging
ROK	Republic of Korea
SAARC	South Asian Association for Regional Cooperation
SFAKR	Shelter Forest along the Yangtze and other Key Rivers
SFM	Sustainable Forest Management
SFP	Shelter Forest Programme
SKFP	Six Key Forestry Programmes
SPARTECA	South Pacific Regional Trade and Economic Cooperation Agreement
TFF	Tropical Forest Foundation
TIMO	Timber Investment Management Organization
TNSF	Three North Shelter Forests
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Commission on Environment and Development
UNEP	United Nations Environment Programme
UNFCCC	UN Framework Convention on Climate Change
USDA	United States Department of Agriculture
WPNRP	Wildlife Protection and Nature Reserves Programme
WTO	World Trade Organization

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# EXECUTIVE SUMMARY

## THE SECOND ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY

Since the completion of the first outlook study in 1998, the Asia-Pacific forestry sector has undergone major changes in response to larger societal transformation within and outside the region. A better understanding of what is likely to happen in the context of such changes is essential in choosing options and developing plans and policies to create a robust forestry sector. It is in this context that the 21<sup>st</sup> Session of the Asia-Pacific Forestry Commission (APFC) recommended conducting this second outlook study to assess the likely changes to the year 2020, focusing on policy options and implications.

## STATE OF FORESTS AND FORESTRY: A MIX OF POSITIVE AND NEGATIVE

### **Asia and the Pacific: the least forested region in the world**

With only 0.2 hectares of forest per person, the Asia-Pacific region is, per capita, the least forested region in the world. Uneven forest distribution means there are a number of countries and subregions where per capita forest area is far lower than the regional average. For example, South Asia, with 23 percent of the world's population, has only 2 percent of the world's forests; these amount to only 0.05 hectares per person and signify the enormous pressure these forests must bear.

### **Deforestation continues in many countries**

Deforestation is a major issue faced by many countries in the region. At the aggregate level, there has been a positive trend, from an annual regional loss of over 0.7 million hectares of forests during 1990 to 2000 to an annual increase of 2.3 million hectares during 2000 to 2005. Recently – between 2005 and 2010 – the rate of increase in forest area has declined to just under 0.5 million hectares per year. The increase over the last decade is primarily due to large-scale afforestation in the People's Republic of China. In addition to China, forest area has increased in Bhutan, Fiji, India, the Philippines, Sri Lanka, Thailand and Viet Nam. If gains in these countries are excluded, deforestation elsewhere remains high. Major areas of forest loss are evident in Southeast Asia – particularly in Indonesia and Myanmar – and large reductions have also been reported in Australia.

### **Forest degradation – the hidden problem**

Forest degradation and declining health and vitality remain major problems confronting Asia-Pacific forests. The definition of forests as areas with at least 10 percent canopy cover fails to capture the extent and severity of degradation. Growing stock per hectare continues to decline in several countries. Fire – most of which is human-induced – and uncontrolled logging remain major factors contributing to degradation in most countries.



### **Trees outside forests – the silver lining**

An important positive trend is the expansion of trees growing outside forests under a wide array of farming systems. Home gardens and tree planting under agroforestry have become important sources for industrial roundwood and woodfuel supplies. In several countries, forest industries have entered into contractual arrangements with farmers to supply pulpwood. A substantial quantity of wood is also produced in cash crop plantations, notably rubberwood and coconutwood.

### **Implementation of sustainable forest management remains challenging**

Despite a wide range of supporting initiatives and much discussion, implementation of sustainable forest management continues to be a challenge. Undefined or overlapping property rights, weak governance and high demand for wood and wood products have led to high levels of unsustainable logging. Agricultural, industrial and urban encroachment remain problems in many areas and excessive pressures on forest resources are causing extensive degradation. There are very few instances of balanced approaches where various forest management objectives are integrated and clear trade-offs established between divergent goals. At the same time, more wood is produced from plantations and trees outside forests and dependence on natural forests as a source of wood supply is on the decline.

Catastrophic environmental problems – especially floods and landslides – have often led to radical responses, logging bans in particular. Although generally reducing deforestation rates in the country of origin, logging bans have often had perverse effects, including the ‘exporting’ of deforestation to other countries. Without sound accompanying measures to satiate wood demand and effective enforcement measures, logging bans have generally been ineffective in stemming deforestation and degradation.

### **Potential of planted forests remains unrealized**

The Asia-Pacific region accounts for about 45 percent of the world’s planted forests. With the exception of a few countries, plantation productivity remains far below its potential. Public sector forest plantations are particularly prone to low productivity, largely on account of inadequate management. The potential wood production from planted forests in 2005 was estimated at 542 million m<sup>3</sup> but total industrial roundwood production (including production from natural forests) in 2005 was only about 273 million m<sup>3</sup>.

### **Many challenges plague management of protected areas**

The provision of ecosystem services is gaining importance and increasingly large tracts of natural forests are being withdrawn from production and set aside as protected areas. Since 2002 the extent of protected areas has remained stable, as potential limits to their expansion are neared. Management of protected areas remains problematic on account of encroachment and poaching of animals and plants; human-wildlife conflicts remain a major problem in many countries. Mining and infrastructure development pose significant threats to protected areas across much of the region. Nonetheless, protected areas remain the mainstay of biodiversity conservation and continued support is essential.

### **Forest policies revised, but implementation lagging**

Most countries in the Asia-Pacific region have revised their forest policies to incorporate sustainable forest management. The provision of ecosystem services has become a primary goal in most policies, with a lessening of the dominant focus applied to wood production. There has also been

increased emphasis on the involvement of stakeholders in policy formulation and implementation. However, the wide gap between what is visualized in policies and what is actually practiced persists. With a host of forest-related initiatives – poverty reduction, biodiversity conservation and climate change mitigation in particular – traditional sectoral boundaries have become less relevant and forestry institutional arrangements have become increasingly fragmented.

### **Forest ownership remains contested**

While there is a preponderance of private ownership in the developed economies, in others (with the exception of the Pacific Island Countries) public ownership dominates. Forest ownership has been a contentious issue in several countries, especially in the context of appropriation of forests by governments from traditional owners. Efforts are underway in several countries to restore the traditional rights of indigenous and other forest-dependent communities and to allocate forest land to families and individuals. The region has also been a pioneer in a number of initiatives to enhance the involvement of local communities, for example through Forest User Groups in Nepal and Joint Forest Management arrangements in India. These efforts, however, face a number of challenges, including economic viability, equitable distribution of benefits and sustainability.

### **Changing patterns of production and consumption of wood and wood products**

#### ***Industrial roundwood production has remained stable***

Officially reported industrial roundwood production has remained relatively stable since 1980, increasing from about 248 million m<sup>3</sup> to 274 million m<sup>3</sup> in 2007. In several countries there has been a significant decline in wood production either because of exhaustion of forest resources or due to increasing concern about environmental protection. One of the steepest declines in production has been in Japan where cheaper imports have made domestic production uneconomical. Oceania is the only subregion that has registered a significant increase in industrial roundwood production, largely accounted for by Australia and New Zealand.

#### ***Unclear trends in sawnwood production***

Production and consumption of sawnwood in the Asia-Pacific region have fluctuated erratically since 1980 and the available statistics indicate a production decline from about 95 million m<sup>3</sup> in 1980 to 91 million m<sup>3</sup> in 2008. As in the case of industrial roundwood, sawnwood production statistics fail to capture a significant part of the real situation in view of the preponderance of small- and medium-sized sawmills, many of which operate in the informal sector.

#### ***Spurred by production growth in China, Asia and the Pacific has become the top producer of wood-based panels***

In contrast to declining sawnwood production, wood-based panel production has increased significantly, from about 19 million m<sup>3</sup> in 1980 to over 114 million m<sup>3</sup> in 2008 with China accounting for most of this increase. China's share in the region's production increased from 12 percent in 1980 to about 70 percent in 2008, making it the top global producer of wood-based panels. This has also enabled China to become a major exporter of wood-based panels.

#### ***Rapid growth in paper and paper board production***

Production of paper and paper board has increased rapidly during the last two decades, increasing from about 31 million tonnes in 1980 to 147 million tonnes in 2008. Investments in new capacity have continued until recently, suggesting continued growth in production. Although consumption

is likely to increase with increases in population, incomes and levels of education, much depends on the future state of the economy and trends toward increased use of electronic media; while increased use of recycled fibre could affect volumes of wood used in paper manufacture.

### ***Domination of the world's furniture market***

During the last two decades, the Asia-Pacific region, led by China and Viet Nam, has emerged as a major producer and exporter of wooden furniture. The surge in production is evident from the rapid increase in the value of furniture exported from the region, which increased from US\$1.56 billion in 1990 to about US\$17.7 billion in 2007 with the region's share in global exports increasing from 9 percent to 33 percent in the same period. Much of this is accounted for by China, whose exports increased from US\$111 million in 1990 to US\$10.7 billion in 2007, making it the world's largest exporter.

### ***Exports shift to higher value-added products***

One of the major changes in the forest products sector in the region is a shift from being a regionally focused exporter of industrial roundwood and other less-processed items to being an internationally focused exporter of more value-added items, especially wood-based panels, paper and paper board and furniture. China is also the main driver of this trend, clearly indicating that even in the absence of a domestic wood surplus a competitive industry can develop if other competitiveness conditions are satisfied.

### ***Sources of industrial roundwood imports are changing***

During the last decade there has been an important shift in the sources of industrial roundwood supplying the major importing countries; China, Japan and India. The Russian Federation, Australia, New Zealand and South Africa have become prominent as supplies from tropical countries have fallen and capability to mobilize wood on a large scale in countries like Russia has grown.

### ***Wood: from an inferior fuel to a modern environmentally friendly fuel***

More than three-quarters of all wood production in the Asia-Pacific region is used as fuel, and wood continues to be the main source of energy in many developing countries. Available data suggest that production has remained relatively stable during the last 15 years, at slightly less than 800 million m<sup>3</sup>. Increases in income and improved availability of more convenient fuels have led to a reduction in the proportion of people using wood as a primary source of energy. However, there are signs of change in this trend as the virtues of woodfuel are being rediscovered in the context of climate change and energy policies while improved technologies are enhancing efficiency and convenience of use.

### ***Many non-wood forest products will no longer be forest-derived***

Non-wood forest products (NWFPs) continue to play an important role in the economic and social well-being of many people in the Asia-Pacific region. Many NWFPs cater to subsistence needs of forest-dependent communities and contribute significantly to poverty alleviation. Management of forests for the production of NWFPs continues to pose major challenges. Increased demand has led to overexploitation, especially in the context of ill-defined tenure and weak institutional arrangements, while potential income opportunities have led to domestication of a number of products. There have also been significant improvements in processing technologies, resulting in a wide array of new products.

## **Increased interest in forest-derived ecosystem services not yet matched by willingness to pay**

Conservation of biological diversity, maintenance and improvement of watershed values, combating desertification and land degradation, and climate change mitigation and adaptation are key ecosystem services provided by forests. With climate change becoming a critical global issue, the role of forests in climate change mitigation and adaptation has become one of the most discussed topics in recent times. Continued deforestation and degradation for timber and land has resulted in significant environmental degradation. However, slow declines in ecosystem services often go unnoticed, delaying appropriate responses. Meanwhile systems of payments for ecosystem services (PES) remain in their infancy.

### **REDD to the rescue?**

With climate change becoming one of the most critical environmental issues, forests and forestry are gaining increasing attention in mitigation strategies, especially as deforestation and forest degradation accounted for about 17 percent of global carbon emissions in 2004. Forestry's role in climate change mitigation largely depends on progress in arresting deforestation and degradation to reduce carbon emissions and stepping up of afforestation and reforestation to enhance carbon stocks.

The proposed programme for Reducing Emissions from Deforestation and Degradation (REDD) envisages payment of compensation to forest owners in developing countries for conserving forests. However, there are considerable uncertainties as to how REDD will evolve and to what extent it will become an important component of climate change mitigation strategies.

## **LARGER SOCIETAL CHANGES WILL HAVE PROFOUND IMPACTS ON FORESTS**

A host of factors outside the forestry sector – demography, economy, political and institutional conditions and technological progress – collectively affect forests and forestry. Growing concern about the provision of ecosystem services, especially in the context of climate change mitigation and adaptation, has added a new dimension. At the same time, changes in society's behaviours alter patterns of goods and services demanded and how these are produced and consumed. These societal changes also affect policies and programmes in other sectors, impacting forests and forestry through backward and forward linkages.

### **Demography will have a critical impact on forests and forestry**

By 2020 the population in Asia and the Pacific will be 4.2 billion (an increase of 600 million from 2005), accounting for about 60 percent of the world's population. While population growth is slowing and some developed countries will see population reductions, many developing countries are on high population growth paths and much of the growth is in countries where population densities are already very high. South Asia remains the most densely populated subregion, almost three-times higher than the regional average.

## **Multiple impacts of economic changes**

### ***High economic growth rates will continue, increasing demand for food, fibre and fuel***

Rapid growth in countries such as China and India is bringing about fundamental changes in production, consumption and trade of all forest products and services. The GDP of the region is expected to increase from about US\$10.7 trillion in 2006 to US\$22 trillion by 2020. Continued growth implies a surge in demand for all products, including wood and wood products.

### ***Poverty to decline, but the number of poor will remain high***

Rapid economic growth in the past has led to significant reductions in poverty, but in many countries, especially in South Asia, high levels of poverty are likely to persist despite high economic growth rates. In many countries, rapid growth has exacerbated disparities, especially between rural and urban areas. The trickling down of benefits has been extremely slow, ensuring that dependence on natural resources will persist. However, international migration and associated flow of remittances are having an impact on land use in the region. Remittances have been a major source of income to many families, reducing the pressure and dependency on natural resources.

### ***Structural changes in economies and a growing middle class***

Rapid growth of the manufacturing and services sectors has reduced the share of agriculture in national incomes and employment. Between 1990 and 2007, agriculture's share in Asia-Pacific's GDP declined from about 25 percent to 12 percent; however, agriculture remains the most important sector for rural employment. The Asia-Pacific region will witness a major surge in numbers of middle-income households with attendant changes in values, perceptions and demands for goods and services. In particular, pressures to focus resources on environmental conservation are likely to increase.

### ***Globalization will alter the opportunities and challenges for forests***

The rapid growth in Asia-Pacific economies has been primarily due to globalization, involving increased flows of investments, trade, technology and management practices across national borders. The forest sector will continue to be influenced by globalization as it changes the nature of forest product value chains and the nature of trade and cooperation relationships, while investments shift among countries in response to shifting competitiveness.

## **Continuing political and institutional changes**

### ***Shifts in the political and institutional environment***

Asia-Pacific countries are witnessing major shifts in the overall policy and institutional environment, reflecting larger political and social changes. Notable trends include greater demands for social justice and participation in governance and in public policy decision-making, increased plurality and wider involvement of civil society and private sector organizations. Devolution of resource management responsibilities to local levels and to families and individuals in particular has become another growing trend.

### ***Forest governance under increased public scrutiny***

Poor governance and inability to resolve resource-use conflicts are major problems in some countries. Forest governance continues to be a major challenge where overall political and institutional frameworks remain undeveloped. New international initiatives in the European Union and the United States aimed at supporting sustainable forest management by preventing entry of illegal forest products into markets are likely to redefine aspects of international trade.

### **Growing environmental concern a major driver of change**

Increasing awareness about the environmental roles of forests has brought forestry and other related land uses under greater scrutiny. Already a number of local, national and global environmental issues have changed the course of forestry in unprecedented ways. With climate change becoming a critical environmental issue, forests and forestry are at centre stage of global political discussions with considerable potential for reshaping the future of the sector.

### **Emerging technological changes**

Notwithstanding the various uncertainties, developments in science and technology could significantly impact the forest sector. These include technologies for improved management, productivity-enhancing technologies (for example tree improvement) and the development of new products and processes. Remote sensing technologies are revolutionizing abilities to monitor resources, helping to track changes on a real time basis. Ongoing efforts to develop commercially viable cellulosic biofuel and 'biorefinery' technologies could have major impacts on the use of wood by 2020.

## **SCENARIOS AND THEIR IMPLICATIONS**

### ***Three probable scenarios based on future economic growth and social and ecological sustainability***

During the next one to two decades, the major uncertainties relating to overall social and economic development of the Asia-Pacific region will be determined by: (a) economic growth; and (b) social and ecological sustainability. Most Asia-Pacific countries will likely move along one of three broad paths of development:

**The high economic growth 'boom' scenario** is one under which countries pursue rapid economic growth rates, overlooking critical social and ecological problems. 'Growth first and trickle down later' remains the guiding philosophy.

Most middle-income and emerging economies are likely to pursue the high growth scenario. Political and institutional conditions will encourage this path, except in the context of catastrophic problems (including a prolonged global recession or climate change-related events). Resource-rich low income countries are also likely to grow rapidly, taking advantage of demand for raw materials from emerging economies.

**The low growth and stagnation 'bust' scenario** presents a future restrained by weak economic performance with low priority given to social and ecological sustainability in many countries.

The low growth scenario envisages slow and weak recovery from the current economic crisis, with a protracted recession extending well into the current decade. Demand for forest products would be dampened, and investments in most aspects of forestry would be sluggish. Forest management would stagnate and forest degradation would likely accelerate, especially in developing countries where livelihood pressures would drive people to greater exploitation of forests. Even in the event of global economic recovery, some low-income resource-poor countries (and regions within countries) may remain vulnerable to a low growth scenario, as may some developed countries where economic fundamentals constrain growth.

**The ‘green economy’ scenario** envisages changes leading to balance between growth with social and ecological sustainability. This is increasingly becoming the vision for a number of countries, especially in the context of the economic and climate change crises.

