

2.4.2. Forests and climate change

Forests are intimately involved in climate change

Forests are globally important reservoirs, sources and sinks of carbon. During the 1990s deforestation and forest degradation accounted for 20 percent of global anthropogenic greenhouse gas emissions (Gullison *et al.* 2007). Growing trees and forests absorb carbon dioxide and provide a means to mitigate climate change. When sustainably managed, forests also supply products for which life cycle emissions of greenhouse gases are considerably lower than alternatives including steel, aluminium, bricks, concrete, plastics and fossil fuels. Additionally, forests provide services, such as coastal and watershed protection, which are important in adapting to climate change effects such as increased frequency and intensity of floods, storms and droughts. Forests will also be directly affected by climate change. In particular, reduced rainfall and increased temperatures are likely to result in forest drying and increased frequency of fire, diseases and pathogens. Phenological patterns and relative competitiveness of species within habitats are also likely to change, with concomitant effects on ecosystem functioning (see Section 2.1.4).

Climate change will affect forestry and forestry could play a role in mitigation

In Southeast Asia, it is expected that climate change will result in decreased freshwater availability, increased risk of flooding in coastal and deltaic areas and increased occurrence of extreme rains and associated landslides (Cruz *et al.* 2007; **Box 2.16**). The potential impacts of climate change – and the impacts of responses to climate change – on forestry in Southeast Asia are considerable. Substantial benefits could accrue if the subregion's forestry sector can be positioned as a feasible mechanism to achieve climate change-related goals. For this to occur, however, many of the social and political issues currently constraining expansion of SFM will need to be overcome.

Box 2.16. The nature of climate change impacts in Asia

Over past decades changes have been observed in extreme events and climate anomalies in Southeast Asia (Cruz *et al.* 2007). These have included increased occurrence of extreme rains causing flash floods in Viet Nam; landslides and floods in the Philippines in 1990 and 2004; and floods in Cambodia in 2000. Droughts have normally been associated with El Niño years in Myanmar, Lao PDR, Philippines, Indonesia and Viet Nam. The droughts in 1997/1998 caused massive crop failures, water shortages and forest fires in various parts of the Philippines, Lao PDR and Indonesia.

In the future, climate change is expected to have a range of effects and is projected to impinge on the sustainable development of most developing countries of Asia, as it compounds the pressures on natural resources and the environment associated with rapid urbanization, industrialization and economic development. Most regional climate change studies project changes in the seasonal distribution of rainfall, with drier and/or longer dry seasons and shorter, more intense wet

seasons (Johnston *et al.* 2009). In Southeast Asia, little change in annual rainfall is foreseen until 2040 (Cruz *et al.* 2007). An increase in occurrence of extreme weather including heat waves and precipitation events is, however, predicted. Increases in tropical cyclone intensities by 10 to 20 percent are expected while temperature is projected to increase by 0.7-0.9°C (Cruz *et al.* 2007).

Changes in climate are expected to increase the incidence of fire, forest dieback and spread of pests, pathogens and invasive species, and are also likely to directly affect tree physiology, forest growth and biodiversity (SLU 2008; Cruz *et al.* 2007). Increases in extreme rainfall events are likely to directly increase the frequency of landslides in sloping areas (Rosenfeld 1999). At the same time, increased road development and rising levels of human activity in forest areas are likely to increase the incidence of fire and may result in increasing cycles of forest devastation (Rowell and Moore 2000). Maintenance of forest health and vitality may, therefore, become of key importance in relation to slope protection as well as other climate change-related goals (Seppälä *et al.* 2009; Dolidon *et al.* 2009).

Source: Cruz *et al.* (2007) and IPCC (2007b).

Roles of forestry in climate change mitigation

Deforestation and forest degradation account for large releases of CO₂ into the atmosphere

On a global scale, land-use change and forestry – mostly deforestation – are estimated to account for 17.4 percent of greenhouse gas emissions while transport accounts for only 13.1 percent (IPCC 2007b). Degradation of forest through logging, fire, disease and pathogen attack also increase CO₂ emissions, which may be permanent. Carbon is stored in the leaves, branches, trunks and roots of trees and also in forest soils. Old growth tropical forests store between 120 to 400 tonnes of carbon per hectare, i.e., 440-1 467 tonnes CO₂ equivalent¹⁸ (Laurance 2007b). Assuming a typical soil carbon density of 60 kg/m³, forests on peat swamps contain 600 tonnes of carbon in the top 1 metre of soil, which also has to be taken into account. A proportion of this is released into the atmosphere following drainage, deforestation and burning (**Box 2.17**). In relation, peatlands make up 12 percent of the land area in Southeast Asia and are estimated to account for 25 percent of current deforestation (Hooijer *et al.* 2006).

Deforestation constitutes a major source of global CO₂ emissions

It has been estimated that the amount of carbon presently locked up in forest ecosystems exceeds the total amount of carbon in the atmosphere (Stern 2006). **Figure 2.21** shows sources of emissions from land-use change in tropical countries, which are the source of over 98 percent of global emissions from land-use change. Deforestation is dominant although emissions associated with forest products and slash¹⁹ from harvesting and management – potentially equivalent to forest degradation – also play an important role.

18 One tonne of carbon is equivalent to 3.67 tonnes of CO₂.

19 Branches, stumps and leaves, etc., left after harvesting or thinning.

STATUS AND TRENDS IN FORESTS AND FORESTRY

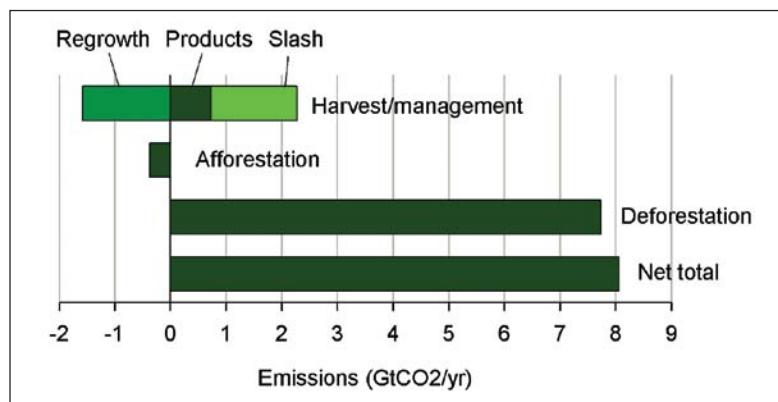


Figure 2.21. Annual emissions from land-use change in tropical regions by source for the 1990s

Source: Based on data from Houghton (2003).

Southeast Asia is a huge emitter of greenhouse gases from land-use change

Figure 2.22 shows net annual transfer of carbon into the atmosphere from land-use change for global tropical regions. As a result of reductions in carbon fluxes in South and Central America in the 1990s, South and Southeast Asia became the largest source of carbon from land-use change in 2002 (Houghton 2008). Carbon flux from the United States is shown to demonstrate trend reductions that have occurred due to transitions away from agricultural expansion since the beginning of the twentieth century.

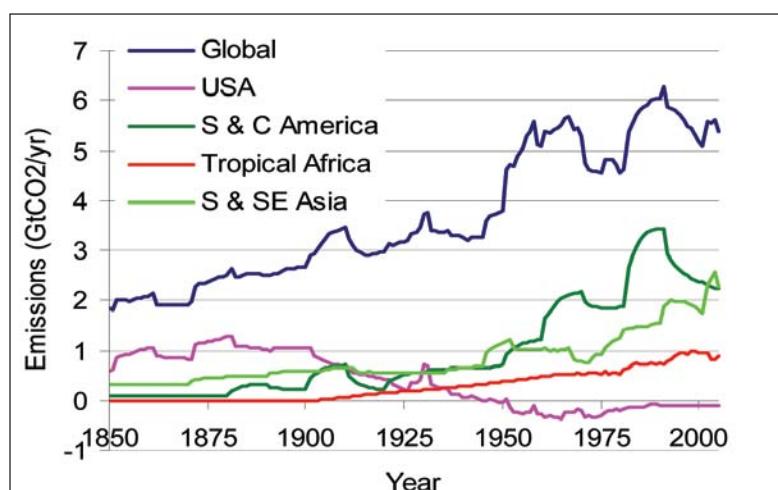


Figure 2.22. Annual net flux of carbon to the atmosphere from land-use change in global regions: 1850-2005

Source: Based on data from Houghton (2008).

Global agreements have so far been unsuccessful in forest-related climate change mitigation

Because benefits associated with climate change mitigation are accrued internationally while costs are borne nationally and locally, global mechanisms to market the climate change mitigation values of forests are being further developed. The United Nations Framework Convention on Climate Change (UNFCCC) recognizes the importance of land use and land-use

change (LULUCF) activities in stabilizing atmospheric greenhouse gas concentrations and the Kyoto Protocol makes provision for associated activities. At present, only afforestation and reforestation (A/R) activities qualify under the Clean Development Mechanism (CDM) of the Kyoto Protocol, which aims to reduce emissions in developing countries by funnelling payments from industrialized countries to help meet their emissions targets.²⁰ Only a handful of projects, have, however, successfully tapped CDM funds. More widespread implementation has been curtailed by methodological complexities related to leakage, permanence, additionality and monitoring (see **Box 2.18**). The low price of temporary credits available for A/R activities and the small proportion of revenue from CDM in relation to other revenues from A/R have also been an obstruction (Neff and Henders 2007).

The cost of reducing emissions from deforestation and degradation appears low

Apart from A/R activities, it has been estimated that the cost of reducing emissions from deforestation and degradation will be low in comparison with current carbon credit prices (Chomitz 2007). The initial annual opportunity cost of forest protection in eight countries accounting for 70 percent of emissions from land use has been estimated at US\$5 billion (Stern 2006). As well as REDD, options open for consideration in a new climate change agreement include afforestation, reforestation and enhancement of sinks through forest restoration, and substitution of forest products for electricity and fuel (Robledo and Blaser 2008). Greater inclusion of forestry in a post-Kyoto agreement is greatly anticipated, although many doubts remain over the expected effectiveness of REDD mechanisms (Lang 2008). In particular, it has been suggested that addressing deforestation and its "deeply-entrenched social causes" may prove to be more expensive than alternative ways of reducing emissions of greenhouse gases (Raffensperger 2007). The failure to reach encompassing agreement on an international framework on REDD at the United Nations Climate Conference in Copenhagen in December 2009 (COP 15) suggests that there is still some way to go before forests become an integral part of international climate change mitigation regimes.

Voluntary markets have become the main vehicle for forestry-related carbon trading

Owing to the difficulty of accessing or the present unavailability of internationally regulated 'compliance' markets for forest-related emissions reductions, voluntary carbon markets have become the main vehicle for investment in forestry-related climate change mitigation. Markets have been growing rapidly and in 2007, A/R and avoided deforestation activities respectively accounted for 10 percent and 5 percent of over the counter transactions²¹ (Hamilton *et al.* 2008). Projects in Asia generated two-fifths of credits transacted in the OTC market in 2007 and around 6 percent of these were for forestry-related activities.

20 Emissions from deforestation were omitted from CDM projects primarily because of the risk of leakage (Stern 2006).

21 'Over the counter' refers to voluntary transaction made other than through the Chicago Carbon Exchange, a cap and trade system which organizations join voluntarily.