Most of the middle-income and emerging economies will apply some effort towards developing green energy, in the context of increasing costs of fossil fuels and concerns over energy security. Developed countries – with relatively well-developed policies and institutional frameworks, and greater ability to invest in science and technology – have greater potential to shift towards a ‘green economy’ scenario. Several emerging economies will also have good prospects to leap-frog into ‘green economy’ positions, especially if inspired by visionary leadership and empowering policies. Sustainability is, however, unlikely to receive great attention, especially in resource-rich low-income countries with weaker policies and institutions and enormous imperatives to maintain economic growth and development.

## FORESTS AND FORESTRY IN 2020

### **Forest area to stabilize regionally, but losses in Southeast Asia, South Asia and Oceania to persist**

At the aggregate level, forest area in the Asia-Pacific region will increase or stabilize largely on account of the significant increase in afforestation and reforestation in China, India and Viet Nam. Rapid economic growth and increases in income will help to bring about forest transition in a number of countries. However, the loss of natural forests through clearance to meet growing demand for food and fuel will continue, especially across Southeast Asia, South Asia and some of the Melanesian countries.

### **Forest degradation will persist in most of the densely populated low-income countries**

Forest degradation is expected to remain a major problem in more densely populated low-income countries, especially in South Asia where dependence on land and forests is high. Considering the high rates of population growth in many countries, a scenario of low economic growth could aggravate degradation. Uncontrolled logging in resource-rich countries to supply export markets will also continue to damage forest health and vitality.

### **Policy and institutional constraints will continue to hinder sustainable management of natural forests**

While adequate technical knowledge exists on approaches to sustainable forest management – including, for example, reduced impact logging – implementation of such measures will be constrained in many countries by weak policies and institutional arrangements. Throughout the region most easily accessible natural forests have already been logged. In the future, managing natural forests for wood production may be increasingly seen as too complicated, too controversial and too costly – resulting in many areas being withdrawn from production and often any formal management.

### **Planted forests and trees outside forests are increasingly important sources of wood**

Forest plantations in countries such as Australia, China, India, Indonesia, Malaysia, Thailand, New Zealand and Viet Nam increasingly dominate wood supplies along with farm level plantings in China and India. Even slight increases in productivity of the current area of planted forests could significantly increase wood supplies. However, in many countries this will depend on improving enabling incentives for planted forest management and the creation of favourable policy and institutional environments.

### **Demand for industrial roundwood to increase**

Considering population and income growth in the region, demand for wood products, especially panel products and paper and paper board, will increase significantly from the current relatively low levels. Demand for industrial roundwood will increase from 317 million m<sup>3</sup> in 2005 to 550 million m<sup>3</sup> in 2020. Under the low growth scenario, the consumption of industrial roundwood will increase to only 462 million m<sup>3</sup>. Some of the key features of the consumption forecasts are:

- East Asia, especially China, will account for most of the surge in consumption, in particular panel products and paper and paper board as well as industrial roundwood.
- East Asia (mainly China) and South Asia (mainly India) will rely very heavily on imports. Oceania and Southeast Asia will remain surplus producers.
- In general wood supplies will be adequate to meet demand, although there could be supply shortages in some localities.

No major constraints are expected in mobilizing wood supplies. Production in existing plantations can be increased significantly through improved management. Wood resources outside forests are also increasing as secure tenure and assured markets are encouraging the expansion of farm-based tree planting. The overall global wood supply situation is improving especially as removals are far less than growth increments in key producing regions in the Russian Federation, Europe, North America and Latin America. Demand for wood in these regions has slumped as a result of the economic recession.

### **Major changes likely in the use of wood as a source of energy**

While wood will remain an important source of energy, its consumption is estimated to decline from 790 million m<sup>3</sup> in 2005 to 699 million m<sup>3</sup> in 2020 with most of the decline taking place in East Asia and Southeast Asia. However, energy and environmental policies could bring about important changes in the extent of wood use. For example, wood pellet markets are emerging in the Asia-Pacific region as many countries attempt to reduce dependence on fossil energy



sources. New technologies, such as cellulosic conversion processes for biofuel production and efficient small-scale wood gasification technologies could have significant impacts on wood use.

### **Major changes in the use of non-wood forest products**

With some exceptions, subsistence production, processing and utilization of NWFPs are expected to decline. A number of products will be cultivated on a commercial scale and will cease to be 'forest-derived' products. Improved processing and marketing technologies will bring about significant changes to the NWFP sector, especially as the market reach of traditional producers expands.

### **Mixed situation *vis-à-vis* forest-derived ecosystem services**

The provision of ecosystem services – including conservation of biological diversity, watershed protection, land degradation and desertification, and climate change mitigation – will vary markedly (in terms of efficiency, quality and magnitude) across the region in view of differing resource situations and policy and institutional environments.

- Developed economies able to improve the provision of ecosystem services  
In view of high incomes and greater willingness to pay, developed countries will give greater attention to the provision of ecosystem services. This will be facilitated by better-developed policy and institutional frameworks and stronger technological capacities.
- Emerging and middle-income economies will face a mixed situation  
With most emerging and middle-income countries putting high priority on economic growth, environmental issues could receive secondary attention. Nevertheless, many are moving or have moved towards improving the flow of ecosystem services, especially through afforestation and reforestation.
- Low-income countries will face the biggest challenges  
Forest-related environmental problems will be acute in all low-income countries, both forest-rich and forest-poor. The forest-rich countries will be under pressure to clear forests to raise incomes and to clear land for alternative uses. In forest-poor countries degradation and impoverishment of forest resources will be a major problem. All of these countries face severe policy and institutional constraints in managing forests sustainably.
- Small island countries  
Small island countries are extremely vulnerable to changes in their economic and ecological conditions. Many of the changes are largely exogenous and domestic capacities to handle them are limited. Improved management of uplands (where they exist), especially to provide high-value watershed services, and coastal vegetation management (to minimize the impacts of storm surges) will be major priorities. Dependence on remittances, external assistance and tourism will persist. Several countries have unique opportunities to shift to a 'green economy' through green tourism initiatives and development assistance interest in mitigating climate change impacts.

## PRIORITIES AND STRATEGIES

### **Focus on social and ecological sustainability**

Priorities and strategies for the forest sector will have to be country- and scenario-specific. Countries are passing through divergent development paths with high and low economic growth rates and varying levels of social and ecological sustainability. For most countries, accomplishing high growth rates remains the priority. However, increasing social and ecological vulnerability is encouraging countries to shift to green pathways.

### **Overall priorities**

The focus of international discussions on forestry reflect only a small portion of overall forestry activity but often consumes a disproportionate amount of attention and energy, especially of government forestry officials. The vast majority of on-the-ground forestry-related activities are often seemingly overlooked and although the international focus can eventually have major positive implications for forestry, practical management aspects should not give way completely to more distant goals.

#### ***Rebuilding the natural resource base and conserving of existing resources***

Although the Asia-Pacific region is unlikely to face any critical wood shortages in the near future, rebuilding the natural resource base and conservation of existing resources will remain a high priority. As countries develop, the demand for wood and wood products is expected to increase considerably. More importantly, there will be a rapid increase in demand for ecosystem services. Considering that populations will continue to grow and levels of consumption will surge, it is imperative that the Asia-Pacific region invests in conserving and enhancing the natural asset base.

#### ***Rural development and poverty alleviation***

Although the Asia-Pacific region is urbanizing rapidly, it will still remain largely rural and rapid economic growth in urban areas is widening the rural-urban divide. With low incomes from agriculture, poverty will remain a major issue, especially in South Asia. Although forestry itself may not be able to lift people out of poverty, it will be important for providing basic needs, especially for forest-dependent communities.

#### ***Enhancing raw material and energy-use efficiency***

With burgeoning demand for various products, it is imperative that the Asia-Pacific region pays greater attention to enhancing efficiency in the use of raw materials and energy. Efficiency in wood energy use particularly requires improvement. A wide array of technologies is already available and, with greater attention to policies and other incentives, it is possible to significantly improve the output of products and energy. Enhanced use of wood residues for local processing and energy generation also warrants more attention. Expanded recycling of fibre would help satisfy the growing demand for paper and paper products while reducing the need for more forest plantations and fibre production from natural forests.

## **Governance**

There is an overarching need to strengthen governance; generally and within the forestry sector. Attention to reducing or eradicating corruption including endemic bribery and extortion will be important in improving investor confidence and creating efficient industries. Better governance will also be a prerequisite to continuing to export to some developed country markets and in attracting carbon-financing. Countries with poor governance will be severely disadvantaged in competing for carbon funds, with money gravitating to where investors have confidence.

## **Strategies**

Several broad areas require renewed attention in the coming decade: (a) improvements in policy, legal and institutional frameworks; (b) building capacities for grassroots forestry; (c) strengthening science and technology capacities; (d) improving education and awareness related to forests and forestry; (e) developing societal consensus; and (f) strengthening leadership and communication.

### ***Policies and institutional changes essential***

Policies, legislation and institutional arrangements should empower people to undertake individual and collective actions, helping to resolve conflicts and establish acceptable trade-offs among competing and conflicting objectives. Issues that will require immediate attention include:

- Tenure reform. Secure tenure will remain one of the core issues in empowering local communities and in motivating them to undertake activities that could help address natural resource degradation and poverty.
- Reform of public sector agencies with emphasis on facilitation and regulatory functions and shifting managerial functions to the private sector, including farmers and communities.
- Improved land-use planning and careful management of land conversion programmes. Enforcement of decisions will also need to accompany improved planning, such that institutional frameworks effectively correspond to ground-level jurisdictions.
- Creating enabling environments. Policies and legislation need to be structured to ensure they create enabling environments in which incentives reward 'good' behaviours and penalize the 'bad'.

### ***Grassroots forestry***

While theory, science and policy may advance; at grassroots levels, lack of capacity and knowledge are often highly constraining. International agreements and policy development need to be accompanied by practical steps towards improvements in forest management. Forestry extension and major attention to training, capacity development and enforcement of regulations are sorely needed if hopes are to become realities.

### ***Investments to improve science and technology***

Enhancing social and ecological sustainability requires major improvements in science and technology capacities. To change the current pattern of resource use, stronger inputs from science are necessary. The focus is, however, not so much towards research, but in translating existing knowledge into technologies that are more energy and material efficient.

***Investment in human resources***

The region's growing population and increased desire of diverse segments of society to be involved in forest-related decision-making places greater emphasis on the need for improved education and awareness related to forests and forestry. An 'environmentally smarter' population of consumers and decision-makers will be essential to reverse trends of forest loss and degradation and move toward truly sustainable resource management in the future.

***Societal consensus***

Continuation and acceleration of efforts towards achieving societal consensus in how forests should be managed, and for which purposes, will be a key element in effective forest management in the coming decade. Greater efforts are required to integrate public opinion into decision-making and build levels of awareness in relation to forests and forestry so that policies are appropriate, widely supported and can be easily implemented with broad community support. Increased attention to national forest programmes can contribute to these aspects.

***Leadership and communication***

A major challenge for forestry is to strengthen its sectoral profile and to develop more powerful champions, advocates and leaders. Provision of specialized training opportunities, greater encouragement and empowerment of staff, and significant institutional culture changes could assist this development. The emergence of stronger leaders and advocates could be a major driving force to shift forestry onto better and more sustainable pathways.



# 1

## INTRODUCTION

### BACKGROUND

The Asia-Pacific forest sector is undergoing unprecedented changes as economies grow rapidly and demands on forests for goods and services accelerate. Already the **impacts of these changes** are being felt within and outside the region and in some cases the increasing demands and the absence of concomitant investments have undermined long-term sustainability. A better understanding of what is likely to happen in the context of larger societal changes is imperative to identify the options available. The decisions and compromises made during the next decade will determine the course of forestry in the coming century.

The Food and Agriculture Organization of the United Nations (FAO) has been undertaking a series of global and regional outlook studies in response to requests from its Committee on Forestry and Regional Forestry Commissions. The first in this series was the inaugural Asia-Pacific Forestry Sector Outlook Study (APFSOS). Since its completion in 1998, the overall social, economic, political and institutional environment within and outside the region has undergone unprecedented changes and the pace of change is accelerating. The demands placed on forests have increased and intensified, forest areas have dwindled and been degraded, and people are demanding greater voice in how forests are managed and for what purposes. As countries become more integrated through globalization and the impacts of what happens in one country are felt far and wide, national forest programmes will be required to adapt to the new opportunities and challenges. The long-term horizons of forestry investments reinforce the imperative to understand future changes in society-forest relationships.

It is in this context that the 21st Session of the Asia-Pacific Forestry Commission (APFC), held in Dehradun, India, in April 2006, recommended revisiting APFSOS I to assess the likely changes to 2020, focusing on what may be done to enhance the forest sector's contribution to society's well being.

### OBJECTIVES AND KEY QUESTIONS ADDRESSED

The key question addressed by the study is how to steer the forest sector along a path that is relevant and appropriate to society's emerging needs? As social, economic and technological changes accelerate, forests and forestry will confront a complex array of opportunities and challenges, some familiar, while others very new. The Asia-Pacific Forestry Sector Outlook Study II aims to articulate this larger picture of change, enabling more informed decision-making at various levels. The specific objectives of APFSOS II are to:

- Identify emerging socio-economic changes impacting forests and forestry;
- Analyse probable scenarios for developments in the forestry sector to 2020;
- Outline priorities and strategies to address emerging opportunities and challenges.

Specifically, the study will address a number of questions relating to the changing roles of forests and forestry in the larger context of social and economic changes (**Box 1.1**).

Box 1.1	Key questions on the future of forests and forestry in Asia and the Pacific
<ul style="list-style-type: none"> <li>• How will developments outside the forest sector impact forests and forestry, especially in the context of the accelerating pace of globalization?</li> <li>• What will be the future role of forests and forestry in the rapidly changing Asia-Pacific region?</li> <li>• What will be the progress towards accomplishing sustainable forest management?</li> <li>• How will future demands for wood and wood products be met?</li> <li>• Considering the underdevelopment of certain areas, what will be the role of forests and forestry in improving social and economic conditions, especially in alleviating poverty?</li> <li>• What will be the future of the forest industry in the region in view of the changing investment climate and increasing trade of wood and wood products?</li> <li>• How can forestry respond effectively to emerging environmental crises, in particular climate change? How will forestry be affected by increasing concern for the protection of the environment and how will it address potential conflicts in dealing with multiple objectives?</li> <li>• What are the lessons learned from the experiences of countries in dealing with the changing societal demands on forests and how could these be used in addressing future challenges?</li> </ul>	

## SCOPE OF THE STUDY

This study covers 33 countries (**Table 1.1**) including all the member countries of the APFC that are physically located in the region, in their entirety. These have been grouped into four subregions (**Figure 1.1, Table 1.1**). A large part of the Russian Federation is also considered to be within the Asia-Pacific region; however, considering that the Russian Federation straddles Asia and Europe and has already been included in the European Forestry Sector Outlook Study (UNECE and FAO 2005), this study does not provide in-depth analysis of the situation in the Russian



Figure 1.1. Asia-Pacific subregions

Federation. Rather, it limits its focus to the changing role of wood supplies from Russia (especially from the Russian Far East) to the rest of the Asia-Pacific region. A number of Pacific Island Countries and territories that have not formally participated in the study process have not been specifically included in the analysis, but many of the findings and conclusions of the study will also be relevant for them. The primary focus of the study is APFC member countries, which have been heavily involved in a three-year APFSOS development process. However, the study does take into account information from non-APFC member countries, although they have not been formally involved through a national process.

**Table 1.1 Subregions and countries included in the study**

Subregion	Countries
East Asia	Democratic People's Republic of Korea (DPRK), Japan, Mongolia, People's Republic of China, Republic of Korea (ROK)
South Asia	Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka
Southeast Asia	Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Viet Nam
Oceania	Australia, Fiji, Kiribati, New Zealand, Papua New Guinea (PNG), Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu

## THE STUDY PROCESS

The outlook study was implemented adopting a highly participative approach involving APFC member countries and other stakeholders, including bilateral and multilateral development agencies, international organizations, civil society organizations, industry and academic and research institutions. APFC member countries nominated national focal points who coordinated the preparation of country outlook papers. In addition, a number of thematic studies addressing cross-cutting topical issues were undertaken. Workshops were organized to facilitate exchange of information and to develop coherent scenarios relating to forestry development. The country outlook papers, thematic studies, as well as discussions during national, subregional and regional meetings and information from the wealth of current literature, formed the basis for preparing draft subregional and regional reports. An international conference organized in October 2007 provided a unique opportunity to discuss a wide array of issues relating to the future development of the forest sector in the region.

A Scientific Committee consisting of experts from the region and collaborating organizations provided guidance and technical oversight. Draft subregional and regional reports were discussed during a meeting of the Scientific Committee held in June 2009 and the revised reports were subjected to further review and revision by the Scientific Committee.

## STRUCTURE OF THE REPORT

Chapter 2 provides an overview of the current state of forests and forestry in the region, outlining the state of forests and recent trends in their management including developments in policies, legislation and institutions. An overview of the economic, social and environmental significance of forests is provided in Chapter 3. The main drivers of change impacting the sector are described in Chapter 4. Drawing upon the major drivers of change and the key uncertainties, Chapter 5 describes the probable scenarios that may develop to 2020 and the implications for the forest sector. Chapter 6 outlines how the forest sector may have evolved by 2020. Possible options – especially priorities and strategies – for moving to a more desirable path of development are outlined in Chapter 7.





# 2 FORESTS AND FORESTRY IN THE ASIA-PACIFIC REGION

## INTRODUCTION

Forests and trees play an important role in Asia-Pacific economies on account of their diverse economic, social, environmental and cultural values. Over time, the relationship between society and forests has undergone important changes, altering the nature of demands placed on forests. Among the region's countries there is considerable diversity as regards the extent of forests and tree cover, overall conditions of growth and productivity and the level of investments required to sustainably manage the resources. While climatic factors play an important role in the overall state of forests – especially as regards productivity of wood and non-wood products and the various ecosystem services – the national and local situations confronting forests are also products of differing policies and institutional capacities to manage the resources. This chapter provides an overview of the state of resources and the policy, legal and institutional frameworks that guide their management.

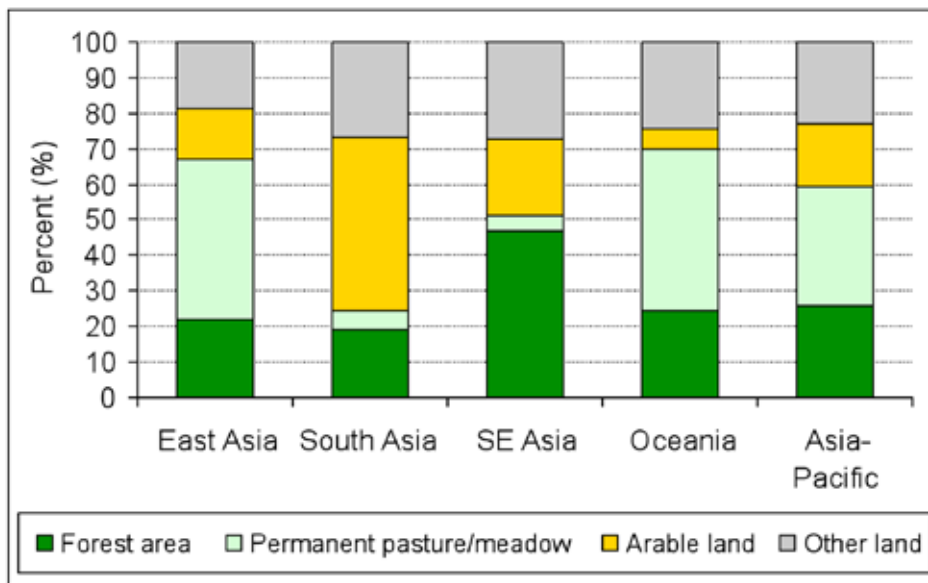
## FOREST AND TREE RESOURCES



**Figure 2.1. Asia and the Pacific: distribution of forests and woodlands**  
Source: FAO (2006a).

Arable and permanent croplands account for about 18 percent of the land area in the Asia-Pacific region, while the share of forests is about 26 percent (**Figure 2.1**). However, there are considerable differences among subregions and among countries within each subregion, largely reflecting

ecological conditions and, often more importantly, demographic and socio-economic conditions. For example, in South Asia, arable land and land under permanent crops accounts for almost 50 percent of the total land area; correspondingly, the extent of land under other uses, especially forests and permanent pastures, is very low. In contrast, the share of permanent pastures in East Asia and Oceania is considerably higher. In the case of Southeast Asia, forests form the major land use and, correspondingly, the share of pasture and arable land is relatively low (**Figure 2.2**).



**Figure 2.2. Land use in the Asia-Pacific region, 2007**

Source: FAO (2010b).

The share of various land uses in the region has been changing, with agriculture expanding into forest areas and permanent pastures and meadows in most subregions. Between 1995 and 2005, the extent of agricultural land increased by about 38.7 million hectares, with East Asia, mainly China, accounting for about 53 percent of the increase. Interestingly, during this period there has been a significant expansion of forest area, especially through large-scale afforestation, suggesting that most of the agricultural expansion has been into areas classified as permanent pastures. Among the subregions, South Asia registered the least expansion of agricultural land, perhaps not surprisingly, given that agriculture already accounts for 50 percent of the total land area in that subregion.

The balance of overall land use, in particular, changes in the extent of land under agriculture, will have a major impact on forests in the region.

### Forest area

The total forest area (**Box 2.1**) in the Asia-Pacific region is estimated at 740 million hectares (FAO 2010b), accounting for about 18.3 percent of the global forest area (**Figure 2.3**). However, the distribution of Asia-Pacific forests is uneven. For example, South Asia accounts for 23 percent of the global population, but has only about 2 percent of the world's forests. Conversely, Oceania and Southeast Asia have greater proportions of forests in relation to their populations (**Table 2.1**).

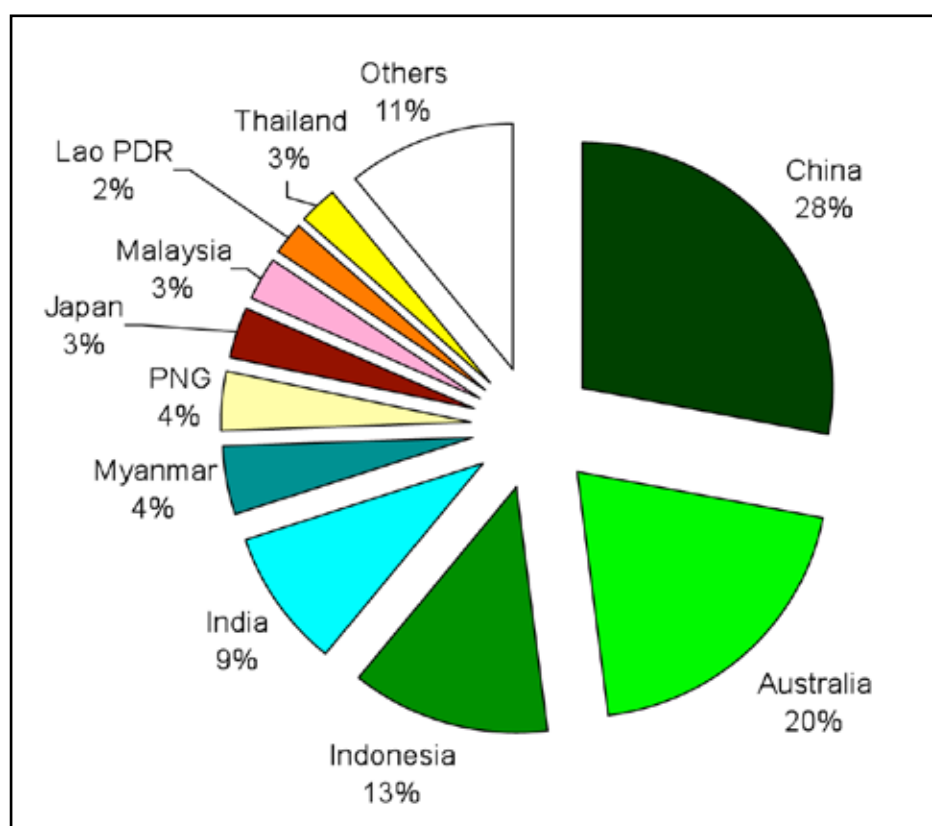
Box 2.1	Definition of forests
<p>There is a wide array of definitions of forest and in some countries more than one definition is in use depending upon who is using the definition and for what purpose. Definitions that are suitable at aggregated regional and global levels are unlikely to satisfy more detailed national level requirements. Conversely, definitions developed to suit the needs of any given country are unlikely to be applicable at a global level (UNEP, FAO, and UNFF 2009).</p> <p>For the purpose of consistency, especially for intercountry comparisons, this report adheres to the definition of forests adopted by FAO for the Global Forest Resources Assessment (FRA) 2005.</p> <p>Forest is defined as: land spanning more than 0.5 hectares, with trees higher than 5 metres and a canopy cover of more than 10 percent or trees able to reach these thresholds <i>in situ</i>. It does not include land that is predominantly agricultural or under urban use.</p> <p>Other wooded land is defined as: land not classified as forest, spanning more than 0.5 hectares, with trees higher than 5 metres and a canopy cover of 5 to 10 percent, or trees able to reach these thresholds <i>in situ</i> or with a combined cover of shrubs, bushes and trees above 10 percent. Urban parks, orchards and other agricultural crops are excluded from this definition – as are various agroforestry systems.</p> <p>Source FAO (2010b).</p>	

**Table 2.1. Forest area change in the Asia-Pacific region**

Subregion	Area (million ha)				Annual change (1 000 ha)			Share of global population in 2010 (%)	Share of global forests in 2010 (%)
	1990	2000	2005	2010	1990-2000	2000-2005	2005-2010		
East Asia	209.2	226.8	241.8	254.6	1761.7	3005.3	2556.9	22.6	6.3
South Asia	78.2	78.1	79.8	80.3	-6.5	346.6	95.6	23.4	2.0
Southeast Asia	247.3	223.0	219.5	214.1	-2421.5	-709.8	-1086.4	8.5	5.3
Oceania	198.7	198.4	196.7	191.4	-36.2	-327.4	-1072.1	0.5	4.7
Asia-Pacific	733.4	726.3	737.9	740.4	-702.5	2314.7	494.0	55.1	18.4
World	4168.4	4085.2	4061.0	4033.1	-8323.0	-4840.8	-5580.9	100	100

Source: FAO (2010b).

The four largest countries, namely China, Australia, Indonesia and India, account for about 71 percent of the forest area. Myanmar, Papua New Guinea (PNG), Japan, Malaysia, Lao PDR and Thailand collectively account for another 18 percent, with the final 11 percent located in the remaining 23 countries and territories (**Figure 2.3**).



**Figure 2.3. Distribution of forest area by country**

Source: FAO (2010b).

The region also has about 312 million hectares of other wooded land with Australia and China accounting for about 76 percent of the other wooded land in the Asia-Pacific region. Some key features relating to forest area are summarized below:

- On a per capita basis, the Asia-Pacific region is one of the least forested regions (with about 0.2 hectares per person) in comparison with the global per capita area of about 0.6 hectares. Further, within the region, South Asia is the least forested subregion with about 0.05 hectares per person, indicating the pressures on these forests for competing uses.
- The diversity of forest distribution is emphasized in a comparison of forest areas in the Asian part of the region, where forests total 0.15 hectares per capita, compared with the Pacific subregion, which has 6.3 hectares of forests per capita. The population pressure on Asian forests is heavier than any other global region, while forests in the Pacific are subject to the least pressure, globally. However, the forest situation varies markedly among countries in Asia and in the Pacific (**Table 2.2**).
- In some of the small island countries, the extent of forests is negligible and much of their forest management is in fact management of trees outside forests, including for example coconut trees.
- If forests in the Russian Far East were included in this analysis, many regional forest resource statistics and ratios would be significantly altered (**Box 2.2**).

Table 2.2. Current importance of forest resources in countries of Asia and the Pacific

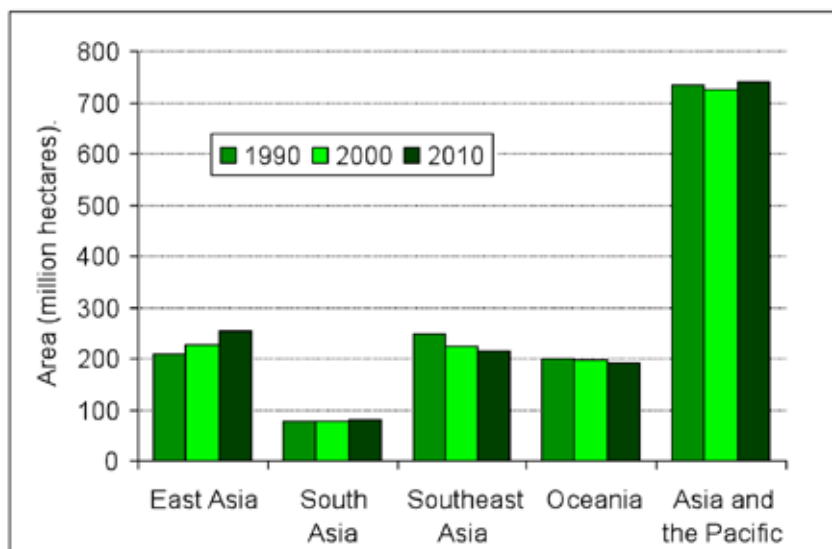
	More than 10 million ha of forest in total		Less than 10 million ha of forest in total	
	More than 40% forest cover	Less than 40% forest cover	More than 40% forest cover	Less than 40% forest cover
<b>More than 0.6 hectares of forest per person</b>	Cambodia Indonesia Lao PDR Malaysia Myanmar PNG	Australia Mongolia	Bhutan Brunei Fiji Solomon Islands. Timor-Leste	New Zealand Vanuatu Samoa
<b>Less than 0.6 hectares of forest per person</b>	Japan	China India Thailand Viet Nam	Korea DPR Republic of Korea	Bangladesh Kiribati Maldives Nepal Pakistan Philippines Singapore Sri Lanka Tonga Tuvalu

Source: FAO (2006a).

<b>Box 2.2</b>	<b>Russian forest resources</b>
<p>With about 850 million hectares of forests accounting for 22 percent of the global forest area, the Russian Federation has the world's largest forest area. About 78 percent of the country's forest lands are located in Asiatic Russia, with the remaining 22 percent in the European part of Russia. Forests account for 50 percent of the total area of Russia. The growing stock of 82 billion m<sup>3</sup> accounts for a quarter of the total volume of the world's forests. Coniferous species (i.e. spruce, pine, fir and larch) predominate, accounting for 71 percent of the forest area; in terms of growing stock, conifers account for 80 percent of the volume. Siberian pine (<i>Pinus sibirica</i>), larch and fir forests are predominant in the Asian part of Russia.</p> <p>The annual estimated wood increment in Russian forests is about 943 million m<sup>3</sup> and the annual prescribed cut is 635 million m<sup>3</sup>. Of this, 367 million m<sup>3</sup> are assigned for harvesting from areas which are currently accessible economically, while the remaining 268 million m<sup>3</sup> are in areas that are currently inaccessible economically. In 1990, prior to the collapse of the Soviet Union, the annual harvest was about 300 million m<sup>3</sup>. Since then, harvests have declined drastically, reaching a nadir of about 140 million m<sup>3</sup> in 1994, but gradually increasing since, to 187 million m<sup>3</sup> in 2007. This is about 62 percent of the 1990 harvest level. Of the 2007 harvest, about 50 million m<sup>3</sup> were exported as roundwood, 33.5 million m<sup>3</sup> were allocated for use by local communities (social needs) and 104 million m<sup>3</sup> for domestic production of various products.</p> <p>With its vast resources, Russia has become a major source of wood supplies to a number of countries in the Asia-Pacific region. A shrinking domestic market implies increased dependency on exporting logs and wood products for the Russian forest industry. Many countries in the Asia-Pacific region will continue to rely on Russian forests to meet demands for wood and wood products.</p> <p>A new forest code was adopted in 2006, including the announcement of major increases in export taxes on wood products, especially logs. This was aimed at increasing domestic value addition. However, a decline in global demand for wood and wood products on account of the global economic downturn has led to the deferment of tax increases till 2011.</p>	

### Forest area changes

Deforestation is a major issue facing a number of countries in the region. At the aggregate level, there has been a positive trend in deforestation in the region; from an annual loss of more than 0.7 million hectares of forests during 1990 to 2000 to an annual increase in forest area of 0.5 million hectares during 2005 to 2010. However, this change is uneven among countries and over time. In fact, since 2005 there has been a significant drop in net annual increase in forest area, from over 2.3 million hectares during 2000 to 2005 to about 0.5 million hectares between 2005 and 2010. This is largely due to a decline in the pace of afforestation and reforestation in China and increased deforestation in Australia and Indonesia. If China's forest area increase is excluded, the rate of deforestation in the remainder of the region remains more or less unchanged between the two periods. Afforestation has increased the extent of forest area in East Asia and kept forest area in South Asia relatively stable. However, Southeast Asia has registered a substantial reduction in forest area (**Figure 2.4**). In addition to China, the most significant increases in forest area have been in India and Viet Nam. In most other countries there has been a decline in the forest area, with substantial losses recorded in Cambodia, Democratic People's Republic of Korea (DPRK), Indonesia, Myanmar and PNG.



**Figure 2.4. Forest area changes in the Asia-Pacific region**

Source: FAO (2010b).

Absence of regular monitoring, assessment and reporting of area changes remains a major challenge in several countries. With the exception of a few countries, overall national capacities for assessing forest conditions remain unsatisfactory. There are several countries where forest area change has been constant during 1990 and 2010 (**Box 2.3**). In at least some cases – especially the larger countries – this may reflect the absence of reliable data rather than the actual ground situation.

Box 2.3	Some examples of forest area changes during 1990 to 2010
<ul style="list-style-type: none"> <li>• In East Asia, the annual rate of forest area decline in DPRK and Mongolia has been constant during the entire period of 1990 to 2010, at 127 000 hectares and 87 000 hectares respectively.</li> <li>• In several countries and territories in Oceania, forest area has remained unchanged during 1990 to 2010. These include American Samoa, Cook Islands, Guam, Kiribati, Marshall Islands, Micronesia, New Caledonia, Vanuatu, Tonga and Tuvalu. On some islands, forest area is so low that further conversion is almost impossible, without undermining economic and ecological stability.</li> <li>• Within South Asia, the annual rate of forest area change in Bangladesh and Bhutan has been constant. Bangladesh has recorded a constant annual decline of 3 000 hectares of forests per annum, while Bhutan registered an annual increase of 11 000 hectares during the period of 1990 to 2010. Forest area in Maldives is reported as unchanged at 1 000 hectares throughout 1990 to 2010.</li> <li>• In Southeast Asia, Lao PDR reported a rate of annual forest loss of 78 000 hectares during the period 1990 to 2010. On the other hand, the Philippines reported an annual increase in forest area of 55 000 hectares throughout this period, dispelling earlier perceptions of a high rate of deforestation in the country.</li> </ul> <p>Sources: FAO (2010b)</p>	

Australia represents an unusual situation in that it has a high level of deforestation, despite being a developed economy with robust policy and institutional frameworks. In fact, for the period 2005 to 2010, Australia has reported the highest level of annual deforestation in the Asia-Pacific region – about 0.9 million hectares per year. (**Box 2.4**).