Prices per tonne of CO₂ equivalent were lower for avoided deforestation than A/R projects, although great variation exists (Hamilton *et al.* 2008). In March 2008, Merrill Lynch agreed to pay US\$9 million over four years to protect 750 000 hectares of forest in Indonesia's Aceh Province with a proportion of funds going to communities to help prevent logging (Wall Street Journal 2008). Emissions reductions of 3.4 million tonnes of CO₂ per year are expected and associated credits are likely to climb in value if REDD is included in a post-Kyoto international agreement.

Box 2.17. CO₂ emissions from deforestation and forest degradation in Riau Province, Sumatra – a case for REDD

In Riau Province, Sumatra, estimated total emissions of CO₂ from deforestation, forest degradation, peat decomposition and peat fires between 1990 and 2007 exceeded the total amount of CO₂ emitted by the European Union in 2005. The total CO₂ emissions of 3.66 giga-tonnes (Gt) were divided between deforestation (1.17 Gt), forest degradation (0.32 Gt), peat decomposition (0.78 Gt) and peat burning (1.39 Gt – from 1997-2007 only).

Carbon sequestration by *Acacia* and oil-palm plantations that replaced the forest amounted to less than 7 percent of that released. Indonesia's emissions from LULUCF in 2000 totalled 34 percent of global LULUCF emissions and average annual emissions from Riau between 1990 and 2007 equalled approximately 4.4 percent of Indonesia's total emissions for 2000.

Riau is covered by vast peatlands, which are able to store more than 30 times more carbon than the forest above them. When peatlands are drained, logged and burned, large amounts CO₂ are released into the atmosphere from woody biomass and from peat oxidation. Rapid changes in land use have been taking place over the past decades due to demand for land, for timber, and for establishment of palm oil and pulpwood plantations. Forest cover in Riau fell by 65 percent between 1982 and 2005 and stands at around 27 percent today.

Forecasts are that forest cover could decline to 6 percent between 2007 and 2015 under a "business as usual" scenario. Of the new deforestation, three-quarters of which is expected to be driven by the pulp and paper industry, 84 percent is expected to take place on peatlands. If profits from marketing carbon credits through REDD mechanisms are comparable to those of marketing timber, it is likely that more of Riau's forest and peatlands will be protected, especially as Riau does have large areas of 'waste' land available where plantations could be developed.

The rate of deforestation in Riau has, however, fallen in the past decade. Firstly, as a result of debt problems in the pulp and paper industry in the early 2000s and more recently as a result of investigations into illegal logging and land conversion. In March 2009, the *Jakarta Post* reported that Riau Andalan Pulp and Paper was laying off half its workforce (2 000 workers) and running at only 44 percent capacity (*Jakarta Post* 2009). The 2008/2009 economic downturn and reduced demand for pulp and paper may yet provide a temporary respite in CO₂ emissions from Riau.

Source: Uryu *et al.* (2008) except where cited otherwise.

Depending on the mechanism adopted, revenues from REDD may be considerable

In anticipation of the inclusion of REDD activities in a post-2012 climate change agreement, most countries in Southeast Asia, are beginning processes to become 'REDD ready', i.e., preparing strategies and frameworks that will meet expected requirements of global REDD markets.²² Emissions reductions from REDD are likely to be purchased either on the basis of foregone opportunity costs or the value of carbon emissions saved (Scholz and Schmidt 2008). **Table 2.8** shows that Indonesia dominates deforestation and loss of growing stock in Southeast Asia, accounting for 63 percent of net forest cover loss. Viet Nam, on the other hand, has made significant gains in forest cover and growing stock since 1990. Myanmar and the Cambodia also have high reported rates of deforestation. Indonesia's 94 432 000 hectares of forest contain an estimated 13 017 million tonnes carbon in above- and belowground biomass. On average, carbon and CO₂ equivalent densities are therefore 138 and 506 tonnes per hectare. Using a price of US\$5 per tonne for CO₂ emissions reductions, the average value of forest per hectare would be US\$2 530, with all forest carbon worth US\$222 billion. In practice, REDD payments would be related to a baseline rate of deforestation. Costs associated with establishing and administering a REDD framework would also be subtracted and in countries where governance is weak, these costs are likely to be considerable.

Table 2.8. Deforestation and degradation rates in Southeast Asian countries, 2000-2010

	Forest cover change (000 ha/yr)		Growing stock change (million m ³ /yr)		Carbon stock in forest (tonnes)*
	2000- 2005	2005- 2010	2000- 2005	2005- 2010	2010
Cambodia	-163.0	-127.4	-16.8	-13.2	464
Indonesia	-310.4	-685.0	-154.0	-223.2	13 017
Lao PDR	-78.0	-78.2	-4.6	-5.6	1 074
Malaysia	-140.2	-86.8	-52.0	-39.4	3 212
Myanmar	-309.4	-309.6	-14.0	-13.8	1 654
Philippines	54.8	54.8	1.8	1.3	663
Thailand	-21.2	14.8	-0.8	0.6	880
Viet Nam	270.4	144.0	12.2	3.0	992
SE Asia	-709.8	-1 086.4	-228.6	-290.8	22 028

*Includes carbon in living above- and below ground biomass.

Source: FAO (2010).

REDD has many hurdles to overcome

The workability of REDD will depend on a wide range of political, institutional and technical issues. The Stern review emphasized defining property rights to forest land and determining rights

22 Lao PDR, Viet Nam, Indonesia and more recently Thailand and Cambodia, have begun preparations to access post-2012 REDD markets.

and responsibilities of landowners, communities and loggers in effective forest management (Stern 2006). Institutional capacity is likely to pose a particular challenge in countries where forest cover remains high and governance systems are relatively undeveloped. A range of technical issues will also have to be addressed as detailed in **Box 2.18**.

Box 2.18. Major technical issues facing REDD

Scope: While a national-level REDD approach addresses issues with in-country leakage and allows flexibility through aggregated management of national forest resources, projects are likely to be easier to implement and more able to accommodate within-country heterogeneity.

Monitoring: Monitoring deforestation and forest degradation and quantifying carbon flows with precision may impose significant costs and internationally agreed definitions and methodologies need to be developed.

Baselines: Setting baselines according to a country's historic rate of deforestation and degradation, and offering carbon credits for reductions below this reference level, have been widely proposed. This method, however, neglects countries that have already lowered their deforestation rate and provides no incentive for continued conservation.

Leakage: Conservation of one forest can displace deforestation and degradation to another area and although a national-level REDD approach addresses this issue at the country level, transboundary leakage is likely to occur where adjacent countries do not participate in REDD. Markets may also turn to alternative products with greater life cycle CO₂ emissions than forest products.

Permanence: Emissions reductions from forestry can be reversed through deforestation or natural causes such as fire. Non-permanence is particularly likely where rights and responsibilities are unclear, as is common in areas with rapid deforestation. Awarding credits post-facto or holding a proportion of credits as a buffer can help to manage such risks. Reductions in the value of credits are, however, likely to result.

Source: Adapted from Davis (2008).

REDD will face longstanding barriers to SFM adoption and must avoid leakage

In Southeast Asia, many challenges face REDD implementation. Monitoring of forest cover and carbon density to the extent and level of accuracy likely to be necessary has never been done at scale. Institutional mechanisms of the type and level of complexity needed to effectively coordinate REDD activities and distribute associated benefits do not exist in most Southeast Asian countries. Definitions also need to be agreed upon to avoid, for example, conversion of natural forest to plantation forest (Sasaki and Putz 2008). Governance issues (see Section 3.6.1) are unlikely to disappear and leakage is likely to occur across borders where

countries with remaining forest resources and no REDD mechanism are found next to countries implementing REDD (see Brown *et al.* 2001). Additionally, effort will need to be made to ensure that forest product shortages resulting from REDD implementation do not increase incentives to resume unsustainable extraction or create rising demand for wood substitutes with higher life cycle carbon emissions (see **Box 2.19**).

Box 2.19. Mounting competition from non-wood substitutes

Competition from non-wood sectors is mounting. The plastics industry has set its sights on the tropical hardwood sector, developing look-alike products for exterior applications, such as garden furniture and boarding. A company called Ecogenic is promoting a new product manufactured entirely from recycled plastic that would replace tropical hardwood plywood in non-structural exterior applications. Two plants, each capable of producing 400 000 panels of the new product each year, will be set up in the United Kingdom during 2009.

Particularly worrying for the tropical sector is that buyers seem to be receptive. There is a strong feeling amongst architects and designers that the key environmental issue at present is the 'carbon footprint'. This is linked to a preference for products not perceived to be transported over long distances. There is also a strong aversion to tropical hardwoods due to the assumption that they are closely associated with deforestation and linked to increased emissions.

Source: Extracted from a report on the Ecobuild event held in London, from 3-5 March (ITTO 2009e)

Forestry and climate change adaptation

Forests have several roles to play in climate change adaptation

Climate change in Southeast Asia is expected to result in increasing intensity of floods, storms and droughts as well as sea level rise. Forests have several potential roles in adapting to these threats, especially in relation to coastal protection and reduction of landslide risk (see Section 2.4.3). Coastal forests and mangroves in particular, provide protection for people and assets against storms and cyclones. Although cyclones infrequently make landfall on the eastern side of the Bay of Bengal, Cyclone Nargis was an exception and claimed over 84 500 lives (TCG 2008). Mangrove forests in the Ayeyarwady Delta have been almost completely cleared over the past 60 years and the presence of habitations close to the high tide mark increased exposure to the oncoming cyclone and storm surge. Although mangrove forests cannot prevent inundation, tall dense vegetation attenuates wave action and provides structures for survivors to cling to. Coastal forests also act as a windbreak in reducing the impact of cyclones and coastal storms on local communities.

Coastal forests can protect against storms and cyclones

The east coast of Viet Nam is regularly subject to storms and typhoons from the South China Sea. Every year there are around 10 to 15 storms and typhoons which cause damage to houses, buildings and trees and also result in flooding, landslides and waterlogging. As such, storms and typhoons strongly impact on people's lives and national production (FSIV 2009). Research carried out in Orissa following the super cyclone of 1999 showed that had mangroves been present around affected villages, loss of life would have been considerably lower (SANDEE 2007). During cyclone Sidr that struck southern Bangladesh in November 2007, the Sunderbans forests also helped to mitigate the effects of the cyclone (FAO 2008a).

Forest management will need to change to protect forest values

Adaptation of forest management will also be necessary to avoid reductions in the flow of goods and services, including in relation to climate change mitigation. Climate change could result in increased incidence of fire, forest diebacks and spread of pests, pathogens and invasive species and could also have direct effects on tree physiology, forest growth and biodiversity (SLU 2008; see **Box 2.7**). Assessments of forest health and productivity and institutional strengthening are of central importance in managing responses to climate change impacts. Specific areas of interest are likely to include maintaining the health and vitality of natural forests, taking future climate change into consideration in planning plantation establishment, developing effective fire suppression and control systems and implementing measures to control insect and disease outbreaks.