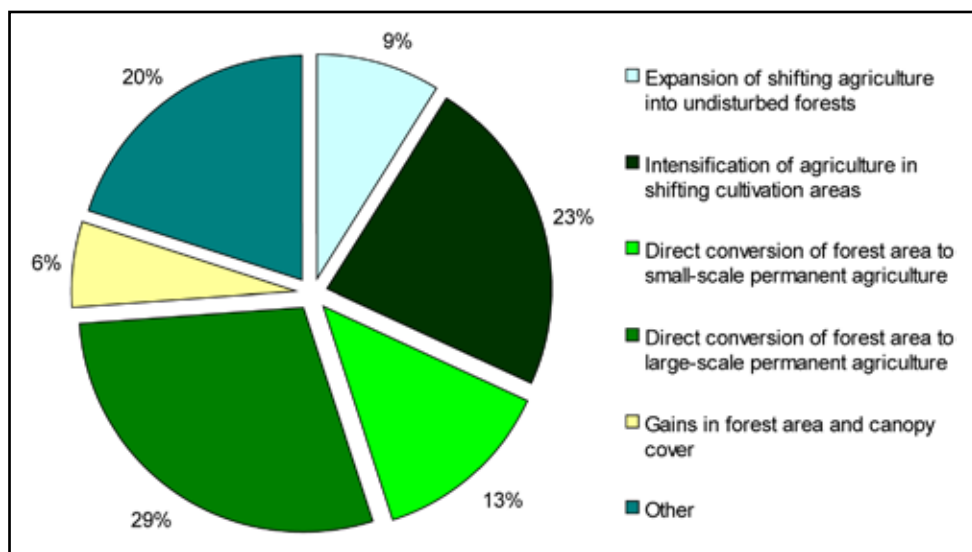
Box 2.4	Forest area change in Australia
<p>The Global Forest Resources Assessment 2010 reports an annual reduction in forest area in Australia of 200 000 hectares during the period 2000 to 2005. This reduced the country's forest area from 154.9 million hectares to 153.9 million hectares.</p> <p>However, between 2005 and 2010 there has been a significant acceleration in forest loss, to an annual average of 900 000 hectares, further reducing Australia's total forest area to 149.3 million hectares. Consequently, Australia has the highest gross deforestation rate in the Asia-Pacific region, ahead of Indonesia. Several factors, including some associated with natural causes, have contributed to the high deforestation rate.</p> <p>Australia's country report to the Global Forest Resources Assessment 2010 notes that:</p> <p><i>“the most likely reason for the detected decline in forest extent is the extended drought across much of Australia since 2000, which has resulted in a double loss: a decline in forest regrowth along with a decline in tree foliage from water stress. It is unclear at this stage whether the climatic-induced reduction is a temporary or permanent loss of forest. Since 2000 there have been a number of high-intensity mega fires, especially in Australia's open forests – the long term effect on Australia's forest extent as a result of these fires is, as yet, unclear.”</i></p> <p>However, the report also notes that land clearing in 2006 totalled 378 300 hectares. A significant proportion of this forest loss results from conversion of dry woodlands on private lands in Southwest Queensland. These areas were previously uneconomic to farm; but new technologies, new varieties of grasses and cattle, and new export markets suddenly made it commercially attractive to convert these lands to pasture.</p> <p>Sources: FAO (2010b) and FAO (2010c).</p>	



An important issue in assessing overall changes in forest area relates to the definition of forest plantations. A broad definition in some countries has led to the inclusion of rubber and coconut as forest plantations. Consequently, conversion of natural forests to these crops is not accounted as a reduction in total national forest area; although, obviously, functions fulfilled by these plantations are different from the natural forests they have replaced.

Forest clearance for agriculture remains the most important cause of deforestation in most of the Asia-Pacific region (**Figure 2.5**). However, there has been a change in the nature of agricultural expansion. In the past smallholder cultivation, especially swidden, has been an important cause of deforestation; however, economic and demographic changes have led to a decline in such cultivation. On the other hand, expansion of industrial agricultural crops – for example, rubber and oil-palm – has become a major cause of forest clearance, especially in some of the Southeast Asian and South Pacific countries including Cambodia, Indonesia, Lao PDR, Myanmar and PNG. Most often large-scale investments in industrial crops are driven by demand from external markets, in particular emerging economies.

In Southeast Asia the primary reason for forest conversion is the establishment of cash crop plantations and agriculture, which in recent years has had a stronger impact on forest cover than logging. Forests in countries adjoining rapidly expanding economies are particularly vulnerable to deforestation, as is the case in Cambodia and Lao PDR. The rapid expansion of infrastructure, especially roads in the Greater Mekong subregion under various economic development corridor initiatives, will increase the value of land, potentially triggering forest clearance for more remunerative uses. Recent trends of large-scale cultivation of land for agriculture and biofuel crops (including through overseas acquisitions as in the case of a number of countries for example, Cambodia, Philippines and Lao PDR) could also have significant negative impacts on forests. As the demand for food, fibre and fuel increases in the region, forests in some Southeast Asian and Pacific countries will become more vulnerable to change. Strengthening environmental regulations and their effective implementation will remain a major challenge.

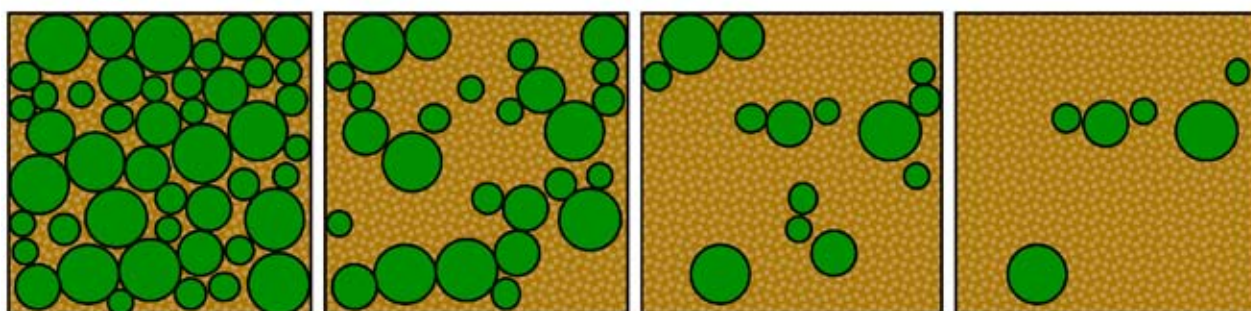


**Figure 2.5. Direct causes of forest area changes (Asia only), 1990-2000**

Source: FAO (2001a).

### Forest degradation and declining health and vitality

Forest degradation remains a major, but less visible (than deforestation) problem, especially in densely populated countries. The definition of forests, primarily based on canopy cover and tree height, fails to capture data on the gradual process of degradation. Currently there is no globally agreed operational definition for forest degradation (RECOFTC 2009b). The adoption of a definition of forests based on canopy cover in excess of 10 percent often includes severely degraded open woodlands. Changes in forest condition and quality – down to this cut off point – remain unidentifiable in national forest statistics (**Figure 2.6**). Changes in the growing stock per hectare may provide some indication of forest degradation, provided forest inventories are undertaken periodically. However, forest inventories are sporadic, incomplete, or extremely dated in many countries. The Global Forest Resources Assessment 2005 suggests a decline in the per hectare growing stock in a number of countries in the region (**Table 2.3**). However, since estimation of growing stock is based on commercial timber volume, this provides at best a partial picture of degradation.



**Figure 2.6. Changes in crown cover and forest degradation (representations of 70, 40, 20 and 10 percent canopy cover – all are ‘forest’ under the FAO definition)**

Source: FAO (2010c).

**Table 2.3. Trends in growing stock per hectare in the Asia-Pacific region (2000-2005)**

Change in growing stock/hectare/year	Countries	Remarks
Significant increase (more than +1.0 m <sup>3</sup> )	Bhutan, Japan, Republic of Korea (ROK), Malaysia	Japan and ROK registered annual increases in growing stock at rates of 3.19 m <sup>3</sup> and 3.10 m <sup>3</sup> respectively
Stable or slight increase (0 to +1.0 m <sup>3</sup> )	India, Myanmar, DPRK, Philippines	
Decline (-1.0 m <sup>3</sup> to 0)	Bangladesh, Cambodia, Mongolia, Pakistan, Sri Lanka, Viet Nam, PNG	
Severe decline (more than -1.0 m <sup>3</sup> )	Indonesia	Some of the decline of per hectare growing stock could be due to methodological problems in growing stock assessment especially inconsistent approaches

Source: FAO (2006a).

Several human and natural factors are contributing to declines in health and vitality and the degradation of forests in the region. Fire has been a major factor contributing to forest loss and degradation. Most fires are human-induced and fire is a major tool for forest clearance in many countries. The increasing frequency of El Niño events over recent decades, along with prolonged dry periods, compound the problem and enhance the severity of forest fires. Since 1997/1998, when fires swept across large areas of Australia, China, Indonesia, Malaysia and PNG, responses to the threat of fire have been limited and the sources of problems have, in many cases, remained untackled. As such, the ability to manage fires has not improved significantly in most countries.

Logging has also had significant impacts on forest health and vitality in the region in view of the generally low quality of harvesting operations. Associated degradation has in many cases reduced the present and future value of forests and along with other influences may negatively affect the future economic and ecological viability of the region's forests. In general, reduced impact logging is not widely practiced in the region despite efforts to introduce better practices.

Incidence of pests and diseases, some of them highly invasive, has been another factor contributing to forest degradation and loss of productivity. Despite significant improvements in the science of pest and disease management, the application of knowledge lags far behind, although a variety of initiatives are seeking to address this (**Box 2.5**). In addition, new problems are cropping up. Especially in the context of climate change, the potential for the emergence of invasive pests is substantial. Pests and diseases will remain a major concern in managing planted forests.

Box 2.5	Asia-Pacific Forest Invasive Species Network
<p>The Asia-Pacific Forest Invasive Species Network (APFISN) was established in 2004 as a response to the immense costs and dangers posed by invasive species to the sustainable management of forests in the Asia-Pacific region. APFISN is a cooperative alliance of the 33 member countries of the Asia-Pacific Forestry Commission. The network focuses on intercountry cooperation to help detect, prevent, monitor, eradicate and control forest invasive species in the Asia-Pacific region. Specific objectives of the network include:</p> <ul style="list-style-type: none"> <li>• Raising awareness of FIS throughout the Asia-Pacific region;</li> <li>• Defining and developing organizational structures;</li> <li>• Building capacity within member countries;</li> <li>• Developing and sharing databases and information.</li> </ul>	

## Trees outside forests

A wide array of farming systems exists in Asia and the Pacific; in several of these annual and seasonal crops are well-integrated with tree crops. Traditional home gardens and tree planting under agroforestry systems form an important source of industrial roundwood and woodfuel. In addition, cash crop plantations, notably coconut and rubber, produce substantial quantities of wood. Examples of trees outside forests becoming important sources of wood supply include:

- **Traditional home gardens.** Home gardens consisting of a mixture of trees and annual and seasonal crops are widespread in several countries, especially in the moist tropical belt. High species diversity is a general feature of many home gardens. Home garden management is extremely flexible and largely depends on the social and economic conditions of a household, in particular, the degree of dependence on land as a means of livelihood. Intensively managed home gardens often incorporate only a limited number of

tree species. As dependence on land as a source of income declines, many landowners reduce cropping intensities, allowing more space for tree growth. In several countries – for example, Bangladesh, Indonesia, parts of India, Malaysia and Sri Lanka – home gardens form an important source of wood supply. In many cases, the numbers of home gardens and the stocks of timber therein are increasing.

- **Farm tree planting.** During the past three decades, there has been a significant expansion in systematic tree growing on farms in several countries in the Asia-Pacific region. Some of the early social forestry initiatives (for example in India) involved provision of technical support to farmers to grow trees in strips or blocks on farms and this practice has expanded in recent years, significantly increasing wood supplies. Realizing the potential of farm plantings, wood industries in a number of countries (for example India and Thailand) are sourcing supplies from farmers under outgrower schemes (**Box 2.6** and **Box 2.7**).

<b>Box 2.6</b>	<b>Farm forestry in Haryana, India</b>
<p>The Indian state of Haryana is primarily an agricultural region focused on irrigated cultivation of wheat and rice. With low forest cover (3.5 percent of the land area), the state relied heavily on wood imports from adjoining states, especially the forested state of Himachal Pradesh. In the 1970s, the Haryana Forest Department commenced introduction of eucalyptus and poplar-based agroforestry models that have been widely adopted by farmers on account of their profitability. Farms in Haryana now supply wood to 600 veneer mills in Haryana and adjoining states, with 300 mills in the town of Yamunanagar alone. Tree growing on farms has led to an increase in forested area – 8 percent of the land in Haryana is now forested – and has significantly reduced pressure on natural forests.</p> <p>Source: Bhojvaid (2009).</p>	

<b>Box 2.7</b>	<b>Contract tree farming in Thailand</b>
<p>Contract tree farming has become critical for major pulp companies in Thailand to ensure secure supplies of raw material. The three largest firms, Advance Agro, Phoenix Pulp and Paper and Siam Forestry, collectively have more than 230 000 hectares of eucalypt plantations under contract farming. Contracts for tree farming specify what is to be produced, how trees are to be grown and outline commitments for future sale, including prices. The company often provides improved planting materials and technical advice on management practices and agrees to buy wood at the end of the rotation. Farmers take full responsibility for management, including protection from fire, pests and diseases. Contract tree farming is partly an outcome of declining profitability of agriculture, especially on marginal lands.</p> <p>Source: Boulay (2010).</p>	

- Plantation crops such as rubber and coconut have become important sources of wood supplies. While latex production remains the primary objective of rubber plantations, developments in rubberwood utilization technologies have created new end uses – for example, furniture and medium density fibreboard – significantly enhancing incomes for growers. Similarly, coconutwood is an important construction material in a number of Asia-Pacific countries (**Box 2.8**).

Box 2.8	Coconut plantations in Asia and the Pacific
<p>The total extent of coconut plantations in the Asia-Pacific region is estimated at approximately 10.3 million hectares, accounting for about 87 percent of the global area of coconut plantations. India, Indonesia and the Philippines have the largest areas of coconut, collectively accounting for about 9 million hectares. Coconut is a multipurpose species, with uses for virtually every part of the palm. The stem (trunk) is used in construction, substituting for wooden poles and beams, with fronds used as a roofing material. In addition to furniture and handicrafts, the husk is used for making ropes, mats and mattresses. A recent product innovation is coconut-fibre cement board using coconut coir, leaf fronds, spathes and shredded coconut wood. Coconutwood and shells are also an important source of domestic energy.</p> <p>Source: Arancon (2009).</p>	

A number of factors have contributed to the increase in tree growing on farms:

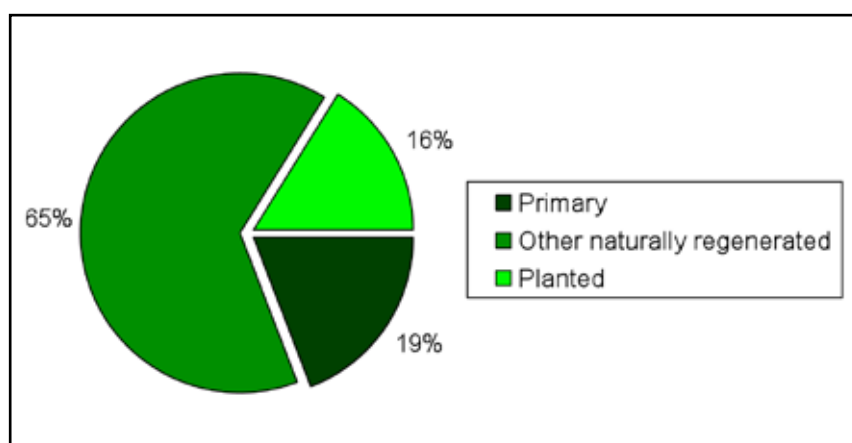
- In several countries, the profitability of agriculture is declining on account of increases in input costs (for example, wages) and competition from higher productivity countries. This is encouraging a shift to less labour-intensive tree crops; especially on low productivity marginal lands. Financial and technical support from wood industries (for example, in China, India, Lao PDR, the Philippines and Thailand) or from government-funded agroforestry and social forestry programmes (India, Philippines) has provided further impetus to tree cultivation.
- Favourable policy and legal environments, especially increased security of land tenure and amendments to rules and regulations that earlier discouraged farm tree planting.
- A number of farmers have taken up tree planting as a risk-minimization strategy.
- Increases in the demand for wood, declining supplies and consequent higher prices.

Expansion of trees outside forests has important implications on policies and legislation and for the support systems that tree growers may require. Invariably, removal of various constraints, especially active disincentives, will be critical in encouraging tree farm cultivation, although provision of direct and indirect incentives is still utilized in some cases.

## FOREST MANAGEMENT

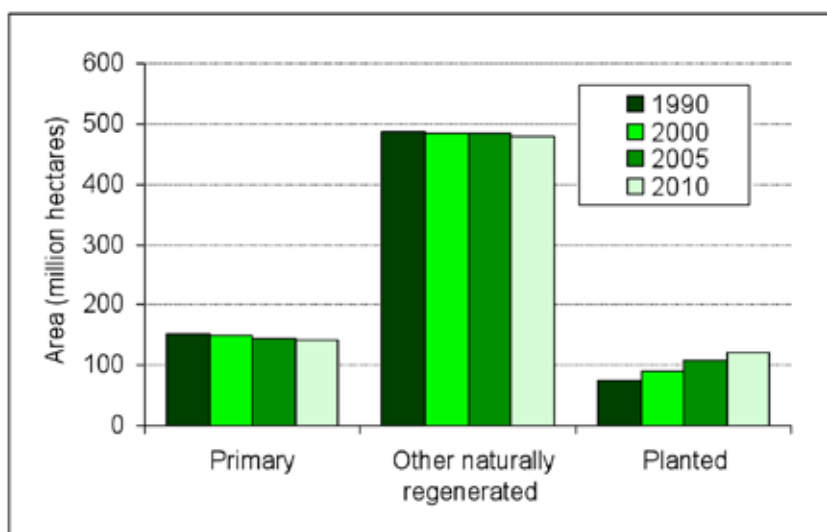
Primary forests account for 19 percent of the forest area in the Asia-Pacific region, while modified natural forests account for about 65 percent of forests (**Figure 2.7**), reflecting the intense human pressure. Since 1990, the extent of primary forests has declined significantly (**Figure 2.8**).

Planted forests account for 16 percent of the forest area and focus primarily on production of wood and non-wood products. The proportion of forests managed intensively in Asia and the Pacific is more than double the world average, reflecting a long tradition of forest management and afforestation in the region.



**Figure 2.7. Characteristics of Asia-Pacific forests (degree of human intervention)**

Source: FAO (2010b).



**Figure 2.8. Trends in forest characteristics, 1990-2010**

Source: FAO (2010b).

Despite a thrust on multiple-use management, problems in determining the trade-offs between competing uses persist – especially between wood production and provision of ecosystem services. Thirty-two percent of the forest area of the region is managed primarily for production of wood and non-wood products. Multiple-use management is adopted in a further 20 percent of the forest area (FAO 2010b).

### Management of natural forests for wood production

Natural forests in the region differ considerably in species composition, growing stock, regeneration status and accessibility. Broadly they can be grouped as protection forests or production forests, primarily based on legislative protection and the feasibility of commercial logging. Relatively easily accessible areas with a high proportion of marketable species are more likely to be managed for wood production. Although the dependence on natural forests as a source of wood supply is declining, they remain important for several countries for revenue generation. Notwithstanding a long history of sustained yield forest management, the extent of natural forests managed sustainably remains very low (**Box 2.9**).

Box 2.9	State of forest management in ITTO producer member countries in Asia and the Pacific
<p>The International Tropical Timber Organization's (ITTO) ten largest producer countries in Asia and the Pacific collectively have a total forest area of 204 million hectares. Of this, 97 million hectares are productive natural forests. Although 69 million hectares have been allocated for concessions, only 55 million hectares have any formal management plan. The extent of sustainably managed forests is estimated to be about 14.4 million hectares, most of which are in India, Indonesia and Malaysia. In the ITTO estimate, forests are assessed to be sustainably managed if they:</p> <ul style="list-style-type: none"> <li>• Have been independently certified or progress towards certification is being made.</li> <li>• Have fully developed long-term (ten years or more) forest management plans with firm information that these plans are being implemented effectively.</li> <li>• Are considered as model forest units in the country and information is available on the quality of management. And/or</li> <li>• Are community-based units with secure tenure for which the quality of management is known to be of a high standard.</li> </ul> <p>The extent of forest area certified as sustainably managed in the ITTO Asia-Pacific producer countries is about 5 million hectares, most of which are in Malaysia.</p> <p>Source: ITTO (2006).</p>	

In general, three approaches are observed in utilization of natural forests, each with differing impacts on production of wood and provision of ecosystem services:

- Intensive logging, giving very little attention to the long-term sustainability of wood production and provision of ecosystem services.
- Sustained yield management, adopting a selective felling system (or variants) aiming to balance production and protection objectives.
- Outright bans on logging in response to growing demand for ecosystem services.

Additionally, forest areas that are remote and cannot be logged economically are often left without management for any purpose.

Logging is seen as an important source of income for some low-income forest-rich countries. However, severe policy and institutional constraints facing some of these countries result in substantial leakages of income through illegal logging and corruption. Undefined or overlapping property rights, weak governance (largely due to weak policies and institutions) and high demand for wood and wood products have contributed to unsustainable logging and several countries are facing, or have already suffered, sharp declines in wood production (**Box 2.10**).

Box 2.10	Logging in the Solomon Islands
<p>Forest harvesting in the Solomon Islands remains highly controversial. Logging practices have been criticized as being wantonly destructive with 'high grading' and with little regard for the residual forest and wider environmental implications. Log harvests have far exceeded the sustainable capacity. For example, while the annual allowable cut is estimated as about 220 000 m<sup>3</sup>, the actual harvest exceeded 1 million m<sup>3</sup> in 2004. In 2007, log exports were 1 446 000 m<sup>3</sup>. Most projections suggest that the merchantable forests in the Solomon Islands will be gone in less than a decade. In recent times the forest industry has generated around 20 percent of government revenue and often more than half of export revenues. Thus, there are enormous economic pressures to continue logging, regardless of the long-term implications.</p> <p>Source: Pauku (2009).</p>	

The Philippines was a classic case of large-scale logging which, in the 1960s and 1970s, led to a near total depletion of timber, transforming the country from a major wood exporter to an importer. Cambodia, Indonesia and Myanmar appear to be following a similar pattern. In 2002, in response to uncontrolled felling, Cambodia suspended all logging concessions and required concession holders to prepare strategic forest management plans as a prerequisite to resumption of logging. However, hitherto no such plans have been prepared. To some extent, suspension of concessions has increased illegal logging (ITTO 2006). In Indonesia, decentralization of forest management in 1999 is reported to have accentuated unsustainable logging as local bodies with limited institutional capacity focused on increasing incomes. This was the justification for a reversal of decentralization in 2002 (Barr *et al.* 2006).

### ***Criteria and indicators for sustainable forest management***

There have been several initiatives to develop criteria and indicators for sustainable forest management, broadening the traditional concept of sustained yield management:

- *Development of criteria and indicators for groups of countries.* Within the Asia-Pacific region, two processes are well established. ITTO pioneered the development of criteria for sustainable forest management, with its member countries endorsing ITTO Criteria for Sustainable Tropical Forest Management in 1992. Also in the region, a number of countries are participants in the Montreal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests. Additionally, in 2000, ASEAN published *Regional criteria and indicators for sustainable management of natural tropical forests for its member countries*.
- *National initiatives.* Several tropical countries are utilizing ITTO criteria and guidelines as a framework to develop national criteria and indicators. For example, Malaysia has developed its own set of criteria and indicators. Similarly, Australia has developed and is implementing a nationally agreed framework of regional (subnational) criteria and indicators based on the Montreal Process structure. The framework provides a coordinated approach for collecting data on forests that facilitates consistent reporting and minimizes duplication.
- *Criteria and indicators for specific forest types.* There have also been efforts to develop criteria and indicators for forest ecosystems outside the moist tropical, and temperate and boreal classifications, for example, in dry forests. A process culminating in a 1999 meeting in Bhopal, India, involved FAO, UNEP, ITTO, the USDA Forest Service and the Indian Institute of Forest Management (IIFM) and resulted in the identification of eight criteria and 49 indicators with particular relevance for dry forests. Guidelines have been drafted for monitoring criteria and indicators in dry forests of Asia.



A number of countries have also developed and adopted codes of practice for forest harvesting, largely drawing upon the regional Code of Practice for Forest Harvesting in Asia-Pacific developed by the Asia-Pacific Forestry Commission (**Table 2.4**). The Association of Southeast Asian Nations (ASEAN) Senior Officials on Forestry endorsed this code in 2001 as a guide to developing specific national codes and guidelines.

However, notwithstanding a multitude of initiatives, the extent of forests managed sustainably remains low; largely on account of policy, institutional and financial constraints. Implementation of national codes continues to face a number of constraints, which include:

- Some national codes are not accepted or implemented by all stakeholders, especially forest concessionaires.
- Inflexibility in some codes and difficulties in adapting them to local conditions.
- Political instability, weak law enforcement, illegal logging and trade and increased demand for wood by industries (FAO and ASEAN 2006).

**Table 2.4. National codes of practice: development status**

Status	Countries
Code of Practice established	Australia, Fiji, New Zealand, PNG, Samoa, Solomon Islands (revised in 2002), Vanuatu, Cambodia, Indonesia, Lao PDR (2005), Malaysia (guidelines), Mongolia, Myanmar, (2000), Japan
Code of Practice under development	Bhutan, Sri Lanka, China, Viet Nam (nearly complete)
Code of Practice planned	Bangladesh, India, Nepal, Pakistan, ROK
Logging minimal or suspended	Philippines, Thailand

Sources: APFC (2000); FAO and ASEAN (2006).

### ***Reduced impact logging***

During the last two decades there have been a number of national and international initiatives to promote reduced impact logging (RIL) (**Box 2.11**). Although RIL is economically viable in the long term, its adoption is very limited. Conventional logging is easier and commercially more profitable in the short term; hence, most concession holders and logging crews are less willing to adopt RIL. It requires substantial investments in planning, including training of logging crews. In particular subcontracting various tasks, with maximizing short-term profits as the main consideration, usually discourages the adoption of RIL.

Box 2.11	Reduced impact logging
<p>RIL aims to minimize damage to residual growth as well as other environmental damage and thus improves the pace of recovery after harvesting. RIL substantially reduces wastage of wood and improves recovery. Consequently, RIL reduces carbon emissions in comparison with conventional logging. A number of organizations, including FAO, are involved in promoting RIL in the Asia-Pacific region. ITTO, for example, has financed projects in Sarawak, Malaysia and East Kalimantan, Indonesia. ITTO is also implementing a project to establish a logging school to facilitate the adoption of RIL in the Asia-Pacific region. The activities of the Tropical Forest Foundation (TFF) include collection and dissemination of information, organizing training programmes and development of guidelines, training materials and technical manuals in support of RIL.</p>	

Capacity building and institutional strengthening in relation to forest harvesting are necessary across the region although even with improvements, the legacy of high impact logging in the past is likely to curtail the economic viability of future sustainable production in some countries. This is particularly likely in forest types where stocking densities are low or where commercial species are scarcer or disproportionately affected by logging. In many cases forest restoration efforts are necessary to bring secondary forests back to full productive capacity.

### **Certification**

Certification aims to create a separate market for products from sustainably managed areas, providing an incentive to move away from unsustainable production. However, obtaining certification often entails significant costs to fulfill the stipulated criteria for sustainable forest management, as well as the costs associated with third party verification. While certification enhances market access, to date, price premiums have not been commensurate with the additional costs involved. For countries applying only rudimentary formal management to their forests, reaching a level that will make them eligible for certification will require significant changes in management practices entailing substantial expenditure and, often, significant reductions in volumes of wood extracted and potential revenues.

Consequently, the extent of adoption of certification remains extremely low. The Asia-Pacific region has about 5 percent of the 306 million hectares of certified forests in the world, mainly in Australia, New Zealand, Malaysia and Indonesia (ITTO 2008). Two principal international programmes for certifying sustainable forest management are operational in the region. These are the Forest Stewardship Council (FSC) system and the Programme for Endorsement of Forest Certification (PEFC). In addition, several countries have developed their own certification systems, often drawing on the principles outlined by the FSC and PEFC. The most notable of these national certification systems are those of Indonesia, Malaysia, Myanmar, New Zealand and Australia (**Box 2.12**).

In 2008, 4.4 million hectares of forest were certified under the Forest Stewardship Council (FSC) scheme in the Asia-Pacific region (**Figure 2.9**). The area is divided relatively evenly between natural forests (28 percent), semi-natural and mixed plantation and natural forest (34 percent) and plantation forest (37 percent). Sixty-nine percent of the total area is divided between three countries: China, New Zealand and Indonesia. Smaller areas exist in Australia, Japan and Malaysia. Growth rates in areas certified have been high in recent years in China and Indonesia, whereas in the Pacific, rates of increase have been much lower and in South Asia the area certified remains negligible.

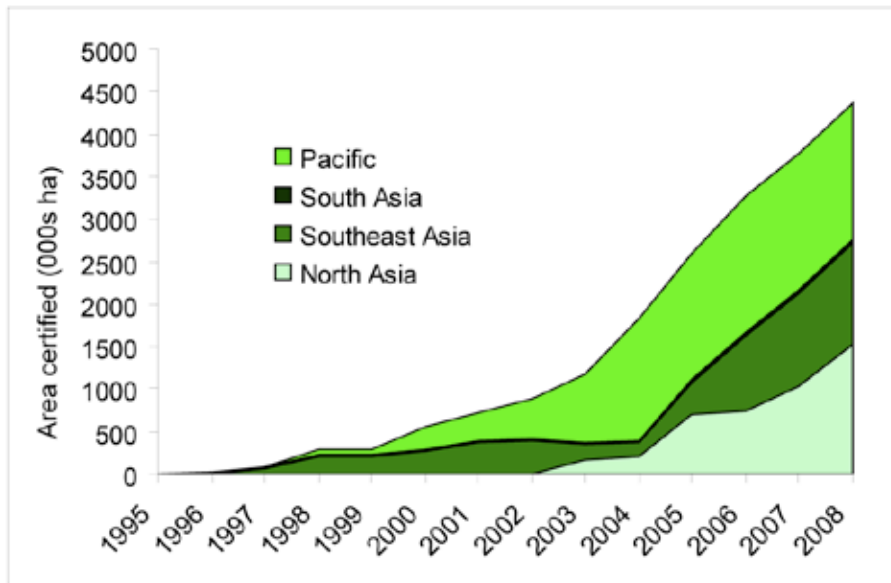


Figure 2.9. Area of FSC-certified forest in Asia-Pacific subregions

Box 2.12	National certification systems in Asia and the Pacific
<p>In addition to the various international certification systems, a number of countries have developed their own national certification systems. Lembaga Ekolabel Indonesia (LEI) was established in 1998, with the main objective of ensuring sustainable natural resources and environmental management by applying a credible ecolabelling system. Malaysia has established the Malaysian Timber Certification Council (MTCC), which has developed a set of national criteria and indicators based on the ITTO framework. MTCC is responsible for planning and operating a voluntary certification scheme. In Myanmar, a Timber Certification Committee is in the process of developing a National Certification Scheme. India is also in the process of developing a system for certification. New Zealand is developing a Verification of Environmental Performance report card system for plantation forests. Commonwealth and state governments in Australia have launched an Australian Forestry Standard that will allow forest products to be independently certified.</p>	

### Bans on logging natural forests

Several countries have opted for partial or total bans on wood production from natural forests, largely for environmental reasons (**Box 2.13**).

Box 2.13	Effectiveness of logging bans in natural forests in the Asia-Pacific region
<p>The Asia-Pacific Forestry Commission conducted an in-depth assessment of the impact and efficacy of logging bans, drawing upon the experiences of six countries; namely China, New Zealand, Philippines, Sri Lanka, Thailand and Viet Nam. Important conclusions of the study include:</p> <ol style="list-style-type: none"> <li>1. Logging bans are neither inherently good nor bad as natural forest conservation and protection policy instruments.</li> <li>2. If bans are adopted selectively and used in combination with other complementary policy instruments, they can help ensure that natural forests will be sustained and will continue to contribute to enhancing the well-being of the people of the region.</li> <li>3. Ineffective implementation of logging bans has often contributed to further deforestation and degradation through the lack of enforcement and control, and through the inadvertent creation of perverse incentives and impacts. Such unanticipated impacts and perverse incentives have arisen both within the country imposing harvesting restrictions, as well as in neighbouring countries or among emerging timber exporters as far away as Africa or South America.</li> </ol> <p>There are also instances where declining incomes due to logging bans have led to the neglect of forest management, exposing forests to a wide array of risks, including illicit felling as well as increased incidence of problems like forest fires.</p> <p>Source: FAO (2001b).</p>	

Often natural calamities, such as floods and landslides have triggered such actions (for example, in China and Thailand). Even in countries where natural forests remain important sources of wood supply, large portions of forests have been excluded from wood production, giving them protected status. Factors that have enabled a reduction in the dependence on natural forests as a source of wood supply include:

- Diversification of sources of income and forests becoming less important in national economies;
- Scope for wood imports at relatively lower prices; and
- Increased wood supply from forest plantations and trees outside forests.

Several countries in the Asia-Pacific region have significantly reduced their dependence on natural forests as a source of wood supply. For example, New Zealand obtains almost all of its wood supply from plantations and all natural forests are set aside exclusively for provision of ecosystem services. In the case of Sri Lanka, no logging is allowed in natural forests. Partial or total bans on logging exist in other countries, including China, India, Pakistan, Philippines, Thailand and Viet Nam.

### ***Regeneration and future management of natural forests***

In most cases, logged-over natural forests are left to regenerate naturally. Natural regeneration depends on postlogging conditions, especially the presence of seedlings or potential for seeding from the trees retained and, more importantly, the soil, moisture and light conditions. Studies in ecology and management have provided a wealth of information on the treatment of logged-over areas. Assisted natural regeneration – including planting of preferred species in gaps and lines, weeding, climber cutting and other tending operations – has been attempted in a number of countries (for example India and Malaysia). However, this has been largely abandoned in most countries, especially in the context of the shift to wood production from plantations and logging bans in natural forests. Costs of ensuring regeneration have been extremely high, especially in forests that have been opened up substantially on account of high intensity logging. Vast stretches

of forests have been converted into *Imperata* grasslands on account of logging, followed by anthropic disturbances such as fire. Reconversion of these areas into forest is achievable through fire prevention and tending activities, but has not so far become widespread in the region.

As management of natural forests has become technically and economically more challenging, wood production has shifted towards planted forests.

### Planted forests

With a total extent of 120 million hectares, or about 45 percent of global planted forests (**Box 2.14**), the Asia-Pacific region is in the forefront of plantation forestry.

Box 2.14	Definition of planted forests
<p>Planted forests encompass the planted components of semi-natural forests, established through planting, seeding and coppice in addition to forest plantations of native and introduced species established through planting or seeding for production of wood and non-wood forest products and provision of ecosystem services.</p> <p>Source: FAO (2006c).</p>	

The annual growth rate in area of planted forests in the Asia-Pacific region during the period 2005 to 2010 has been 2.2 percent, significantly higher than the global rate of growth (**Table 2.5**). Some of the key features of planted forests in the Asia-Pacific region are outlined below

**Table 2.5. Planted forest area change in the Asia-Pacific region (million hectares)**

	Extent of planted forests (million hectares)				Annual change (%)		
	1990	2000	2005	2010	1990-2000	2000-2005	2005-2010
Asia-Pacific	68.8	90.6	107.5	119.9	2.79	3.50	2.20
World	171.3	214.6	243.0	264.0	2.28	2.51	1.67
Asia-Pacific proportion of global total (%)	40.2	42.2	44.3	45.4			

Source: FAO (2010b).