2.4.3. Forests and water

Forests reduce erosion and help to maintain water quality

Sustainable management of upland forests and agricultural lands in Southeast Asia is hindered by the combination of steep hill slopes, high intensity rainfall, dry seasons and highly erodible soils (Sidle *et al.* 2006). The role of forests in minimizing erosion and maintaining water quality is of particular importance in hydroelectric schemes where sediment can reduce reservoir capacity and wear down turbine blades; in maintaining aquatic habitats and river navigation by preventing excessive sedimentation and sediment deposition; and in maintenance of water quality for drinking (Hamilton 2008). Because fertilizers and pesticides are seldom used in natural forest areas, forests provide preferable land cover to agriculture, habitation and industrial development, etc., where drinking water supplies are concerned (Hamilton 2008). Riparian buffer zones are particularly important in preventing sediments and pollutants from entering rivers and in stabilizing river banks. Erosion control and entrapment of sediments is also of relevance in coastal ecosystems where removal of mangroves can lead to loss of land, saline intrusion and exposure of coastal populations and assets to increased risk from coastal hazards (FAO 2006c, Forbes and Broadhead 2007).

Forest cover can reduce landslide risk

Trees also play an important role in averting landslides under less extreme conditions, although deep landslides resulting from continuous heavy rainfall or earthquakes are unlikely to be affected (Hamilton 2008). Deep-rooted trees and shrubs strengthen shallow soil layers and improve drainage, thereby reducing the occurrence of shallow landslides. Transpiration from extensive tree canopies can also decrease soil water content and reduce landslide risk (Dolidon *et al.* 2009). Conversion of forests on sloping land reduces rooting strength for up to two decades, even with subsequent regeneration, and increases landslide risk (Sidle *et al.* 2006). Maintenance of forest cover in slip-prone areas where slopes are greater than 45–55 percent, where slopes are concave, or soils have low cohesion, or are shallow and cover bedrock, is particularly important (Megahan and King 1985).

Landslide risks are recognized but not always mitigated

Land uses that increase surface erosion and slope instability in tropical uplands include logging,²³ road and trail construction and forest conversion, while surface erosion is usually low in undisturbed forest catchments (various sources cited in Sidle *et al.* 2006). Increased occurrence of storms and increased logging and infrastructure development in sloping areas is likely to raise the incidence of erosion and landslides in the coming years. Although regulations preventing logging in riparian zones and on steep slopes are generally included in forest harvesting guidelines in most countries, they are often not strictly adhered to or enforced.

Forest-water relationships are unclear

Lack of certainty regarding the precise nature of the hydrological functions of forests, particularly in relation to flooding and droughts, has brought some uncertainty to forest protection for watershed management (Hamilton 2008; FAO 2005b; **Box 2.20**). Water-related issues have, however, been perhaps the most significant driver of forestry-related policy change in Asia. Landslides following heavy rains in southern Thailand in 1988 were linked to deforestation of steep slopes and, as most of the damage was on land cleared for cropping, a logging ban was subsequently implemented (see **Figure 2.23**). Although logging increases landslide risk, forest clearance itself and replacement with vegetation less capable of securing the soil – rubber in particular – also played an important role (Rao 1988). Similarly, in the Philippines, recurrent devastating floods and landslides were attributed to illegal logging and led to the pronouncement of logging bans, most recently in 2004 (Guiang 2001; Manila Bulletin 2004). Although links between forestry activities and erosion, floods and droughts are sometimes imprecise, natural disasters are likely to remain a key driver of forest policy in the coming years.

23 In steep areas with wet climates, unpaved roads commonly associated with logging operations can cause a 10–300-fold increase in landslide erosion rate in forested catchments (Dolidon *et al.* 2009).

Box 2.20. The technical and political relationship between forests and water

The relationship between forests and water has been variously misunderstood over the years. Forests have been believed to play roles that upon closer examination have been disproven. Importantly, it has been commonly held that firstly, trees and forests increase downstream water yields and secondly, that forest cover prevents flooding. On the basis of collected scientific evidence, however, it is clear that forests reduce the water yield of catchments rather than increase it (Hamilton 2008). Another comprehensive assessment has made a very strong argument that forest cover has limited effects on catastrophic flooding (FAO 2005b). Nonetheless, forest- and water-related issues have been at the forefront of dramatic policy shifts in the Asia-Pacific region. For example, the logging bans in Thailand, the Philippines and in China were largely the result of the understanding that landslides, floods and droughts were the result of deforestation.

Removal of tree cover does accelerate water discharge from a catchment and can therefore increase the risk of flooding and drought, although the effects are only significant in small catchments of up to 100 km² and with short duration low intensity rainfall (Hamilton 2008). At larger scales and lower down in watersheds, the effect of forest cover is negligible. As such, the primary significance of forests in relation to water is in maintaining water quality through reducing sedimentation and filtering out pollutants and in erosion control and landslide prevention. In relation to these roles, forest alteration or conversion generally does not have catastrophic consequences, but high impact logging and forest removal generally increase risk. Additionally, substitution with other vegetation types may provide similar benefits but the period without vegetation has to be considered and water-related services may still fall short of those provided by healthy forests (see review by Hamilton 2008).

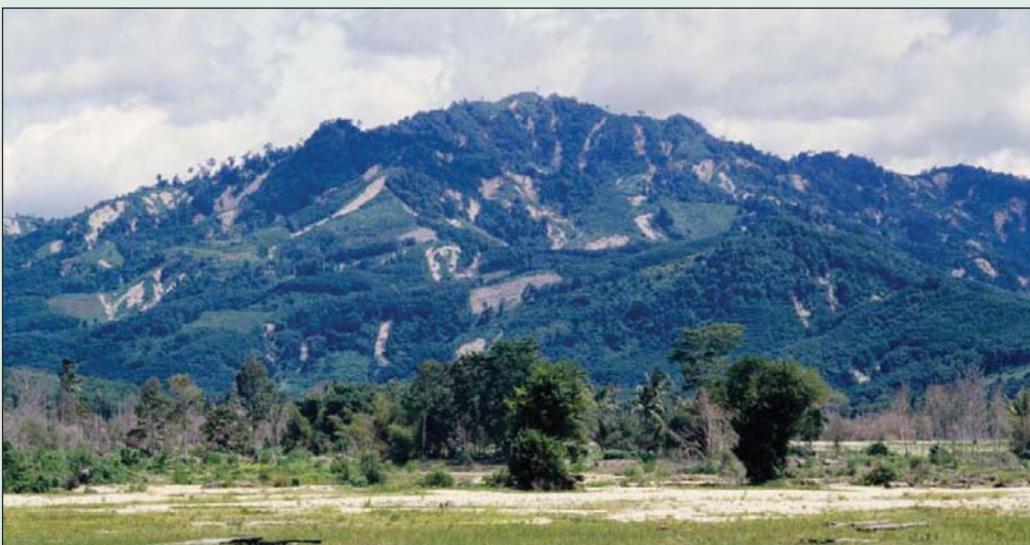


Figure 2.23. Landslide scars in Southern Thailand following heavy rains in 1988

Source: M. Kashio

Protection forests cover a fifth of the subregion's land area and 10 percent of its forest area

Table 2.9 gives the area of protection forest²⁴ in Southeast Asian countries. Lao PDR, Indonesia, Malaysia and Viet Nam have significant areas designated for protection. Thailand, although having banned logging in 1989 in response to landslides and flooding, has designated much of its forest for conservation purposes and a smaller area for protection. **Figure 2.24** shows that the area designated for protection fell in Indonesia and Lao PDR and rose in Viet Nam. In Viet Nam, forest area primarily for protection constituted 37 percent of the total forest area in 2010, having risen rapidly since 1990 in response to the implementation of national forestry programmes.

Table 2.9. Change in area of protection forest in Southeast Asia

	Area (000 ha)			% forest area
	1990	2000	2010	2010
Cambodia	0	6	551	5
Indonesia	24 301	23 272	22 667	24
Lao PDR	11 634	10 310	9 074	58
Malaysia	2 700	2 910	2 694	13
Myanmar	312	1 499	1 352	4
Philippines	526	569	613	8
Thailand	727	1 081	1 332	7
Viet Nam	2 925	5 502	5 131	37
SE Asia	43 686	45 636	43 741	20

Source: FAO (2010).

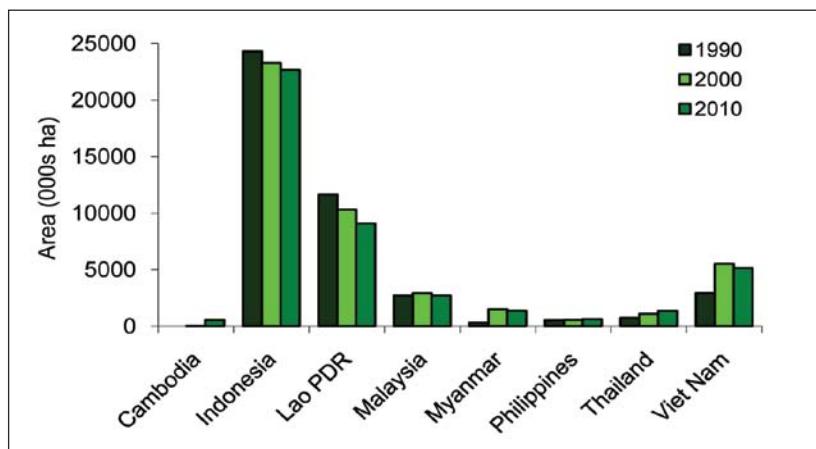


Figure 2.24. Area of forest designated for protection in Southeast Asian countries, 1990-2010

Source: FAO (2010).

24 Protective functions of forest include climate amelioration, protection from erosion and protecting coastlines and water resources.

Mountainous Lao PDR is taking steps to reduce watershed deforestation

Lao PDR is the most mountainous country in the subregion with 87 percent of the land area classified as uplands. Watershed classes 1, 2 and 3²⁵ represent 74 percent of the land area, but much is highly degraded and in 1993 only 11 percent was covered by dense forest and 44 percent lacked any forest cover (MAF 2004). Over the last 50 years forest cover in Lao watersheds has fallen from 70 percent to 47 percent. In response, the Ministry of Agriculture and Forestry (MAF) has adopted a 5-year Development Plan 2006-2010, which includes targets to identify watershed protection areas and develop plans for the use and control of around 4 million hectares of watersheds (Tong 2009a). Plans laid out in the Forestry Strategy 2020 include implementation of integrated watershed management, including intensification of lowland agriculture, introduction of agroforestry in sloping areas and reduction of forest conversion in steep upland areas (Pravongviengkham *et al.* 2005).

Protection forests are poorly managed in Indonesia

In **Indonesia**, protection forests are designated to safeguard locally important environmental services, particularly in relation to hydrology and erosion control. Due to weak forest management and illegal logging, however, vast areas of designated protection forests are severely degraded and in 2006, the national extent of degraded conservation and protection lands was estimated at 13.2 million hectares (CFPS 2009). Over 700 000 hectares of protection forest were reforested with the participation of local communities in 2002 to 2006 and plans for 2005 to 2009 include rehabilitation of 282 priority watershed forests and 5 million hectares. Following issuance of decentralization legislation in 2004, many local governments began experimenting with innovative watershed management approaches. The government is investing heavily in land rehabilitation through the GERHAN (Forest and Land Rehabilitation) programme and about 30 percent of the total investment is in protection forests. Unfortunately, protection forests are among the least well-managed categories of forest land and rehabilitation investments may be wasted unless management frameworks can be clarified and strengthened.