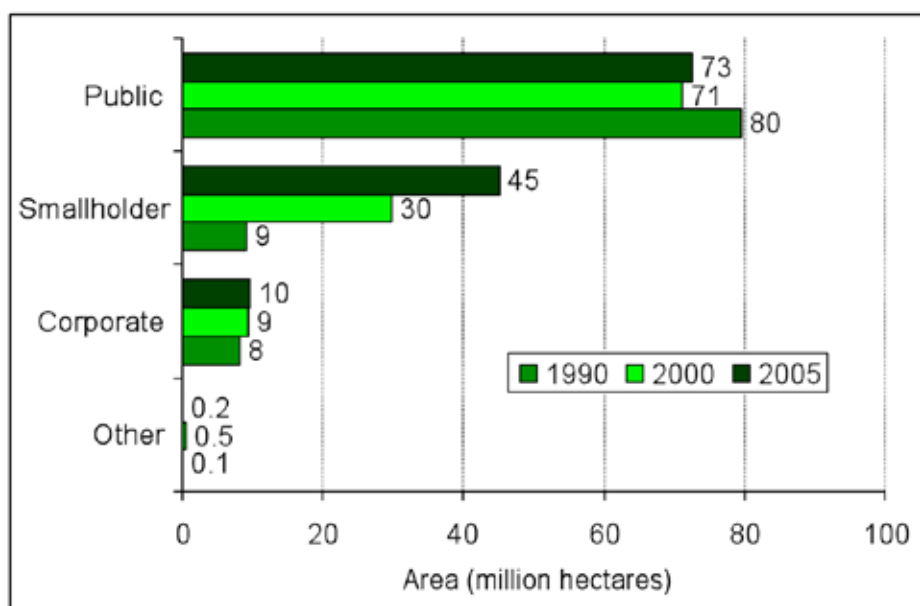
- A few countries – namely China, Viet Nam, Thailand, India, Indonesia, Japan and Australia – account for most of the region's plantations and most of the annual planting. However, China is by far the dominant force in planted forests. In 2010, China accounted for 64 percent of planted forests in the Asia-Pacific region and, over the preceding five years, 80 percent of the regional expansion in planted forests was in China. China's rapid expansion of plantations is based on highly focused, state-supported programmes (**Box 2.15**).

Box 2.15	China's afforestation programmes
<p>In the late 1990s, China started the Six Key Forestry Programmes (SKFP) to promote afforestation. The six programmes are:</p> <ul style="list-style-type: none"> <li>(i) National Forest Protection Programme (NFPP);</li> <li>(ii) Conversion of Cropland to Forest and Grass Programme (CCTF);</li> <li>(iii) Combating Sandification around Beijing and Tianjin Programme (CSPABT);</li> <li>(iv) Key Regions' Shelter Forest Programme (SFP), which is a combination of the fourth stage of the Three North Shelter Forests (TNSF) and the SFP along the Yangtze and other Key Rivers (SFAKR);</li> <li>(v) Wildlife Protection and Nature Reserves Programme (WPNRP); and</li> <li>(vi) Programme for Fast-Growing and High-Yielding Forest in Key Areas (FGHYFP).</li> </ul> <p>The six programmes commenced as individual programmes in 1998, and were reorganized into SKFP during the 10th Five-Year Plan. Although the initial purposes of SKFP, with the exception of FGHYFP, were to protect natural forests, address water and soil erosion problems and protect wildlife and endangered species, all the programmes used afforestation as their main thrust, backed by a number of supporting policies and activities. Including areas planted and naturally regenerated, the total area afforested under the SKFP, to 2005, was 58 million hectares, with a total expenditure of US\$22 billion.</p> <p>Source: SFA (2009).</p>	

- Most of the early efforts in forest plantation establishment focused on slow growing, long rotation species (**Box 2.16**), aimed to produce saw and veneer logs. Since 1980, and more so in most recent times, there has been a significant shift to short rotation fast-growing species, mainly intended to produce pulp and other fibre products. Changes in wood-processing technologies enabling the use of small dimension logs have particularly influenced the choice of species and management practices, including rotation age.

Box 2.16	Main species planted
<p>Information collected from ten countries in the Asia-Pacific region as part of FAO's assessment of global planted forests suggests that a small number of species account for most of the planted forests in the region:</p> <ul style="list-style-type: none"> <li>• In China, the most important species for plantation forestry are <i>Cunninghamia lanceolata</i>, <i>Castanea molissima</i> and <i>Eucalyptus</i> spp.</li> <li>• In India, the most widely planted species are <i>Tectona grandis</i>, <i>Eucalyptus</i> spp, <i>Shorea robusta</i>, <i>Dalbergia sissoo</i>, <i>Pinus roxburghii</i>, <i>Acacia nilotica</i> and <i>Acacia mangium</i>.</li> <li>• <i>Tectona grandis</i> remains the most important plantation species for Indonesia and Myanmar; <i>Pinus merkusii</i> is another widely planted species in Indonesia.</li> <li>• Viet Nam's plantation programme is largely focused on <i>Acacia</i> and <i>Eucalyptus</i> species. In addition, a wide variety of species are used in establishing planted forests for protective functions.</li> <li>• <i>Pinus radiata</i> and <i>Eucalyptus globulus</i> account for almost three-fourths of the planted forests in the Pacific.</li> </ul> <p>Source: FAO (2006c).</p>	

- Historically, most plantations were under public ownership and management. However, this is changing in view of the increasing involvement of corporate investors, local communities and smallholders. In particular, there was a significant expansion of the area of planted forests under smallholder ownership between 1990 and 2005 (**Figure 2.10**), with East Asia accounting for a large part of the increase.



**Figure 2.10. Changes in planted forest ownership in Asia and the Pacific**

Source: FAO (2006c).

- Stagnation in planted forest area under public sector management is indicative of larger institutional and environmental challenges. The replacement of natural forests with plantations is slowing down in view of an increasing emphasis on environmental protection. Future expansion of plantations will be largely driven by the private sector, including smallholders; with commercial viability being a major consideration.

In almost all Asia-Pacific countries, governments have provided various incentives to promote forest plantations (**Table 2.6**). While direct incentives provide some impetus in the early stages of plantation development, as the pace of plantation development matures and accelerates, enabling incentives – especially removal of constraints – are more important.

**Table 2.6. Plantation development and incentives (reported examples)**

Country/state	State planting	Low-cost seedling	Land grants	Nursery subsidies	Survival incentives	Grants to growers	Concessionary loans	Tax concessions	Joint venture arrangements	Research and extension	Resource security	Focus on enabling incentives and removal of structural constraints
Australia	X						X	X	X	X	X	High
China	X	X	X			X	X			X	X	Medium
India	X	X	X	X	X	X	X		X	X		Low
Indonesia	X					X	X	X	X	X		Low
N. Zealand	X	X	X			X	X	X		X	X	High
Philippines	X		X				X	X		X		Low
Sabah	X							X		X		Medium
Thailand	X	X				X	X			X		Low

Source: Enters and Durst (2004).

Rehabilitation of degraded areas has received considerable attention in many countries. The Global Assessment of Soil Degradation (GLASOD) estimated that about 13 percent of the land in Asia and

the Pacific is degraded – most of this is in Asia, but 104 million hectares were estimated to be degraded in the Pacific subregion, where large-scale clearance of forest land has caused a decline in soil structure and fertility (UNEP 2003). There are also degraded forest lands, which include areas where forests have been substantially damaged and debased, as well as lands on which forests have been cleared, but remain legally classified as ‘forest lands’. For example, intensive logging, shifting cultivation and more particularly the incidence of fire have led to the creation of vast tracts of *Imperata* grasslands, especially in Southeast Asia (**Box 2.17**).

**Box 2.17****Rehabilitation of *Imperata* grasslands in Indonesia**

Indonesia has about 97 million hectares of degraded forest lands due primarily to forest conversion, unmanaged agricultural expansion, illegal logging, forest fires and social conflict over forest resources. An estimated 55 million hectares of this area include production forests and conservation and protection forests, while 42 million hectares of degraded forest land are now outside forested areas. *Imperata cylindrica* (*alang-alang*) grasslands in Indonesia cover at least 8.6 million hectares (although some estimates tally over 20 million hectares) of land, most of which is classified as degraded. The grasslands have spread across previously forested lands as a result of logging and slash-and-burn cultivation and are sustained by regular burning.

Efforts to reforest Indonesia’s grasslands have struggled. A primary reason is fire, caused in part by accident as well as by intention; fires may be set to provide cattle fodder, to make room for cultivation or to make hunting easier. Frequent fires maintain *Imperata* grasslands, which would otherwise be succeeded by regenerating trees and shrubs. Human-induced fires are the result of social constraints rather than technical ones, as farmers typically have measures to control burning in their own fields.

In some areas, trees have been planted in efforts to rehabilitate *Imperata* grasslands. However, local farmers have few incentives to protect these plantations. Inadequate communication and cooperation between the government (or the funding body) and local farmers and a lack of secure land tenure mean farmers usually see few benefits in protecting plantations. Most planting projects have also been dependent on donor funding, but local bodies have often been left without adequate resources to continue efforts when the external funding terminates. Most initiatives focus primarily on technical aspects, while institutional arrangements on the ground are inadequately developed, resulting in minimal adoption of techniques by local people. An assessment by CIFOR in 2007 identified the following reasons for ineffectiveness of rehabilitation programmes:

- Targeting of forest resources as the main source of national income.
- Complexity of the direct and indirect causes of deforestation and degradation.
- Regular changes in the policies relating to rehabilitation.
- Project-based approaches that lead to inadequate maintenance of planted trees, lack of funding to sustain the initiatives beyond their project periods and inadequate assessment of economic viability.
- Limited community participation due to unresolved tenure problems and ineffective community organization.

Rates of rehabilitation have lagged behind degradation with the extent of degraded areas doubling since the 1970s.

Sources: Nawir and Murniati (2007); Dalfelt *et al.* (1996).



## Management of forests for environmental protection

In almost all countries there has been a shift in management de-emphasizing wood production, with greater thrust on the provision of ecosystem services. Natural forests are withdrawn from wood production and logging banned in response to natural calamities like flooding and landslides. Most countries have enacted legislation protecting fauna and flora, with considerable thrust on the establishment of protected areas. Conversion of forests into non-forestry activities is discouraged through legislation and, in many countries, development projects have to secure specific environmental clearances that require *ex-ante* environmental impact assessments.

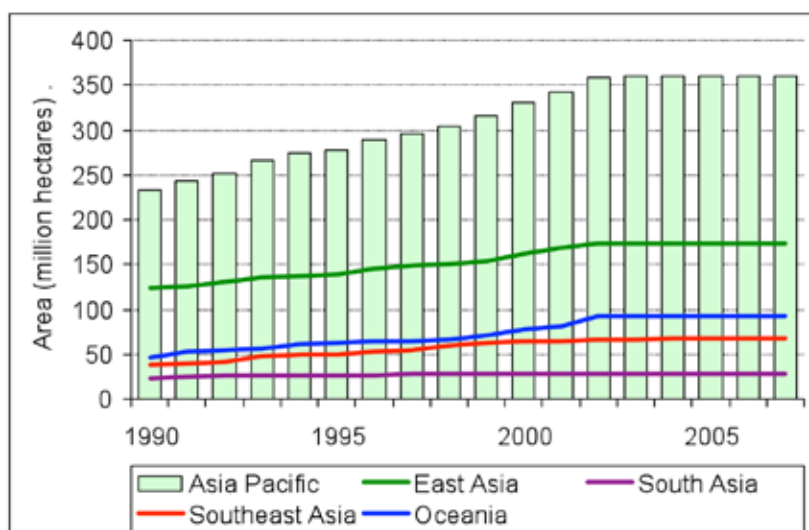
The extent of protected areas varies among the Asia-Pacific subregions (**Table 2.7**). Major efforts to establish protected areas were made following the Earth Summit in Rio in 1992 and their extent in the Asia-Pacific region increased relatively continuously until 2002. In recent years the area has stabilized (**Figure 2.11**) suggesting limited scope for further expansion, especially in view of high population densities and continuing population growth.

**Table 2.7. Extent of terrestrial protected area in Asia and the Pacific**

Subregion/countries	Land area (%)
Australia and New Zealand	9.6
East Asia	8.5
Pacific	2.1
South Asia	6.8
Southeast Asia	14.8

Source: IUCN (2003).

Management of forests for the provision of ecosystem services suffers from a range of challenges – especially when the focus on ecosystem services is a significant change from the previous forest use – including illegal logging, ongoing deforestation and degradation and poaching of animals and plants. With the public sector playing a dominant role, the thrust of protected area management has been on enforcement of legislation to: (a) prevent conversion of forests to alternative uses; and (b) protect fauna and flora from poaching and other illegal activities.



**Figure 2.11. Protected area in Asia and the Pacific, 1990-2007**

Source: UN (2008b).

<b>Box 2.18</b>	<b>Protected areas and investment in the lower Mekong countries</b>																		
<p>Protected area systems have expanded rapidly in the lower Mekong countries. Including locally and provincially managed areas, they cover close to a fifth of the total land area in Cambodia, Lao PDR and Thailand (see table). Protected areas are mostly located in forested uplands and have expanded from virtually none over the past three decades. Estimates suggest that by 2005, around 53 percent of natural forests in the lower Mekong countries were within protected areas.</p> <p><b>Forests and protected areas in the lower Mekong Basin (2003)</b></p> <table border="1"> <thead> <tr> <th></th> <th>Cambodia</th> <th>Lao PDR</th> <th>Thailand</th> <th>Viet Nam</th> </tr> </thead> <tbody> <tr> <td>Protected areas as a % of land area</td> <td>21%</td> <td>21%</td> <td>19%</td> <td>8%</td> </tr> <tr> <td>Estimate of forests in existing and proposed protected areas as a % of total forest</td> <td>40%</td> <td>39%</td> <td>65%</td> <td>26%</td> </tr> </tbody> </table> <p>In general, domestic investment in protected areas, especially relating to recurrent costs associated with staff and maintenance, has increased as new areas have been established. Overseas funding increased rapidly between 1990 and 2000, but fell off subsequently.</p> <p>Despite their extent, limited capacity and relaxed enforcement at the community level means that most protected areas in the lower Mekong Basin are multiple-use areas. The collection of non-wood forest products is eroding biodiversity values and most of the main trade routes from Lao PDR and Cambodia are directly linked to protected areas. Additionally, encroachment by local communities and commercial interests are reducing the size of protected areas. Despite many small-scale logging infringements within protected areas, and notwithstanding a number of serious exceptions, destruction within protected areas has been less than in surrounding landscapes in the lower Mekong countries.</p> <p>Source: ICEM (2003).</p>						Cambodia	Lao PDR	Thailand	Viet Nam	Protected areas as a % of land area	21%	21%	19%	8%	Estimate of forests in existing and proposed protected areas as a % of total forest	40%	39%	65%	26%
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Throughout the world, consumptive use of biological resources, and predominantly poaching, along with habitat conversion and modification of ecological processes represent serious threats to conservation. The huge demand for wildlife for food, medicine, pets, display and fashion, particularly from China, has led to increased trafficking and many wildlife species with high commercial value are now rare, endangered or locally extinct. The trade not only undermines biodiversity, but also curtails sustainable development and poverty alleviation for those dependent on wildlife for subsistence. This is particularly prevalent in lesser developed areas within the region. Development of roads and infrastructure, expansion of logging and encroachment into pristine areas have increased access to wildlife and levels of extraction have risen markedly in the past decade.

The World Parks Congress in 2003 highlighted concerns that many protected areas exist only on paper, especially in developing nations, and that costs associated with protected areas are often borne locally while benefits accrue globally (IUCN 2003). Global financing for conservation of forests in the humid tropics is particularly necessary given the low level of domestic benefits that are generally available. In the Philippines, for example, forest allocated for biodiversity conservation and forest reserves cover at least 28 percent of the total classified forest land but are poorly supported and only an eighth of legislated protected areas have an annual budget allocation (Guiang and Castillo 2006). Only half of the 430 protected areas have protected area management boards and most are highly centralized. In Myanmar, 45 protected areas covering over 3.5 million hectares or 5.4 percent of the total land area had been established by 2003. However, only 22 have active management with wardens and staff present (Thaung 2008).

A consistently challenging issue in protected area management is the inclusion of local people in management decisions and aligning livelihood improvement activities with conservation

objectives. Surveys have shown that protected area effectiveness declines with the extent to which people have access and that participation of local and indigenous people in management decisions does not necessarily increase the effectiveness of protected area management. It has, nonetheless, become impossible in many areas, and particularly in densely populated subregions such as South Asia, to adhere to the strict principles of traditional protected area management i.e., excluding all human interferences. A shift in approach has therefore come about, especially due to:

- Greater involvement of local communities in managing protected areas through participatory approaches; and
- Fine-tuning management based on research on ecological processes and population behaviour.

There is greater recognition that protected areas cannot function in a vacuum, isolated from the surrounding human-modified ecosystems (Shahabuddin 2009). Increasingly, there are also efforts to adopt landscape approaches, involving integrated management of large tracts of land with a range of diverse land uses including conservation areas. An example of such an approach is the Terai Arc landscape, covering parts of Northern India and the plains in Nepal, where habitats for tiger, rhinoceros and elephant are being conserved in a contiguous territory. By providing an integrated framework, the landscape approach avoids protected areas becoming 'islands' surrounded by land uses that potentially may undermine their existence.