In the Philippines responsibility for watershed management is shifting to corporations

Of around 421 watersheds in **the Philippines**, approximately 126 are reserved for protection of water-related functions and approximately 140 are considered vital sources of water for domestic, agricultural and industrial purposes, as well as for power generation. The Department of Environment and Natural Resources (DENR) is the primary agency responsible for watershed areas. Government-owned and controlled corporations are responsible for about 685 000 hectares of watersheds in support of irrigation, hydropower and other projects. Critical threats to watersheds include the expansion

25 Watershed classes: 1. Areas with very steep slopes and rugged landforms, commonly uplands and headwater areas; 2. Areas with steep slopes, usually at higher elevation; 3. Areas with moderate to steep slopes and less erosive landforms.

of corporate plantations and lack of funding. In the 1990s, the government launched a massive programme to reforest denuded areas and important watersheds, but tree survival rates were low due to poor maintenance and protection. Although illegal logging and agricultural conversion are expected to reduce forest cover in coming years, large tenure holders, including the government-owned and controlled corporations, are being encouraged to charge environmental fees and fund watershed rehabilitation. Local government units (LGUs) are also involved in co-management of some local watersheds and have begun to implement various related activities.

*In Malaysia
watershed
management is
being integrated
into forest
management*

To meet the water-related demands of the population, agriculture and industry, **Malaysia** has gazetted watershed areas covering 5.16 million hectares – primarily in Sarawak (79 percent), but also in Peninsular Malaysia (16 percent) and in Sabah (4 percent). Management of water resources under the Ninth Malaysia Plan, 2006-2010, focuses on maintaining and enhancing the ecosystem functions of river systems through restoration and maintenance of highland catchments, wetlands, river buffers and riparian zones (Chiew 2009). To mitigate the adverse impacts of forestry activities, environmental impact assessments are required prior to logging, especially on sloping lands. The forestry departments have also adopted forest harvesting and road construction rules and guidelines for logging contractors. Currently, a National Water Policy is being formulated which includes provision for protection of watershed areas and wetlands. It is expected that by 2020, watershed management will be better integrated with other forest management practices, especially in upland areas. It is also expected that more areas will be protected as water catchment forest in relation to hydropower generation and that mechanisms for transferring benefits for environmental services will be developed.

*Payments for
watershed-related
environmental
services are being
piloted in Viet Nam*

In general, schemes to establish payment mechanisms for watershed-related environmental services have not become popular in Southeast Asia. In 2008, however, **Viet Nam** enunciated the Prime Minister's decision on The Pilot Policy for Payment for Forest Environmental Services to provide the foundation for a legal framework for PES from forests. The framework will define the responsibilities and benefits in relation to water supply for electricity production, clean water production and ecotourism. PES schemes are being piloted in several provinces to assist development of legislation, policies and mechanisms. For PES in watersheds to work, however, demonstration of costs and benefits is required to ensure buyers' involvement; government enforcement and initial funding to finance land-use change are also necessary (Ha *et al.* 2008). These issues lie at the heart of watershed management and uncertainties in the linkages between forest management and hydrological benefits (see **Box 2.21** and also **Box 2.12**).

Box 2.21. Watershed-based payments for environmental services in Southeast Asia

PES, including watershed management, have not yet taken off in Southeast Asia. Of 30 watershed-related case studies reviewed in Asia, including 13 in Indonesia, 11 in the Philippines and one in Viet Nam, all were still at the pilot level. Few of these had associated monitoring systems to determine whether the service is actually being produced.

Demand among potential environmental service buyers in Asia is limited due to lack of awareness of the concept, lack of successful cases, lack of clear scientific linkages and resistance to additional taxes or fees. Further impediments include the highly fragmented nature of land use and ownership in upland areas, the lack of sellers' bargaining power, high transaction costs, unclear land tenure and low capacity of local institutions to act as intermediaries. Additionally, countries in Asia do not have laws and policies supporting PES.

If payment schemes for watershed services are to be successful, demand from water users must increase and for this to happen, better evidence of the benefits and of watershed protection and of the effects of payments on the flow of benefits is needed.

Source: Huang and Upadhyaya (2007); Porras *et al.* (2008).

2.5. WOOD AS A SOURCE OF ENERGY

Energy demand in Asia is set to rise rapidly

With global increases in energy consumption and concerns over future oil prices, greenhouse gas emissions and energy import dependence, changes in the sources from which energy will be derived are expected in coming years. Globally, energy consumption is projected to increase most rapidly in Asia, where population and economic growth rates are highest (EIA 2007). Wood energy has been receiving increased interest as a means to reduce fossil fuel consumption and limit greenhouse gas emissions, but has also been used for thousands of years for cooking and heating. In Southeast Asia it remains a primary source of energy for these purposes.

2.5.1. Extent of wood energy use

Consumption of woodfuel is falling but may increase in response to high energy prices

In Southeast Asia, wood energy is predominantly used in the form of fuelwood for heating and cooking – primarily in rural areas – while charcoal use is less widespread. Domestic fuelwood use is often associated with low income and/or poverty and traditional modes of use are inconvenient and have negative health effects (Broadhead *et al.* 2001; Arnold *et al.* 2003). Increasing availability of alternative energy sources and fuel subsidies, as well as improvements in income and rural to urban migration, have reduced fuelwood use in recent years.

*Domestic fuelwood
use is falling as
standards of living
increase*

Fuelwood is often collected from trees outside of forests and is therefore not generally associated with deforestation, but commercial collection of fuelwood and wood for charcoal has had major impacts. This is particularly common in mangrove areas due to the high quality of wood for fuel use. In the Ayeyarwady Delta, mangroves have been cleared to supply Yangon with fuelwood and charcoal and in the Philippines mangroves and other forests have been heavily exploited to provide fuel for baking, tobacco curing and to supplement bagasse supplies in the sugar industry (FMB 2009). In other locations, limited areas of forest have been found capable of providing large quantities of woodfuel and meeting the demands of ever-expanding populations (Bensel 2008).

*Patterns of
commercial wood
energy use are
changing*

Wood energy is also used for industrial purposes – especially in association with large wood-processing facilities (FAO 2008b). Quantitative information on commercial and industrial consumption of wood energy is, however, scarce. In the Philippines, logging wastes and residues are estimated to have contributed up to 39 percent of total fuelwood consumption, but as forest resources have declined the supply of logging waste has fallen – from an estimated 5 082 000 m³ in 1980 to 138 000 m³ in 2005. The decline in production has been replaced with supply from trees on farms – especially coconut fronds, husks and shells – and from other biomass such as rice husks and bamboo (FMB 2009).

*Woodfuel use in
Southeast Asia is
decreasing*

In 2007, woodfuel consumption in Southeast Asia is estimated to have amounted to over two and a half times the total industrial roundwood consumption. **Figure 2.25** shows estimates of total woodfuel²⁶ consumption, demonstrating an overall reduction with time associated with rising income and increasing urbanization. Estimates suggest that woodfuel consumption in Southeast Asia will fall by 15 percent between 2010 and 2020 from 180 to 152 million m³.²⁷ Although data are scarce, it is probable that fuelwood use increased after the 1998 Asian economic crisis and rose again due to high oil prices prior to the 2009 economic slowdown. A similar situation may result if a protracted economic slowdown results from the 2008/2009 crisis.

26 ‘Woodfuel’ applies to the sum of wood used directly as fuel ('fuelwood') and wood for making charcoal, both for domestic and industrial purposes.

27 The models use driving variables including income, forest cover and the urban proportion of the population (Broadhead *et al.* 2001). Forecasts were revised for this publication using updated GDP purchasing power parity figures (World Bank WDI downloaded 12/07/08). Projections do not take account of the 2009 economic slowdown.

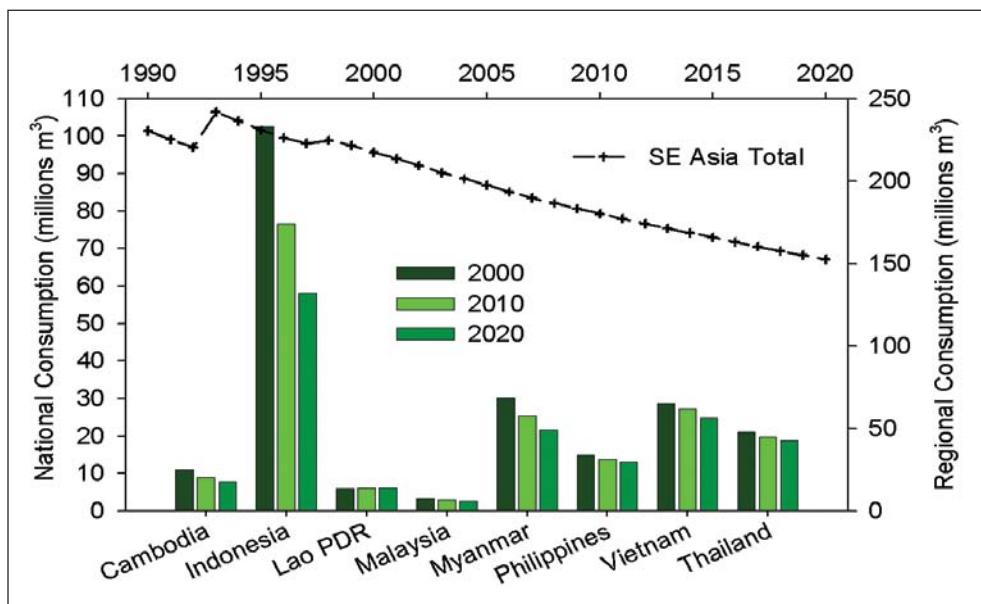


Figure 2.25. Woodfuel consumption Southeast Asian countries, 2000-2020

Source: FAO calculations based on Broadhead *et al.* (2001).

Much of the population is still reliant on fuelwood in Viet Nam

In Viet Nam, in 2002, an estimated 80 percent of the population was reliant on biomass for cooking needs and biomass is an important energy source for local industries. Viet Nam used around 24.5 million tonnes of fuelwood, mainly for cooking and heating in rural areas, but also to bake bricks and tiles, for porcelain production and in food processing. The proportion of biomass used in total national energy consumption fell from 73 percent in 1990 to 50 percent in 2002, although overall biomass consumption increased by 13 percent. It is likely that fuelwood consumption will fall in the coming years as a result of rural electrification, rising income and falling poverty. In more rural and mountainous areas, however, dependence on fuelwood is likely to remain (FSIV 2009).

Patterns of woodfuel use around the subregion are mixed

In Myanmar, fuelwood and charcoal are still very important in domestic and industrial applications and, contrary to estimates shown above, which are based on optimistic GDP growth, total woodfuel consumption is expected to increase in the coming years (Box 2.22). In Malaysia, domestic woodfuel use is minimal, but residues from the wood-processing industry are used in industrial applications, although there is still considerable room to improve recovery (Poh *et al.* 2006). In Indonesia, domestic woodfuel consumption remains significant, although per capita consumption is falling. Since 2000, industrial use of fuelwood has increased in relation to increased oil prices (CFPS 2009). A new development for Indonesia has been Republic of Korea (ROK) interest in developing more than 700 000 hectares of industrial forests in Indonesia, 200 000 hectares of which would be used for energy production in ROK (ITTO 2009j).

Box 2.22. Woodfuel and biofuel use in Myanmar.

Woodfuel is the most commonly used biofuel in Myanmar and is used mostly in rural households. Fuelwood consumption is dependent on availability of substitute fuels, standard of living and climate. In northern and eastern parts of the country, households often use fuelwood for heating during the cold season. With respect to charcoal, mangroves in delta areas, especially in Ayeyarwady Division, have been major sources of production for many years and are under significant threat. Charcoal production is now restricted and substitute fuels are promoted to prevent deforestation. Moreover, around 4 500 hectares of fuelwood plantations have been established annually.

Estimates of past and future energy consumption by fuel type show a falling proportion of fuelwood and charcoal, although total consumption is likely to increase by 14 percent as a result of population growth (**Table 2.10**).

Table 2.10. Percentage energy consumption by fuel type, 1990-2020.

Type of fuel	1990	2000	2010	2020
Crude oil	6.7	8.0	8.0	9.0
Natural gas	3.9	4.5	6.0	10.0
Coal	0.3	0.4	0.8	1.0
Hydropower	1.7	6.0	9.0	13.0
Agricultural residues	3.3	4.5	6.8	9.0
Fuelwood/charcoal	84.1	76.6	69.4	58.0

To promote biodiesel as an alternative fuel, a large-scale campaign to plant *Jatropha curcas* was introduced in 2005. The five-year plan involves planting 202 000 hectares in each state and division, totalling 3 237 000 hectares or almost 5 percent of the total land area. The plants are grown along roadsides and around

houses, schools and hospitals, as well as on land formerly producing rice and other crops. A blend of 5-20 percent Jatropha oil with diesel is recommended for low cost engines in rural areas.

Other programmes to reduce woodfuel consumption and deforestation have been implemented, including promotion of agri-waste briquettes, distribution of efficient stoves, household use of liquefied petroleum gas (LPG) and natural gas for brick kilns and reintroduction of kerosene. The 2001 National Forest Master Plan included targets of establishing 60 750 hectares of local wood supply plantations by 2010, followed by 48 600 hectares by 2020 but funding constraints and low institutional capacity have hindered implementation.

Source: (Tun 2009).

2.5.2. Factors affecting future wood energy use

The future of wood energy is dependent on several factors...

The extent to which energy will be derived from non-renewables, renewables, bioenergy and also from forests will depend on a number of factors (FAO 2008b):

- The future price of fossil fuels.
- The location of the energy source (in relation to national energy dependence).
- The carbon efficiency of alternatives and the nature and implementation of climate change-related policy.
- The magnitude of efforts to develop alternative energy supplies.

... energy prices and climate change mitigation efforts

Since the unexpectedly high price peaks of almost US\$150/barrel in 2008, oil prices have subsided considerably and the immediacy needed to find fossil fuel alternatives has faded. The International Energy Agency (IEA) estimates that prices will fall to around US\$60 (in 2006 dollars) by 2015 and remain fairly even until 2030. There may, however, be sharp increases prior to 2015 due to uncertainty in production capacity (IEA 2007).

... and energy import dependence

Dependence on energy imports is another factor likely to increase the extent to which renewables are promoted. The share of fuel in Asia's total merchandise imports reached 19.5 percent in 2006, up from 14.7 percent in 2004 (WTO 2004, 2007). In Lao PDR, fuel and energy imports rose from 10 to 16 percent of total imports between 1996 and 2006, while in Cambodia fuel as a proportion of total merchandise imports dropped from 13 percent in 2000 to 10 percent in 2004 (World Bank 2009c, WDI 2010). Thailand and the Philippines both have net energy imports that stand at around half of energy use, while Myanmar, Viet Nam, the Philippines and Malaysia are net energy exporters (WDI 2010).

Wood residues are an untapped and potentially large source of energy

Wood energy may also be promoted in relation to carbon efficiency, although it should be noted that bioenergy is only a renewable and sustainable form of energy where harvest is sustainable, taking carbon 'expenditure' during production, transportation and processing into account. Many countries possess little information on the amount of biomass that can be collected from forest operations and have not assessed the potential of wood residues for energy generation. In natural forests, between 80 and 90 percent of total volume could be used for energy generation (FAO 2008b). Most of this material is made up of tree crowns and other rejected pieces that are left in the forest after harvesting operations.

Gasification technologies have potential for rural power generation

Gasification technology has been suggested as a way to provide small-scale power delivery for villages and small-scale industry (Knoef 2000). In Cambodia, Abe *et al.* (2007) found that biomass gasification provided cheaper power than diesel generators, although consistent supply and barriers to growing wood were potential constraints. The profitability of small-scale plants has also been found to be marginal and highly dependent on both energy prices and biomass input costs (Knoef 2000; Wu *et al.* 2002). The future of gasification technologies is therefore likely to be highly reliant on institutional backing.

Second generation biofuels are still some way off

Second generation biofuel technologies are expected to allow economically competitive production of liquid biofuels for transport from cellulosic feedstocks, including agricultural residues and wood. It is anticipated that the technology for commercially competitive production will be available within ten to 15 years (Worldwatch Institute 2007). Because of technological requirements and the limited size of the expected markets, cellulosic ethanol production is, however, likely to be limited in Southeast Asia, particularly before 2020.

Without high energy prices woodfuel use will depend on policy intervention

High fossil fuel prices provide a direct impetus to invest in alternative fuels, whereas environmental and strategic energy issues only act as indirect drivers of change through policy intervention. In the absence of high fossil fuel prices, initiatives to switch to woodfuel are likely to be financially constrained. Under these conditions, measures by governments – which have not been seen to date – are likely to be the only way that woodfuel will be promoted.

2.6. FOREST TENURE AND OWNERSHIP

State ownership is gradually receding

As demands for land and forest products and services increase, it is becoming ever more critical for forest managers to balance interests and to integrate or separate activities according to local and national conditions. The long life cycles and non-material benefits of forests make tenure a particularly important issue. Although state ownership predominates, patterns are changing in the subregion with particular emphasis on state ownership of protected forests and private ownership of production forests.

Tenure security underpins sustainability

Economic performance in much of the subregion has been strong in recent years and poverty levels have fallen. The contribution of forestry to rural and economic development of the environment in general has, however, often fallen short of potential. This has been variously attributed to inequitable distribution of benefits, lack of reinvestment in forestry and inefficient tenure arrangements (RECOFTC 2008; Fraser 2002).

Tenure should suit management objectives

The optimum tenure and ownership for different forest types – plantations, protected areas, production forests, etc. – differ in accordance with the nature of the product/s and the markets that exist (Landell-Mills and Porras 2002). Natural forests have usually been considered state property but inefficient management, declining growing stock and forest value, and calls for greater social and economic justice are resulting in transfer of forest ownership to local levels, either as private or community property (FAO 2006b).

Stable and clear allocation of rights and responsibilities is essential

For governments, the private sector and individuals alike, clear allocation of rights and responsibilities reduces investment risk. With increasing scarcity of land and resources, formalization of rights and responsibilities has become increasingly necessary. Where tenure has remained unclear, unstable or non-exclusive, suboptimal management has resulted (FAO 2006b).

Allocation of forest and land rights has far reaching implications

Revisions of ownership and tenure can transfigure forest management, as is happening in China and Viet Nam (Zheng 2006; Nguyen 2006). Additionally, allocation of land can have considerable effects on economic efficiency and equity. Land reforms in the late 1940s and early 1950s in Taiwan and Korea, for example, are thought to have been instrumental in reducing income inequality and stimulating economic growth in comparison with later experiences in Southeast Asia (Jomo 2006).

Devolution of forest and land rights has begun but...

Natural forests in Southeast Asia are predominantly state-owned or administered and almost all protective plantations are state-owned (Katsigiris *et al.* 2004; FAO 2006b). In several countries in the subregion, forest and forest land allocation processes have been progressing over the past decade as economic frontiers have advanced and societal demands have changed (Edmunds and Wollenberg 2003; FAO 2006b). The area of forests where secure tenure rights for local stakeholders have been devolved remains extremely small and unclear forest tenure constrains SFM in many countries in the subregion (FAO 2006b). Only in Viet Nam have rights over significant areas of forest been devolved to individuals and families, communities, the private sector and other economic entities.

... state ownership still dominates

Figure 2.26 shows the large variation in private forest ownership between countries in Southeast Asia and the rapid adjustments that have taken place. In 1990, only 2 percent of forest land was privately-owned in Southeast Asia, and in Cambodia, Lao PDR and Myanmar, there was no privately owned forest land at all. By 2005, almost 6 percent was privately-owned with the most substantial increase in Viet Nam where private ownership increased steeply to 24 percent – largely as a result of forest land allocation programmes. In Thailand, large areas of rubber, pulp and sawlog plantation are also privately-owned but no natural forest. Similarly, in Malaysia, rubber plantations constitute the bulk of privately-owned forests and, mainly as a result of conversion of rubber plantations to oil-palm, private forest ownership dropped between 1990 and 2000.

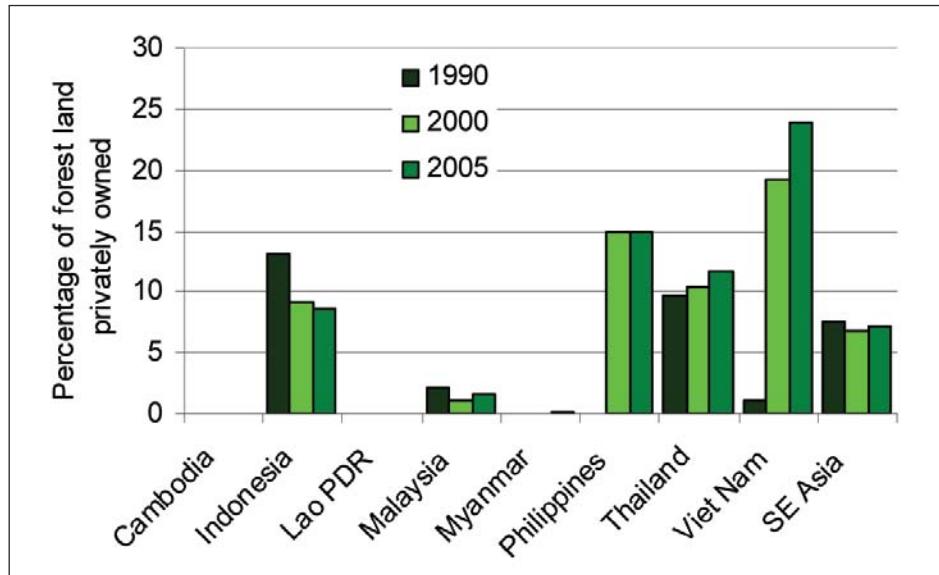


Figure 2.26. Percentage of forest land privately owned in Southeast Asian countries

Source FAO (2010).

Plantations in the Philippines are increasingly privately-owned

In the **Philippines**, changes in ownership have resulted primarily from establishment of productive forest plantations with accompanying increases in corporate and smallholder ownership (FAO 2006b). Incomplete delegation of rights and responsibility due to an emphasis on forest protection has been largely to blame for forest degradation and co-management has been suggested as a possible solution as detailed in **Box 2.23**.

Box 2.23. Forest land allocation in the Philippines: struggling to find balance

In recent decades, property rights over public forest land in the Philippines have been granted to local communities and the private sector in an effort to address deforestation and forest degradation while increasing social justice and reducing poverty. In 2004, around 33 percent of forest land was under community management, 12 percent under private sector management, 28 percent under state control and 25 percent remained as open access. The total area of forest allocated to upland emigrants and indigenous people increased to more than one-third of total forest land from close to zero in the 1980s. The allocation process was considerably strengthened by the well-known Indigenous Peoples' Rights Act of 1997.