Community conservation areas address human dimensions, ensuring that local communities retain full ownership and control of managing protected areas. Many community conservation areas evolve on the basis of local initiatives, eventually receiving recognition from governments. Community conservation areas include, for example, the sacred groves in several Asia-Pacific countries. Nepal has made significant strides in developing community conservation areas, with the Annapurna Conservation Area and the Kanchenjunga Conservation Area being two notable examples.

Where protected areas generate substantial income through ecotourism, benefit sharing with local communities has helped to improve management. However, for a vast majority of protected areas this type of positive outcome remains elusive. Where local communities are dependent on forests for livelihoods, resource-use conflicts are intensifying. Increasing human populations and shrinking animal habitats are increasing people-animal conflicts (**Box 2.19**).

Box 2.19	Sunderbans: people and tiger conflicts
<p>The Sunderbans is the world's largest inter-tidal area, extending over 26 000 km<sup>2</sup> spread across Bangladesh and India. The Sunderbans constitute the largest mangrove reserve in the world; but the reserve adjoins populated villages dependent on fishing, collection of honey, collection of wood and other forest uses. This brings communities into direct conflict with tigers; the Sunderbans' tiger population is estimated at about 440. Man-eating tigers have been a major problem in the area, resulting in large numbers of 'tiger-widows'. Since a major cyclone in 2007, the problem has worsened, especially as a large part of the forest was destroyed, forcing tigers to move to areas outside their normal territories. As degradation sets in, the natural prey of tigers is declining, leading to cattle-lifting and man-eating. At the same time, destruction of cultivated areas has increased the livelihood dependency on mangroves for many people, increasing contact with tigers.</p>	

Illegal trade in plants and animals (and in particular animal parts) is a major problem facing Asia-Pacific countries. As incomes increase, the demands for medicines and other preparations based on animal parts (for example, from tiger, elephant, rhinoceros, pangolin, and bears) – along with demands for various birds, animals and reptiles as pets – are also on the increase, leading to poaching and illegal trade, impacting severely on rare and endangered species (**Box 2.20**).

**Box 2.20****Asian demand driving illegal trade in endangered animals**

Income and population increases have led to a significant escalation in demands for animal and plant products. These demands are threatening endangered species within and outside the region. A 2009 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) standing committee meeting revealed that illegal rhinoceros horn trade to destinations in Asia is the major driver of rhinoceros poaching; most notably in Africa, but also in Asian countries such as India. Rhinoceros poaching has risen to a 15 year high. Similarly, demand for pangolin scales is forcing this endangered species closer to extinction. The pangolin decline comes despite national legislation that bans hunting the species throughout its Southeast Asia range and a CITES prohibition against pangolin trade across borders.

Declining populations and increasing efforts to prevent illegal cross-border trade have driven up prices for many animal products – further stimulating associated organized crime networks. A kilogram of pangolin scales worth 80 yuan (US\$10) in the early 1990s is now priced at 1 200 yuan (US\$175) on the Chinese black market. Inadequate funding, insufficient community-level participation and lack of supportive policies and legislation remain major hurdles in protecting the species and combating illegal trade.

Sources: Block (2009); CITES (2009); ENS (2009); O'Brien (2007).

## FOREST POLICIES, LEGISLATION AND INSTITUTIONS

Forest policies, legislation and institutions together determine how forest resources are actually managed; although, in practice, extra-sectoral policies and institutions possibly have greater impacts on forests and forestry. The pace of change in forest policies, legislation and institutions has been extremely varied and often, too slow in responding to the emergence of challenges affecting forest management. Overall trends in policies, legislation and institutions, drawing upon a recent review (Yasmi *et al.* 2010), are outlined below.

### Forest policies

Forest policies in the Asia-Pacific region have undergone major changes, involving a shift from timber-focused management to multiple-use management that gives due attention to a wide range of goods and services. In many cases, provision of ecosystem services has become a major thrust. Economic growth, globalization, trade liberalization and UNCED-related attention on sustainable development, have all directly and indirectly influenced forest policies. Some key trends in forest policies include (**Table 2.8**):

- Increased thrust on ecological aspects with provision of ecosystem services gaining primacy.
- Emphasis on increased involvement of stakeholders in forest management, including in forest policy formulation.

A number of internal and external factors have contributed to these changes. Increased pressure from growing populations has undermined the efficacy of traditional approaches to resource management, compelling public sector forestry agencies to involve local communities and other players. Major policy changes have often been made in response to natural disasters, as in the case of logging bans in the context of floods and landslides.

Table 2.8. Examples of current forest policy objectives in the Asia-Pacific region

Country	Current policy objectives	Remarks
<b>China (Xiaoqian 2008)</b>	<ul style="list-style-type: none"> <li>• Improve biodiversity conservation and secure adequate national ecological management</li> <li>• Restore key ecosystems</li> <li>• Promote sustainable forest management (SFM)</li> <li>• Clarify forest land tenure and farmers' rights and responsibilities <i>vis-à-vis</i> forest and forest land management</li> <li>• Promote forest industries</li> <li>• Strengthen international cooperation</li> </ul>	Forest policies in China show a clear shift from primarily timber production to SFM in recent decades.
<b>India (Rao 2008)</b>	<ul style="list-style-type: none"> <li>• Maintenance of environmental stability, restoration of ecological balance and soil and water conservation</li> <li>• Meeting the needs of local communities through partnerships between forest departments and local communities</li> <li>• Achieve a target of 33% of national land area under tree cover</li> <li>• Promote partnerships between industries and farmers to produce raw materials</li> </ul>	Forest policies have shifted radically from regulatory to participatory management embracing SFM objectives.
<b>Myanmar (Thaung 2008)</b>	<ul style="list-style-type: none"> <li>• Protection of soil, water, wildlife, biodiversity and environment</li> <li>• Sustainability of forest resources</li> <li>• Support basic needs of people</li> <li>• Harness economic benefits</li> <li>• Participation of people</li> <li>• Public awareness of the vital role of the forests in the well-being and socio-economic development of the nation</li> </ul>	Forest policies embody the broader concept of SFM, biodiversity conservation and people participation – both forest and people-focused
<b>PNG (Hurahura 2008)</b>	<ul style="list-style-type: none"> <li>• Commercial logging based on SFM principles</li> <li>• Conserving natural forest for the benefit of people</li> </ul>	SFM objectives are used as guiding principles

Source: Yasmi *et al.* (2010).

Almost all countries in the Asia-Pacific region have adopted sustainable forest management as the main objective of their forest policies, giving due consideration to social, economic and environmental dimensions. Several countries have shifted their orientation from timber production to broader sustainable forest management. In China, for example, one of the main policy objectives is environmental protection and restoration. India, Indonesia and Viet Nam have implemented major reforestation and afforestation projects, focusing on environmental improvement, reflecting a shift in policy objectives (Table 2.9). However, establishment of trade-offs between competing objectives remains challenging. In the quest for rapid economic growth, extraction of minerals, energy production and infrastructure development have become major threats to forests; but forest policies seldom provide a robust framework to deal with the changing situation.

**Table 2.9. Recent priorities of forest policies in selected Asia-Pacific countries**

Country	Environmental protection/ restoration	Forest plantation expansion	Decentralization & devolution
Cambodia	Low to moderate	High	High
China	High	High	High
India	High	Low	High
Indonesia	High	Low	High
Lao PDR	Moderate	High	High
Malaysia	High	High	Moderate
Myanmar	Low	High	Low
Nepal	High	Low	High
PNG	Low	High	High
Philippines	High	Low	High
Thailand	High	Medium	Moderate
Viet Nam	High	High	High

Source: APFSOS II country papers.

Other themes that have been included in forestry policy include forest rehabilitation (particularly in China, Indonesia, the Philippines and Viet Nam), community involvement, poverty reduction, forest law enforcement and governance and tackling of illegal logging and trade. Support for the forest product industry to promote domestic value addition has been another key theme, although at the same time excessive wood-processing capacity has also led to policies promoting industrial rationalization. Logging bans have also been imposed at different stages in a number of countries – more recently including China and Cambodia. In Viet Nam, China and the Philippines granting of land rights to individuals, families and indigenous groups has had a huge influence on the forestry sector. In Viet Nam the forest land allocation policy has been combined with major programmes to increase forest cover, wood product manufacturing and rural incomes through afforestation.

However, in many countries actual implementation of policies based on sustainable forest management has been weak because of field level issues including high demand for forest land and forest resources, limited sources of alternative employment and low human resources capacity. Poor governance and low demand for alternative outcomes, for example greater production of environmental services, has also played a part. Similarly, permanent forest estates have often not been demarcated, agricultural frontiers have continued to advance and uncontrolled logging has often remained widespread.

In addition to forest policies, a plethora of extra-sectoral policies impinge on forests and forestry. Some overlap, for example, policies dealing with biodiversity, climate change mitigation, protection of wildlife and desertification control, all of which transcend traditional sectoral boundaries. To some extent this has fragmented forestry agendas all the more so when several institutions are involved in policy implementation. Often such overlap mirrors the international situation, where almost every new convention also entails the creation of a new institution.

More importantly, policies in other sectors – agriculture, industry, energy, rural development, trade, etc. – heavily influence the forest sector, although these policies are usually primarily directed at issues far outside the forest sector. While there is considerable awareness about the impact of extra-sectoral policies on forests and forestry (and vice versa), difficulties persist in resolving intersectoral issues. In the event of conflicting objectives, forest policy objectives are often superseded by other policies that may appear to more directly and immediately affect human welfare.

## Legislation

As a policy instrument, legislation provides the legal mandate for policy implementation. One of the main concerns regarding legislation is whether it remains relevant in view of rapidly changing circumstances. Forest legislation is often fairly old in many countries (**Table 2.10**). For example, in India and the Philippines, the base legislation dates back to the early 1900s. Implementing these laws in societies undergoing rapid social, economic and political changes tends to create substantial social tensions. A number of countries are in the process or have recently completed revising their forest legislation.

**Table 2.10. Key forestry legislation in Asia-Pacific**

Countries	Legislation	Year enacted
Cambodia	Forestry Law	2002
China	Forest Law	1970 and revised 2006
India	Indian Forest Act	1927
Indonesia	Basic Forestry Law	1999
Lao PDR	Forest Law	2008 (latest)
Malaysia	National Forest Act	1984 and amended in 1993
Myanmar	Forest Act	1942
Nepal	Forest Act	1993
Philippines	Forestry Act	1904 (Amended 1975 Revised Forestry Reform Code)
PNG	Forestry Act	1992
Thailand	National Forest Act	1941 and amended in 1986
Viet Nam	Forestry Law	1991 and revised in 2004

Source: Yasmi *et al.* (2010).

Invariably one of the primary thrusts of most forest legislation is on defining forest ownership. Who formally owns the forests generally determines – from a legal perspective – who manages the forest. The overall forest ownership pattern in the Asia-Pacific region can be summarized as follows:

- In the developed industrialized countries, private ownership is widespread. For example, 24 percent of indigenous forests in Australia is privately owned and another 46 percent is on leasehold land under private management. As regards plantations, there have been significant changes and currently only 37 percent of the plantations is under government ownership. The extent of private forest ownership is about 60 percent in Japan. Ninety-three percent of the 1.8 million hectares of plantations in New Zealand is under private ownership (**Box 2.21**). Most forests in ROK are also under private ownership.

<b>Box 2.21</b>	<b>Ownership of plantations in Australia and New Zealand</b>
<p>Private ownership of plantations in Australia has increased significantly in the past 15 years, from about 30 percent in 1994 to 59 percent in 2006. During this period, two state governments have sold extensive tracts of plantations. At the same time, significant private sector investments in plantations have been made. A trend towards involvement of Timber Investment Management Organizations (TIMOs) in New Zealand is mirrored in Australia, with about 38 percent of forest plantations in Australia presently owned by TIMOs.</p> <p>The vast majority of plantations – about 93 percent – in New Zealand are under private ownership, including some Maori (indigenous groups) incorporations. Since 2003, the advent of TIMOs as substantial plantation owners is a major change in the ownership structure. Currently TIMOs own about 40 percent of New Zealand's plantation forests.</p>	

- Most forests – in particular natural forests – in developing countries in Asia are under public ownership, although governments may not have the necessary capacities to fully exercise ownership rights for various reasons (**Box 2.22**).
- Forests in Pacific Island Countries are primarily under customary community ownership (**Box 2.22**). Here again, the ability of communities to fully exercise their ownership rights varies depending on local level institutions.

Box 2.22	Forest ownership in South and Southeast Asia																																						
<p>Forest tenure is a key element determining who can use a forest and, consequently, how the forest is used. In 2006, FAO and other partners conducted a survey in 17 countries to assess typology of ownership and levels of control and access to resources. Of the 365 million hectares of forests in the 17 countries studied, at least 92 percent was publicly owned and most of this – about 67 percent – was under direct control of central governments. As regards actual management, 65 percent of publicly owned forests is managed directly and exclusively by central or local governments. Although user rights for home consumption are granted in many (41 percent) of these forests, this category comprises mainly open access, non-protected forests that are often de facto unmanaged owing to lack of government capacity.</p> <p>Source: FAO (2006b).</p> <p><b>Forest ownership in Pacific Island Countries</b></p> <p>Landholding in many Pacific countries is largely communal under systems of customary ownership, with some alienated land owned by government or privately owned under freehold titles (see table below). Increasing ownership disputes are a major deterrent to long-term investments and these are particularly severe in resource-rich countries like PNG, Solomon Islands and Vanuatu. However, too often logging companies easily bribe individual chiefs and obtain their approval for timber harvesting. In the absence of community dispute, the loggers move in quickly and ravage the forest with little or no monitoring.</p> <p><b>Landownership in selected Pacific Island Countries (Siwatibau 2009; PNG Investment Promotion Authority 2010)</b></p> <table border="1"> <thead> <tr> <th>Country</th> <th>Customary land (%)</th> <th>Government land (%)</th> <th>Freehold (%)</th> </tr> </thead> <tbody> <tr> <td>Fiji</td> <td>83</td> <td>9</td> <td>8</td> </tr> <tr> <td>PNG</td> <td>97</td> <td>3</td> <td>0</td> </tr> <tr> <td>Vanuatu</td> <td>98</td> <td>2</td> <td>NA</td> </tr> <tr> <td>Solomon Islands</td> <td>97</td> <td>3</td> <td>NA</td> </tr> <tr> <td>FSM*</td> <td>NA</td> <td>60</td> <td>40</td> </tr> <tr> <td>Kiribati</td> <td>40</td> <td>60</td> <td>NA</td> </tr> <tr> <td>Marshall Islands</td> <td>100</td> <td>NA</td> <td>NA</td> </tr> <tr> <td>Tonga</td> <td>NA</td> <td>100</td> <td>NA</td> </tr> </tbody> </table> <p>*Federated States of Micronesia.</p>				Country	Customary land (%)	Government land (%)	Freehold (%)	Fiji	83	9	8	PNG	97	3	0	Vanuatu	98	2	NA	Solomon Islands	97	3	NA	FSM*	NA	60	40	Kiribati	40	60	NA	Marshall Islands	100	NA	NA	Tonga	NA	100	NA
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Forest ownership has been a contentious issue in many countries in the Asia-Pacific region, especially in the context of contested claims arising from how forest laws, rules and regulations are formulated and who drives such legislation. In several countries, forest reservation has led to the appropriation of traditional rights, undermining the livelihoods of local communities. Often, strict interpretation of the rules and regulations makes collection of woodfuel, grazing, collection of non-wood forest products, etc., illegal. There is increasing recognition of the need for restoration of traditional rights of indigenous and other forest-dependent communities. A number of countries have enacted legislation in this direction (**Box 2.23**).



**Box 2.23****Restoration of rights to indigenous communities**

Conferring legal rights to traditional landowners has been addressed by a number of countries in the Asia-Pacific region. Many of these have a long history, beginning from a period of colonization and appropriation or termination of community rights over land and forests. Notable legislations that has attempted to enforce or restore indigenous community rights include:

- New Zealand Treaty of Waitangi (1840);
- Malaysia Land Ordinance of Sabah (1930);
- PNG Native Land Registration Ordinance (1952);
- Australia Native Title Act (1993);
- Philippines Indigenous Peoples Rights Act (1997); and
- India Forest Rights Act (2006).

The experience of transfer of forests to indigenous communities varies between countries. One of the most successful efforts has been the transfer of Crown forests to Maori communities in New Zealand. Very recently (July 2009), 176 000 hectares of plantations were transferred to CNI Iwi Holdings, owned by the eight iwi that make up the Central and North Island Iwi Collective (iwi are Maori tribal units).

In other countries, the effectiveness of implementation varies and the actual process of availing these rights is fraught with difficulties. India is in the process of implementing a Forest Rights Act (2006). In the Philippines, the Indigenous People's Rights Act (1997) requires prior and informed consent of local communities for logging, even if logging concessions have been awarded prior to the Acts' entry into force. Effective implementation of these types of legislation largely depends on democratic governance, transparency and rule of law. Interventions by civil society organizations have significantly helped in this regard.

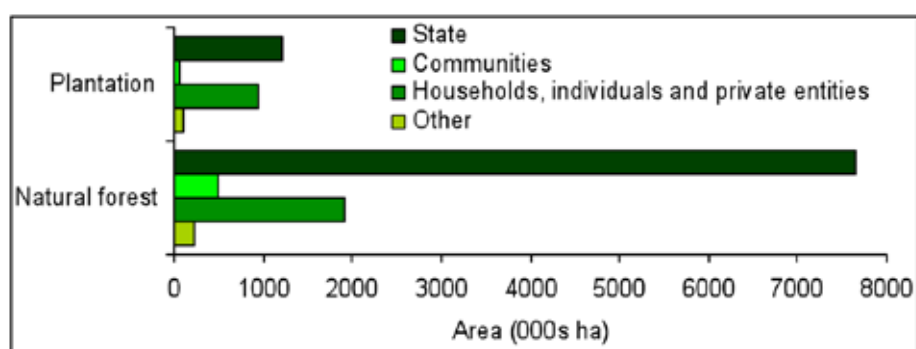
Source: Asia Forest Network (2009).