Land allocation has, however, failed to deliver substantive results and land tenure issues continue to constrain forestry development in the Philippines. There has been little increase in investment in plantations by the private sector or LGUs, illegal logging and forest land conversion have not been curbed and poverty remains widespread in upland areas. Unclear allocation of rights and responsibilities, insufficient funding, low transparency and frequent policy changes have been largely to blame. Policy instability and regulatory reversals

have similarly discouraged private sector investment in forestry despite land having been allocated (see **Box 2.5**). The net result has been an increasing national dependence on natural forests and forest product imports.

A central contention involves the allocation of harvesting rights to communities and knock-on effects on income, poverty and forest management. Without income from forest harvesting or from external sources, forest protection and rehabilitation activities are unprofitable and people may have to abandon forest areas. This in turn can increase the chances of encroachment and conversion of forest land. The DENR has suspended community harvesting rights over productive natural and planted forests on three occasions since 1995 because of alleged insufficient local capacity to protect and manage forests and lack of funding. Notwithstanding the current suspension of harvesting rights, regulations for harvesting and transportation are designed for commercial timber production rather than community-scale forestry.

Although disagreements over harvesting have undermined forest management in the Philippines, lack of independent monitoring and an associated lack of confidence and trust underlies many of the problems faced in the forest land allocation process. A respected system of monitoring could provide much needed information on the performance of various tenure and land allocation initiatives and could also strengthen trust between forestry stakeholders. Increased cooperation between central and local levels could also yield benefits by combining technical support from the DENR with local interest and human resources. In this respect, the role of LGUs looks set to increase in the future due to recent funding provisions. LGUs have not become involved in forest management in the past due to the continued interest of the DENR, but co-management or contractual agreements offer a possible solution. If local funding and effective monitoring fail to materialize, disputes over harvesting rights and forest management capacity can be expected to remain and further forest degradation and loss are likely.

Source: Guiang and Castillo (2006).

Thailand's forests have been protected but local rights and production have been curtailed

In **Thailand**, all natural forest is state-owned and protected following the logging ban of 1989. The ban and accompanying shifts in forest policy towards conservation – in state plantations as well as natural forests – had significant repercussions on the livelihoods of people living in protected areas and also on forest product production (Lakanavichian 2006). After 18 years of consultation a bill defining the rights of forest-dependent people was passed in 2007 (RFD/DNP 2009). The bill recognizes the rights of those living within protected areas to collect NWFPs but not to harvest trees. Those living outside do not have use rights, although a three-year opportunity to prove legitimate right of access has been granted. Resembling the situation in the Philippines, the argument that villagers' are unable to manage forests sustainably is juxtaposed with the belief that local custodianship is necessary to prevent encroachment, illegal logging and forest degradation.

In Viet Nam forest land has been allocated to households, individuals and others

In Viet Nam, significant areas of forest and forest land have been allocated to households, individuals, communities and the private sector (FAO 2005a). Public ownership of productive plantations fell from 48 percent in 1990 to 27 percent in 2005, while smallholder ownership rose from 46 to 64 percent (FAO 2006b). The contribution to SFM and livelihoods has generally been positive. Like the Philippines, however, benefits to local groups have often been insufficient. Regulatory constraints favouring forest protection, low forest quality/value, inequitable benefit-sharing arrangements and poor local awareness of rights have been variously implicated as detailed in **Box 2.24**.

Box 2.24. The contribution of forest land allocation in Viet Nam to SFM, livelihoods and wood production.

Land allocation 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.

Three types of forest – special-use, protection and production forest – were classified throughout Viet Nam to create a legal framework for forest management. At the end of 2006, there were 2.2 million hectares of special-use forest, 5.3 million hectares of protection forest and 5.4 million hectares of production forest. Of the total, 10.4 million hectares were natural forest and 2.5 million hectares were plantation forest (MARD 2007).

In early 2005, there were 1.2 million forest landowners; 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 (**Figure 2.27**). By September 2007, more than 8 million hectares of forest land were reported to have been allocated.

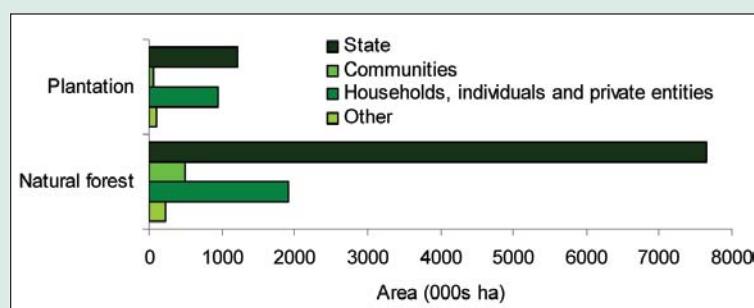


Figure 2.27. Forest allocation in Viet Nam 01/01/2006

generation. Allocated forests are also often degraded and inequitably distributed. Additionally, problems have been encountered with inadequate benefit-sharing arrangements, poor local awareness of rights, tenure overlaps and lack of monitoring (Nguyen 2006; Nguyen *et al.* 2008).

The orientation of forest policies in Viet Nam towards protection has affected the contribution of the forest land allocation programme to poverty alleviation and income

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 SFM (Nguyen 2006).

The effects of land allocation and of increased landownership fragmentation on wood production are also receiving attention. Concerns are that wood production targets will be missed due to difficulties in establishing extensive areas of plantation and restriction of efficiencies of scale. Production of timber and sawlogs as opposed to pulp logs may also become more limited due to smallholders' preference for short rotations and quick returns. Models are being piloted to manage consolidation of land areas but a sound and successful method has yet to emerge.

Source: FSIV (2009) except where cited otherwise.

In Sabah, 100-year concession tenure arrangements are encountering difficulties

In Sabah, **Malaysia**, the effects of poorly defined tenure and low interest in long-term investment in sustainable management of natural forests have been addressed through Sustainable Forest Management Licence Agreements. SFMLAs were launched in 1997 and provide 100-year tenure of large areas of secondary forest. Years of forest exploitation and clearance to make way for oil-palm and other crops were a key motivation (Toh and Grace 2006). In 2006, 12 SFMLAs covered a total of more than 2 million hectares of logged forest. Within these areas, reserves for communities and community forestry projects are set aside. Although the tenure arrangements support long-term management, the poor quality of much of the forest covered by the agreements and burden of attaining SFM objectives may mean that demands for conversion to commercial agriculture prove difficult to resist. So far, the results of the initiative have been disappointing and several licences have been revoked due to non-compliance and the high opportunity cost of the land suggests that in addition to stable tenure, external funding will be required to protect forests.

In Indonesia, a workable local level model of forest management has not been found

A similar situation exists in **Indonesia**, where since the 1960s, forests have been owned by the state and were progressively degraded through timber exploitation and pulp and paper production in the 1970s and 1980s, followed by oil-palm plantation establishment beginning in the 1990s. Throughout, there has been little recognition of local-level rights and while the regime change in 1998 and subsequent decentralization was expected to provide benefits to forestry and rural communities, the situation has worsened. The lack of a workable model of local-level forest management and associated lack of livelihood benefits, combined with continuing forest degradation and the

financial attractiveness of palm oil production, provide a lean basis for forest management. Even at the local level, oil-palm plantation establishment is favoured as it provides local communities with more income more quickly than other options. Conflicts between timber and plantation companies have been intense, but the issue has become land- rather than forest-related (Simorangkir and Sardjono 2006). Regulation and compensation may therefore be required to maintain forests and efforts are necessary to prevent further forest degradation by clarifying tenure, improving law enforcement and providing support for communities.

A clear land-use policy is badly needed in Myanmar

In **Myanmar**, all forest, including productive plantation, is state-owned, although communities do have long-term permission to use forests in some areas. Forests in the country remain in considerable flux, however, and a key issue contributing to poor progress in forestry is the lack of a nationwide land-use policy (Tun 2008). Formulation and implementation of a land-use policy is necessary to prevent continuing forest loss and provide a foundation for government targets, including attainment of a permanent forest estate covering 30 percent of the land area. Current government aims to increase agricultural expansion are coming into conflict with this policy because land use is not defined at the national scale and agricultural development is taking place within the permanent forest area. Unless a clear-cut land-use plan is endorsed, environmental degradation and reduction of forest product production will continue.

In Lao PDR and Cambodia land concessions are impacting upon forestry

In **Lao PDR** and **Cambodia**, all forest is state-owned and the issuance of land concessions became an important issue for forestry in 2007 and 2008 following huge increases in commodity demand from China. The situation in Lao PDR led to granting of concessions being suspended (see **Box 2.6**) and in Cambodia claims of widespread sale of land to foreign investors were made (Global Witness 2009). In both countries, mechanisms to introduce greater involvement of local people in forest management are warranted as a means of maintaining forest resources, reducing poverty and increasing rural income.

2.7. POLICY AND INSTITUTIONAL FRAMEWORK

Forest policy goals have shifted but implementation remains weak

During past decades the focus of forest policy in Southeast Asian countries has shifted from timber extraction to forest protection, devolution and multipurpose management. Frequently, however, forest policy has been weakly implemented because of field-level issues including high demand for forest land and forest resources, limited sources of alternative employment and low human resource capacity. Poor governance and low demand for alternative outcomes, i.e., greater production of environmental services, has also played a part. In relation, permanent forest estates have often not been demarcated, agricultural frontiers have continued to advance and uncontrolled logging has often

remained widespread. In one or two instances, however, where demand for alternative outcomes has strengthened, forest policy has been more effectively implemented.

Targets have often remained unmet

Forestry strategies have been launched as guiding documents for sectoral development in Indonesia, Lao PDR, Myanmar and Viet Nam and most countries have forest cover targets as shown in **Table 2.11**. The target set by Lao PDR is high in comparison with current forest cover and the trend is in the opposing direction. In Cambodia and Myanmar the direction of change is also awry, but absolute differences are smaller, while in Viet Nam, Thailand and the Philippines forest cover is rising in the direction of the target.

Table 2.11. Forest cover targets, actual forest cover and forest cover trends in Southeast Asian countries

	Forest cover 2010 (%) ⁹	Annual change 2005-2010 (%)	Forest cover target
Cambodia¹	57.2	-1.2	Maintain 60% through 2015
Indonesia²	52.1	-0.7	"Sufficient area that is proportionally distributed [...] and an increase in forested areas and expansion of planted forest"
Lao PDR³	68.2 (41.6) [†]	-0.5	70% by 2020
Malaysia⁴	62.3	-0.4	Each state should maintain 47% of land area as forest reserve, with the long-term goal of 50%
Myanmar⁵	48.3	-0.9	50% (35% closed forest, 15% open forest)
Philippines⁶	25.7	0.7	27%
Thailand⁷	37.1	0.1	40% (25% conservation forests, 15% economic forests); not less than 33% (18% conservation area)
Viet Nam⁸	42.4	1.1	47% by 2020 (15.6 million ha)

1. Forestry Administration (2009); 2. MoF (2006a); 3. Tong (2009a); 4. Malaysia – <http://projects.wri.org/sd-pams-database/malaysia/national-forestry-policy>; 5. Tun (2009); 6. FMB (2003) (deforestation – 4 000 ha/yr, Reforestation – 40 000 ha/yr, rehabilitation of degraded areas – 10 000 ha/yr); 7. RFD/DNP (2009) (40% figure is from 1985 National Forest Policy, 33% figure is from 10th National Socio-economic Development Plan); 8. MARD (2007); 9. Figures from FAO (2010) – national targets may be based on different forest cover definitions to those used by FAO.

[†] The figure of 68% is given in the 2010 FAO *forest resources assessment*, which uses a minimum crown cover limit of 10%. The figure of 41.6% is cited in the Forestry Strategy 2020 and is based on a minimum crown cover of 20% and is the relevant figure in relation to the 2020 target (see **Box 2.25**).

SFM, value addition and forest protection have been common policy themes

In Southeast Asia, forest policy has been directed towards SFM in almost all countries for over a decade. In more precise terms, this has meant reorientation towards reduced exploitation of natural forests, increased establishment of plantation resources and greater inclusion of community groups and the private sector in forest management and forestry. Support for the forest product industry to promote domestic value addition has been another key theme, although excessive wood-processing capacity has also led to policies promoting industrial rationalization. Logging bans have been imposed at different stages throughout the past two decades in Thailand, the Philippines and most recently Cambodia. Log export bans have also been implemented to reduce forest degradation and increase the availability of timber to domestic wood-processing industries.

Forest rehabilitation, and local rights have also been targeted

Forest rehabilitation has become more frequently included in policy declarations, particularly in Indonesia, the Philippines and Viet Nam. Plantation development has also been an important policy focus in Indonesia and Viet Nam. Community involvement has frequently been targeted and in Lao PDR poverty reduction has become a central theme. In Viet Nam 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 production and rural incomes through afforestation.

Forest law enforcement and climate change-related goals are more recent policy thrusts

Regional and international collaboration to tackle illegal logging and trade has been strengthened in Indonesia and several other countries and efforts are beginning at the regional level to better enforce forest law and improve forest governance. In the more advanced economies, e.g., Malaysia and Thailand, separation among institutions responsible for conservation and protection has been enacted and private sector involvement in forest product production has increased. More recently, protection/conservation of forest resources has received great attention in relation to climate change mitigation and also adaptation. In the future, these issues are likely to receive greater consideration as concern grows over climate change and associated adaptation and mitigation goals.

The following Sections review major changes in forestry policy in each of the Southeast Asian countries over the past decades.

2.7.1. Cambodia

<i>Sustainability stands at the centre of Cambodian forest policy</i>	For over a decade, sustainability has been at the centre of forestry policy in Cambodia. A log export ban has been in place since 1996 and various declarations have been made regarding illegal logging and forest encroachment (Forestry Administration 2009). Policy adopted in 1998 emphasized balancing harvesting with tree planting and forest growth while controlling illegal logging. Specific objectives included planting fast-growing trees for woodfuel production; controlling timber-processing capacity; and encouraging modernization of wood-processing equipment and employment generation. Provision was made for reviewing the legality of forest concessions, with cancelled concessions to be classified as protected areas or classified forests (Savet and Sokhun 2003; Forestry Administration 2009).
<i>In 2002, problems with the concession system led to policy and institutional revisions</i>	In 2002, failures in the production forest management system resulted in the suspension of concession licences and forestry in Cambodia embarked upon a period of revision. A new law on forestry was implemented in 2002 and a National Forest Policy Statement was issued by the Prime Minister. The Department of Forest and Wildlife was reorganized into the Forest Administration in 2003 to create a single line of authority for forestry at the national level (Rotha 2009; Forestry Administration 2009). Local forest management has become increasingly important and a community forestry subdecree implemented in 2003 resulted in 274 community forest areas being identified by 2005 (Rotha 2009).

2.7.2. Indonesia

<i>Conservation, governance and social goals have been increasingly emphasized</i>	Indonesia's 1990 forest policy aimed to reduce unplanned forest conversion while promoting sustained yield management, land rehabilitation, plantation development, forest protection and conservation, and community participation (FAO 1993). A new forestry law in 1999 introduced principles of good governance while promoting social objectives by recognizing forest land tenure and user rights and allowing individuals and cooperatives involvement in forest-based business (Wadojo and Masripatin 2002). The focus of MoF programmes and activities over the past decade are shown in Table 2.12 . New directions towards conservation and rehabilitation of forest resources as well as community development are evident after 2004.
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Table 2.12. Strategic priorities of the Ministry of Forestry, Indonesia, for 2001-2009

2001-2004	2004-2009
<ul style="list-style-type: none"> • Illegal logging • Timber-based industry restructuring • Forest fire • Timber plantation development • Decentralization in forest management 	<ul style="list-style-type: none"> • Combating illegal logging and associated trade • Forestry sector revitalization, in particular forestry industries • Conservation and rehabilitation of forest resources • Community economic development in and around forest areas • Stabilization of forest area

Sources: Wadojo and Masripatin (2002); MoF (2006b).

Illegal logging is a key issue

Illegal logging and trade have become increasingly important issues in Indonesian forestry. Following the Bali Ministerial Declaration on Forest Law Enforcement and Governance of 2001, many countries, including China, the EU, the United Kingdom and Japan, developed bilateral agreements with Indonesia to address forest crime and trade (CFPS 2009). In 2005, related efforts included presidential instructions aimed at eradicating illegal logging and associated activities.

Six forestry development missions have been established

The development vision for the forestry sector in Indonesia is for forestry to be a “pillar for sustainable development by 2025”. In relation, six “forestry development missions” have been established (MoF 2006a):

1. To create a strong institutional framework for forestry development.
2. To increase the value and sustainable productivity of forest resources.
3. To develop forestry products and services that are environmentally friendly, competitive and that have a high added value.
4. To develop an enabling forestry investment climate.
5. To increase the level of exports of forestry products and services.
6. To improve social welfare and raise society’s active role in supporting responsible and equitable forest management.

Forestry development will variously cover management reform, securing of forest resources, human resource development, establishment of mechanisms to maintain forest environmental services, increased forest product production, business development and marketing and plantation and community forest development.

2.7.3. Lao PDR

Lao forestry has moved towards more inclusive approaches

In the early 1990s, Lao forest policy prioritized protection and conservation of forests, improvement of logging practices and forest industry efficiency and forest rehabilitation. Particular attention was given to protection against shifting cultivation and indiscriminate cutting of forests by rural people (FAO 1993). The Forestry Strategy to the Year 2020 represented a considerable step forward in guiding the Lao forestry sector towards multiple objectives with poverty reduction at the forefront (MAF 2004). Targets include:

- Improving the quality of forest resources by natural regeneration and tree planting for protection and livelihood support.
- Providing a sustainable flow of forest products for domestic consumption and household income generation.
- Preserving species and habitats.
- Conserving environmental values in relation to soil, water and climate.

Community involvement is central

Particular areas of focus include: land-use planning, village-based natural resource management, sustainable harvesting; rationalization of the wood-processing industry; tree planting; law enforcement and participation to prevent unauthorized activities; and protection of watersheds. Achieving and maintaining 70 percent forest cover has been a long-term goal that remains high on the 2020 agenda (see **Box 2.25**).

The new forestry law focuses on forest protection and regeneration

The forestry law (2007) has also been amended to include the following priorities:

- Prevention and control of forest fires, and restriction of shifting cultivation and illegal logging.
- Forest regeneration and forest plantation.
- Regulation of the allowable extent of natural forest conversion and forest land use.
- Provision for a Department of Forest Inspection.

In line with the Forestry Law revision, the Department of Forestry will have new divisions of protection forests and production forests, while provincial agriculture and forestry offices will have planning and forestry inspection Sections (Tong 2009a).

Box 2.25. Forest cover in Lao PDR

The Ministry of Agriculture and Forestry (MAF) has adopted the 5-year Agriculture and Forestry Development Plan 2006-2010, which includes the target of increasing forest cover from 9 million hectares (42 percent) to 12 million hectares (53 percent) by 2010 (Tong 2009a). The FAO global forest resources assessment (FRA) in 2000, reported a figure of 54 percent forest cover for Lao PDR, while in FRA 2005 the figure for 2005 had jumped to 69.9 percent and a backdated figure of 71.6

percent was given for 2000. In the latest FRA a figure of 68.2 percent is reported for 2010 (FAO 2010). Forest cover determined by the Forest Inventory and Planning Division (FIPD) in 2004, and quoted in the Lao PDR Forestry Strategy 2020, was 41.5 percent. As the national forest cover target for 2020 is 70 percent, the figures are of considerable importance. Indeed, a figure of 70 percent forest cover is already being quoted by MAF.¹

The differences in figures result from the definitions used: FRA figures for Lao PDR used 10 rather than 20 percent canopy cover, 5 rather than 10 metre height minimum and bamboo as well as unstocked forest; shifting cultivation areas that will be restocked are included. Currently, the FS2020 target is based on FIPD criteria, but there is discussion of revision to coincide with the FAO definition. Additionally, the recent inclusion of rubber as a forest species under the FAO definition will further inflate forest cover in Lao PDR given the decision that rubber is to be used to reach the 70 percent forest cover target (Mekong Maps 2009).

¹"Minister explains logging regulations" Vientiane Times, 11 July 2008.

2.7.4. Malaysia

Policy changes have emphasized biodiversity values and involvement of non-state actors

In Malaysia, forestry is under the jurisdiction of the state governments – Peninsular Malaysia, Sabah and Sarawak. The cornerstone of the National Forestry Policy 1978 (Revised 1992) is the establishment of Permanent Reserved Forest, which provides the foundation for achievement of SFM (Chiew 2009). Amendments in 1992 reflected global concern over biodiversity and the role of local communities while reducing focus on production and recognizing forestry's multiple roles. Encouragement of private sector involvement in plantation establishment was also new and reflected early resource concerns (FAO 1993).

Sabah and Sarawak policies emphasize production

Sabah and Sarawak have their own forestry policies. In Sabah, greater emphasis is placed on production and trade and there is less focus on biodiversity or community participation (Sabah Forestry Department 2009). In Sarawak, production and revenue generation are emphasized while social and environmental objectives are omitted (Sarawak Forestry Department 2009).

Production and protection roles have been separated

Federal-level changes in institutional structure have separated forest conservation and production functions. Responsibility for forestry and timber resided with the Ministry of Primary Industries until 2004, when the Ministry of Natural Resources and Environment and the Ministry of Plantation Industries and Commodities were formed (ITTO 2006). In 2004, the Sarawak Forest Department devolved powers to the Sarawak Forestry Corporation (SFC), a private company owned by the government and responsible for the management of forest resources and timber administration. The Forest Department's role is limited to policy development and regulation (Chan 2008).

2.7.5. Myanmar

As pressures have increased multirole forest policy has been introduced

For most of the last century a system of sustainable forest production, the Myanmar Selection System (MSS), was in operation in Myanmar and environmental impacts were not severe. The 1894 Indian Forest Policy, which focused mainly on sustainable timber production, provided guidance until the Myanmar Forest Policy of 1995, which has six priority areas (Tun 2009):

1. Protection of soil, water, wildlife, biodiversity and environment.
2. Sustainability of forest resource use.
3. Basic needs of the people for fuel, shelter, food and recreation.
4. Efficient use, in a socially and environmentally friendly manner, of the full economic potential of forest resources.
5. Participation of people in the conservation and use of forests.
6. Public awareness of the vital role of forests in the well-being and socio-economic development of the nation.