A number of countries have made substantial efforts to change land tenure arrangements and to empower local communities. China and Viet Nam have been in the forefront of such changes. Viet Nam has allocated significant areas of forests and forest land to individuals, communities and the private sector (**Box 2.24**). Public ownership of productive plantations fell from 48 percent in 1990 to 27 percent in 2005, while smallholder ownership rose from 46 percent to 64 percent. The impacts of such tenure changes remain inconclusive and will largely depend on the abilities of landowners (including communities) to manage the resources sustainably.

**Box 2.24      The contribution of forest land allocation in Viet Nam to SFM and livelihoods**

Land allocation by the state has been in progress in Viet Nam since 1994 and finalization is planned for 2010 (MARD 2007). Previously, forest in Viet Nam belonged exclusively to the state and was managed by state-owned entities but more recently forest has been allocated to households, individuals, communities and the private sector. This has had a range of effects on forest management, income generation and poverty.

In early 2005, there were 1.2 million forest landowners in Viet Nam; almost all were households or individuals. In 2006, 19 percent (1.9 million hectares) of the total natural forest area and 40 percent of plantation forests were owned by households, individuals and the private sector (see figure). By September 2007, more than 8 million hectares of forest land were reported to have been allocated.



In general, private and community rights contribute more to livelihood improvement and, to a lesser extent, poverty alleviation than organizational ownership. Results from a study in Dak Lak and Hoa Binh provinces show that forest land allocation also has a positive effect on forest resources – primarily in sites with donor support (Nguyen *et al.* 2008). In areas of critical environmental importance, state management appears to be more suitable than other tenure arrangements. In less critical protection and production forests, local management may be better suited to reducing poverty and achieving sustainable forest management.

Source: FSIV (2009) except where cited otherwise.

## Forestry institutions

The forestry institutional landscape is extremely varied. There has been significant progress towards pluralism, with a wide array of institutions – public sector forestry agencies, private sector firms, community organizations, civil society organizations and international institutions – being involved in forestry and other forest-related issues. The overall trend is towards reducing public sector involvement, thereby increasing the space for other players.

### *Public sector forestry institutions*

Historically, in almost every country, government forestry departments undertook a full range of forestry functions – from wood production to processing and marketing. Government activities also included activities such as policy development, research, education, forest health, training and extension. However, the roles of the public sector are being redefined as more efficient institutions emerge and take over some of these functions, requiring revamping and reinvention of public sector forestry organizations. During the past 20 years, there have been significant changes in the functions and structures of forestry institutions in the Asia-Pacific region, although the direction and pace of such changes differ considerably among countries (**Box 2.25**).

<b>Box 2.25</b>	<b>Reinventing forestry agencies</b>
<p>In 2008, FAO undertook a regional assessment of changes taking place in the functions and structures of forestry institutions, with particular focus on government forestry agencies. The assessment involved nine country studies analysing efforts at institutional restructuring and key outcomes. The study concluded that there is no panacea for institutional restructuring and reform processes, considering that social, economic, physical and political factors are markedly different among the countries in the Asia-Pacific region. To be successful and remain relevant, institutions need to ensure flexibility, strategic management capabilities, strong 'sensory' capacities and an institutional culture that responds to change.</p> <p>Source: FAO (2008b).</p>	

The overall pattern of change as regards public sector forestry agencies can be summarized as follows:

- Where forests are under government ownership, their protection from encroachment, illegal logging, etc. still dominates the functions of many public forestry departments. This is especially the case where land-use pressures are high.
- Management of forests for the production of goods and services is the other main function of public forestry departments. However, many departments face difficulties in combining policing and management functions in view of the very different skill sets and competencies required. Fulfilling management functions, especially in the context of commercial wood production, requires considerable operational flexibility. Many public forestry agencies – operating within the framework of civil services – may not have such flexibility. Since privatization of forests is often politically unacceptable, one approach has been to establish semi-autonomous public sector corporations (**Box 2.26**). A number of countries have pursued this path, but the efficacy and impacts of this option have been at best mixed. In many cases, larger governance constraints undermine the effectiveness of public sector corporations.

<b>Box 2.26</b>	<b>Fiji Pine Ltd.</b>
<p>Fiji Pine, Ltd. (FPL), a former government-managed asset (state-owned enterprise), was incorporated in 1990 as a step towards privatization of Fiji's pine plantation forests. The ultimate intention is to transfer ownership of the plantations into the hands of private landowners. At present, the shareholders of the company are the Government of Fiji and the Fiji Pine Trust, which represents the landowners who have leased their land to FPL. The company's management has to balance the demands of a variety of stakeholders, including the government (the majority shareholder), the forest landowners, the extension (leased) forest owners, managers, employees, contract labour, the labour union, village communities and external funding agencies, all with conflicting needs and expectations.</p> <p>Source: Van Deusen (2008).</p>	

- Provision of an appropriate policy and regulatory framework is another important function of public forestry agencies. This includes policy analysis and strategic planning to assist governments and other players to understand long-term developments and emerging opportunities and challenges. In many cases in Asia and the Pacific, the removal of constraints to efficient operations in the forestry sector – especially restrictive rules and regulations – will be a major step forward. Institutional theory suggests there is significant merit in dividing managerial and regulatory functions into separate agencies. For many forestry agencies in the region, trends in this direction are a major shift requiring significant

restructuring. Organizational structures and skill sets required to deliver the regulatory functions are very different from those required to fulfill managerial functions.

- As other players assume the major responsibility for producing forestry goods and services, increasingly the public sector is gearing to function as a facilitator. There are several examples that demonstrate how public sector forestry agencies have facilitated and supported smallholders and communities in sustainably managing forest and tree resources. The success of social forestry and community forestry in several countries in the region clearly indicates what could be accomplished through reorienting forestry agencies, shifting emphasis to the facilitation function.

The fragmentation of national forestry agendas with involvement by a multitude of government agencies (**Box 2.27**) is a major problem facing a number of countries. With several departments and ministries working in related areas, coherence and coordination have become major concerns.

Box 2.27	Public sector institutions involved in forestry
<p>There is no single, or even prevailing, institutional model among government forestry agencies in Asia and the Pacific. A wide variety of different structures and agencies operate to address forest management, land-use planning, research and extension, forest protection and conservation. In Indonesia and Myanmar, forests and forestry are under the jurisdiction of a specific and specialist Ministry of Forestry. In other countries (e.g. Cambodia, India, Lao PDR, Philippines), a ‘hybrid ministry’ exists. In India, for example, the Ministry of Environment and Forests is in charge of forestry matters. Lao PDR has a Ministry of Agriculture and Forests while Cambodia has a broader Ministry of Agriculture, Forestry and Fishery. Many countries designate forestry as a subordinate department within an overarching Ministry of Agriculture or Ministry of Environment. In Thailand, forestry is under the jurisdiction of both the Royal Forest Department and the National Park, Wildlife and Plant Conservation Department. The size of government forestry institutions is also diverse. In Myanmar, the Ministry of Forestry employs some 20 000 staff, while the Indonesian Ministry of Forestry employs around 35 000 staff. Conversely, in some of the small island countries a small handful of staff deals with forestry issues among other responsibilities. State forestry agencies are generally divided into a variety of divisions or groups that have different roles and responsibilities at various levels (i.e., national, provincial, or district) for activities such as forest management, policy development, planning, research, extension and training. Very often, the roles of these groups overlap due to changes in functions, legislation and policy that have outpaced institutional development.</p> <p>Source: Yasmi <i>et al.</i> (2010).</p>	

Research, education and training are other important functions that have remained largely within the public sector domain. Capacities in this regard vary among countries, largely reflecting the overall importance of the forestry sector within individual countries. While research and development and educational capacities are very well developed in countries such as Australia, China, Japan, India, Indonesia, Malaysia, New Zealand and Thailand, there are others where forestry is important, but capacities remain weak. Similarly, in many countries there are major barriers to translating research into practical applications. Public sector research has largely focused on biophysical and ecological aspects with much less attention being given to economic and social dimensions. To some extent, this imbalance is being remedied by the private sector and civil society organizations that are compelled to consider social and economic issues in their action-oriented research agendas.

### ***The private sector***

The degree of private sector involvement in forestry varies considerably in the Asia-Pacific region. While the private sector plays a key role in wood processing in most countries, its role

in managing forests depends on the overall policy and legal framework as well as economic viability. As indicated earlier, private ownership and management of forests is more predominant in the developed countries, especially Australia, Japan, New Zealand and ROK, compared with developing countries. Three key areas of private sector involvement are:

- Management of natural forests – primarily for production – through long-term concessions, especially in Southeast Asia and to some extent in the Pacific countries.
- Forest plantation management.
- Wood processing.

In the past, managing long-term natural forest concessions has proven attractive to the private sector, as the payback period on investments is relatively short. However, with increasing concerns about the environmental values of natural forests, forest concession management is facing considerable challenges, especially on account of cost increases and the need to demonstrate that forests are managed sustainably, taking into account a wide range of social and environmental values. Consequently, the private sector focus is increasingly shifting to establishment and management of plantations.

In addition to traditional forestry players, particularly firms that manage forest concessions and plantations as part of vertically integrated forest industry companies, a number of new players have emerged on the forestry scene in recent years, especially institutional investors. TIMOs have been particularly active in Australia and New Zealand and, more recently, in China. However, many of these investments respond to short-term market sentiments, causing considerable uncertainty in management (**Box 2.28**).

Box 2.28	Mobility of institutional investments and stability of wood supply
<p>“While planted forest investments are very immobile (being locked into the land they are planted on) planted forest investment funds by contrast have become very mobile in recent years. It is now commonplace for TIMOs especially, to buy planted forests and managed natural forests and then sell down part or all of them in a decade. TIMO funds are set to have about a ten-year life span and it is most common for them to be wound up at the end of those periods, or before. Even endowment funds may buy and sell on very short time frames.”</p> <p>“This short-termism of the new planted and managed native forest owners may be creating a new set of problems, including fire management and long-term wood supply security (or lack of it) for wood-processing companies.”</p> <p>Source: Neilson (2009).</p>	

In many countries, the rules and regulations intended to protect public forests have discouraged private sector involvement in tree growing. For example, until recently, in India, the government maintained ownership of species like sandalwood, including trees growing on private lands. These restrictive rules, which discouraged private sector initiatives, are gradually being removed.

### ***Smallholders and enterprises***

Throughout the Asia-Pacific region smallholders have become significant players in the forest sector producing a substantial quantity of wood. The main factors contributing to this increased involvement of farmers in tree growing are:

- Secure tenure.
- Increasing local demands for wood, especially in the context of declining supplies from forests.

- Reduced profitability of agriculture, especially in the context of increasing input prices (especially labour) and consequent shift to low input tree cropping.
- Diversification towards income generation from non-agricultural activities and consequent reduced dependence on agriculture.

A diverse array of support mechanisms has promoted farm tree planting. The most important has often been the removal of restrictive rules and regulations, including those related to transport of wood and wood products. Others include:

- Technical advice and supply of seedlings under social forestry and farm forestry programmes implemented by forestry departments.
- Financial and technical support through joint initiatives by financing institutions and industries.
- Provision of incentives including more favourable taxation rules.
- Outgrower schemes implemented by industries, providing technical support (including high quality seedlings) with guarantees to procure wood at agreed prices.

Despite the relatively small size of typical farm woodlots, there are indications of continued expansion of tree growing by farmers. Increasingly, the activities of tree growers are being supported by cooperatives, as in the case of tree growers' cooperative societies in India. The National Tree Growers' Cooperative Federation, established in 1986, provides support to all tree growers' cooperatives in India. In a number of Indian states, tree growers' cooperatives have also taken up afforestation and reforestation of public land, which provides opportunities for the landless.

### **Local communities**

Community forestry has a long history in the Asia-Pacific region, although government dominance – especially through forest reservation during colonial periods – led to a marginalization of such community-managed systems. The importance of community involvement has been rediscovered over the past 30 years, especially in the context of failures by public forestry organizations to effectively protect and manage forests sustainably. Nepal has made pioneering efforts in this regard, through the establishment of Forest User Groups. These have become an effective grassroots mechanism for sustainable management of forests and other resources (**Box 2.29**).

<b>Box 2.29</b>	<b>Community forestry in Nepal</b>
<p>Community forestry in Nepal emerged in the mid-1970s and led to the transfer of management responsibilities and rights to products to Forest User Groups, with the objective of conserving and arresting degradation in hill forests. During the past three decades, the country's community forestry programme has evolved in terms of coverage and institutional innovation, supported by changes in policies and legislation that empowered local communities. Substantial international support has also helped to sustain community participation. As of September 2007, a total of 1.2 million hectares of forests had been handed over to approximately 14 500 Forest User Groups. An important development has been the establishment of the Federation of Community Forestry Users, Nepal (FECOFUN), which has become a powerful institution in helping Forest User Groups to improve their efficacy, sustainability and equity. FECOFUN is one of the most effective community-based organizations in the Asia-Pacific region and has been highly successful in articulating the needs of Forest User Groups and influencing policy processes at various levels.</p> <p>Source: FECOFUN (2009).</p>	

Joint Forest Management (JFM) in India is a similar model of community participation. Unlike Forest User Groups, there is much more involvement of state forest departments in regulating the functions of communities under JFM. In many cases, the real power in managing forests still rests with the forest departments. For example, Forest Protection Committees at the local level are seldom given the power to develop management plans or to exercise executive and legal functions. Currently, about 22 million hectares are under JFM, covering about 125 000 villages and involving about 100 000 JFM committees (Ministry of Environment and Forests, Government of India 2009). Although the evolution of JFM is a major institutional innovation in forest management in India, the commitment of state governments and forest departments to implement it varies across the country (Damodaran and Engel 2003).

### ***Civil society organizations***

Civil society organizations include a wide spectrum of institutions, other than government and private sector organizations, operating at local, national and global levels. They have emerged as major players in the forestry scene in the Asia-Pacific region, especially during the last three decades (Keong 2009). Civil society organizations include local and international NGOs, indigenous groups, churches, the media and academic and research institutions, and form an important constituency in advocating changes and monitoring progress (Elges 2009). The scope of their interventions varies considerably, largely reflecting overall political environments. Civil society organizations particularly thrive in democratic environments. At grassroots levels, non-governmental organizations (NGOs) take up tasks that are perceived to be inadequately performed by public and private sectors. Many provide critical services, including technical advice to local communities on a wide array of topics like tree growing, and management, collection, processing and marketing of non-wood forest products. In many cases, governments depend on NGOs to implement various programmes, especially when the outreach capacities of governments are limited.

The advocacy roles of NGOs have become increasingly important, helping to bring about changes in policies, legislation and institutional arrangements. NGOs have played a key role in the shift in forest management objectives, emphasizing social and environmental dimensions. Establishment of protected areas, conferring forest rights to indigenous communities and promotion of community management of forests are some of the major issues that advocacy by NGOs has strongly influenced in the Asia-Pacific region. Many of the accomplishments in these areas are largely due to the advocacy role of civil society organizations, especially NGOs.

Forest law enforcement and governance (FLEG) has become a key issue for civil society organizations in the region. Concerted efforts by NGO major players such as Transparency International, Greenpeace, TRAFFIC, Global Witness and other such organizations have compelled governments to pursue action to address rampant illegal logging and associated trade in several countries in the region. Especially in the context of large-scale global trade in illegally procured wood and other products, the role of NGOs that have global reach becomes critical. Largely, it is their efforts that have led the private sector to give significant attention to corporate social responsibility.

While NGOs have had major impacts on the forest sector, there are considerable differences in the performance of individual organizations. Improved access to information (often facilitated by legislation relating to rights to information and advancements in information and communication technologies) will certainly enhance the role of civil society organizations as important players in the forest sector. A number of civil society organizations have well-established research facilities to back up their advocacy and action roles. However, there are also opportunistic organizations driven by individual interests, as well as those that have become large bureaucracies, undermining

efficiency and effectiveness. As in the case of other institutions, significant changes should be expected in the roles and responsibilities of civil society organizations, including some consolidation as more inefficient groups are weeded out.

## **AN OVERVIEW OF RESOURCES, POLICIES AND INSTITUTIONS**

The Asia-Pacific region is less endowed with forests in comparison with much of the rest of the world. Further, there is considerable imbalance in the distribution of forests and human populations, with East Asia and South Asia being the least forested in relation to populations. Although a number of countries have achieved stability in forest areas through high investments in reforestation and afforestation, and despite the increased focus on provision of ecosystem services, deforestation and degradation remain major problems in most Asia-Pacific countries. However, tree planting by farmers is a positive development in several countries, boosting wood supplies considerably. Most countries have also invested in expanding the extent of protected areas and improving their forest management, especially through community involvement.

Forest policies have undergone major changes in the last two decades, with a significant shift away from timber-focused management to the provision of ecosystem services. In response to perceived environmental problems, several Asia-Pacific countries have banned logging in natural forests. Although sustainable forest management that balances economic, social and ecological objectives remains the basic tenet of most forest policies, its actual implementation remains elusive. Extraction of timber often far exceeds the levels of sustainability; at the other extreme negative reactions to logging have led to total bans on logging in a number of countries.

Changes in legislation and institutions have often lagged behind forest policy changes. Forest tenure remains a critical issue, considering that more than 80 percent of forests are under government control. However, communities are gaining greater voice in resource management through various initiatives. Of particular significance is the restoration of forest and land rights to indigenous communities and other forest-dependent people. However, changes in the institutional environment remain highly variable. While public sector forestry agencies maintain a dominant position in many countries, the involvement of the private sector, farmers, local communities and NGOs is on the increase, creating a dynamic, pluralistic, institutional environment.