The Forest Master Plan emphasizes economic and environmental aspects of forestry

The National Forest Master Plan (NFMP) was developed in 2001 for the period up to 2030. It covers nature conservation, sustainable harvesting of teak, forest protection, environmental conservation and export of value-added wood and NWFPs. Also included are protection and extension of forests, forest regeneration and rehabilitation, watershed management, law enforcement, and promotion of fuelwood substitutes (Tun 2009). A Community Forestry Instruction, issued in 1995, has provided a foundation for about 600 community forest management agreements (Thaung 2008).

Forestry institutions are becoming increasingly militarized

Recently, an increasing number of military personnel have been appointed to Forest Department posts. There has also been increasing centralization despite a statement in forest policy to encourage public participation (Thaung 2008). There is, however, evidence of the emergence of pluralistic institutional arrangements. For example, the Forest Products Joint Venture Corporation was established to expand manufacturing and distribution of forest products (Thaung 2008).

2.7.6. Philippines

Forest policy in the Philippines has long emphasized multiple uses

Forest management in the Philippines is governed by a Presidential Decree issued in 1975, known as the Revised Forestry Code of the Philippines. The decree outlines priorities including multiple use of forest land to support development; land classification and survey; establishment of wood-processing plants; and the protection, development and rehabilitation of forest lands. This law has become the basis of numerous DENR administrative orders, memoranda, plans and programmes relating to forest management (Quintos-Natividad *et al.* 2003).

Logging was effectively banned in 1992

In 1992, the DENR issued an administrative order transferring harvesting in natural forest from virgin or old growth forest to secondary forest (FMB 2009). This effectively banned logging in old growth forest, and areas above 1 000 metres or with slopes of 50 percent or more. In the same year, Congress passed the National Integrated Protected Area System or NIPAS law which provides for the establishment of an integrated protected areas system.

CBFM became the main basis for SFM in 1995

An executive order issued in 1995 established Community-Based Forest Management (CBFM) as the national strategy to ensure sustainable development of the nation's forests. Communities are granted tenure over the forest lands for an initial 25 years, renewable for another 25 years, and are obligated to prepare and implement a management and development plan. The Strategic Action Plan 1997-2020 of the DENR details strategies for implementing the CBFM programme (FMB 2009). The associated 1997 Indigenous People Rights Act (IPRA) and the NIPAS law have had significant influence on forestry. The IPRA recognized the primary right of indigenous people to their ancestral lands, while the NIPAS law establishes protected areas and upholds the rights of affected communities to participate in protected area management (Castillo 2008).

Lack of clear direction plagues forestry development

A key reason for slow progress in Philippine forestry is the failure over almost 20 years to pass the Sustainable Forest Management Bill (FMB 2009). Passage was stalled due to disagreement over whether to allow commercial logging in remaining natural forests (Quintos-Natividad *et al.* 2003). As a result, the 1990 Master Plan for Forestry Development was not implemented. The Revised Master Plan for Forestry Development for 2003-2015 may suffer the same fate as it has neither funding nor DENR affirmation (FMB 2003; Castillo 2009). The SFM bill has recently been revived, however, and contains provisions giving the state, through the DENR, full control and management of forest lands, including granting of tenure rights, licences and approval of management plans.

2.7.7. Thailand

Thai forest policy emphasizes environmental protection

Thailand's first comprehensive National Forest Policy was established in 1985 (RFD/DNP 2009). The policy is based around the principles of SFM and emphasizes environmental protection. The 40 percent national forest cover target was originally divided into 15 percent for protection and conservation and 25 percent for production. After catastrophic flooding in Southern Thailand in 1998, however, a logging ban was imposed and the ratio of conservation to production was reversed (Ongprasert 2008).

Local participation in forest management continues to divide opinion

In 1991, the Royal Forest Department began developing a community forestry bill to allow involvement of local communities in managing forests in and around national reserves. The bill made little progress despite being redrafted several times. Conflict has arisen between 'the people's movement' which emphasizes communal rights and the 'dark green movement' which objects to community forest establishment in protected areas (Ongprasert 2008). A decision was made that community forestry would be allowed where communities could prove that they settled before 1993 and could demonstrate ability to protect forests. The bill was approved by Parliament in 2007 and is awaiting royal approval before enactment.

People-centred development is gaining national level importance

Thailand's forest-related policy, legislation and institutional framework distinguished between protection and production roles of forests. In 2002, the Royal Forest Department was divided into three departments: the Royal Forest Department (responsible for forests outside protected areas), the National Park, Wildlife and Plant Conservation Department and the Department of Marine and Coastal Resources. Decentralization and public participation in policy, planning and management of natural resources in Thailand is still rather limited. After the coup d'état in 2006, however, a new constitution was drafted containing provisions for the promotion of public participation in environmental conservation and sustainable natural resource use (Ongprasert 2008).

2.7.8. Viet Nam

The basis for forest management in Viet Nam has shifted and major programmes have been implemented

Since nationwide introduction of free market principles in 1986, substantial changes have taken place in the forestry sector in Viet Nam, including the reorganization of state forest enterprises, changes in forest ownership and growth in wood product exports. Forests have been classified into three types – special-use,²⁸ protection and production, and state forest enterprises are being dissolved or rearranged into companies and forest management boards. Legislation was issued during the past decade to allocate land to households and individuals for sustainable forest production, conservation of flora and fauna and forest protection (Coi 2009). Several major programmes have been implemented including the Five Million Hectare Reforestation Program, which has contributed greatly to national forest restoration since 1998.

Forestry has been granted an enlarged national role

Forestry has moved towards greater participation, improved forest protection, increased plantation establishment and increased timber processing, both for domestic demand and export. Protection of existing natural forest, greening areas of bare land, planting of production forest and sustainable use of forest resources are expected to increase the importance of forestry as an economic sector while contributing to income, livelihood improvement and poverty reduction (FSIV 2009).

The vision for forestry is broad in scope

In 2007, the government approved the Viet Nam Forestry Development Strategy 2006-2020. The strategy comprises five programmes (MARD 2007):

1. Sustainable forest management and development programme
2. Programme on forest protection, biodiversity conservation and environmental service development
3. Forest product processing and trade programme
4. Programme on research, education, training and forestry extension
5. Programme on renovating forest sector institutions, policy, planning and monitoring

Viet Nam, although retaining only small areas of natural forests, has also become a leader in developing REDD readiness and significant revenues could be secured by the forestry sector if international agreement and associated funding are realized. The fact that only one forestry-related CDM project exists in Viet Nam despite national focus on afforestation and reforestation does, however, suggest that expectations should remain conservative.

2.8. PROGRESS TOWARDS SUSTAINABLE FOREST MANAGEMENT

Progress towards SFM may be measured according to seven elements

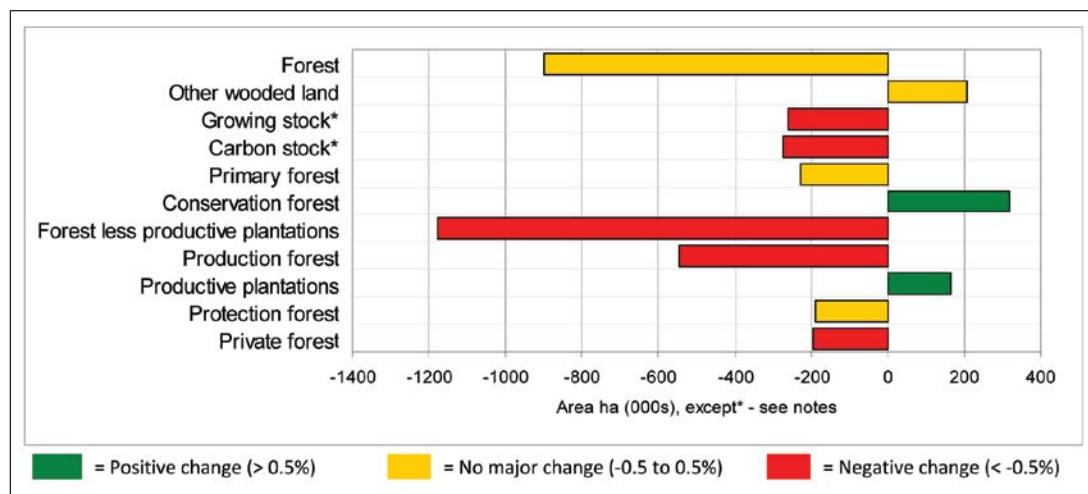
Forest resources, the products and services they provide and the social, institutional and business structures that surround them are transforming at varying rates across Southeast Asia. Demands from different groups across society are impacting forests and forestry in various ways and are also influencing the capability of the forestry sector to meet future demands. To measure progress towards SFM²⁹ seven thematic elements derived from regional and international processes on criteria and indicators for SFM have been suggested by FAO (2005a):

- (1) Extent of forest resources – maintaining significant forest cover and stocking.
- (2) Biological diversity – its conservation and management.
- (3) Forest health and vitality – reducing fires, pollution, invasive species, pests and diseases.
- (4) Productive functions – maintaining production of wood and NWFPs.
- (5) Protective functions – in relation to soil, hydrological and aquatic systems.
- (6) Socio-economic functions – the support provided by forests to the economy and to society.
- (7) Legal, policy and institutional framework – to support the above themes.

²⁹ “Sustainable forest management aims to ensure that the goods and services derived from the forest meet present-day needs while at the same time securing their continued availability and contribution to long-term development.” (<http://www.fao.org/forestry/sfm/en/>)

Trends are predominantly negative in the subregion as a whole

In Southeast Asia, key shifts between 2000 and 2010 included a decrease in total forest area of 898 000 hectares/year and a reduction of 230 000 hectares/year in the area of primary forest (**Figure 2.28**). These trends were only partly countered by an increase in planted forest area of 280 000 hectares/year. Forest area designated for conservation increased by 318 000 hectares/year between 2000 and 2010, while forest designated for protection fell by 190 000 hectares/year. The area of forest designated for production fell by 545 000 hectares/year. These trends indicate a gradual shift from production of forest products to production of services together with a reduction in the area of forest, and natural forest in particular. The area of other wooded land increased by 207 000 hectares between 2005 and 2010, although this has been at the expense of total forest area.



Notes: Growing stock in million m³, carbon stock in million tonnes; also see **Table 2.13** notes.
Sources: FAO (2005a); FAO (2010).

Figure 2.28. Trends towards SFM in Southeast Asia – changes in forest resources 2000-2010

Balance between elements is essential for sustainability

Comparative analysis of trends in social, environmental and economic aspects of forestry provides an indication of balance – and degree of sustainability – in sector development. Negative and unbalanced trends show a lack of SFM whereas, predominantly positive trends, together with some negative responses, indicate shifting sector structure. Trends for individual countries between 2000 and 2010 are given in **Table 2.13**. Clearly positive trends, shown in green, include Viet Nam's performance against a number of variables, although areas of primary and protection forest are falling. The Philippines and Thailand also stand out while Cambodia's performance shows few positive trends.

Forest resources have declined in most countries

Changes in the extent of forest resources, defined by forest area, area of other wooded land, growing stock and carbon stock, have been predominantly negative in all countries except the Philippines and Viet Nam. Elements related to biological diversity, including area of primary forest and total forest area excluding the area of planted forests, show mixed trends in all countries. Additionally, it should be recognized that although the area designated as conservation forest has been increasing, the management of conservation forests has often been poor as detailed in Section 2.4.1.

Productive functions of forests are falling

Trends in the productive functions of forest resources have to be carefully considered given the tendency towards forest clearance in the subregion and the low rate of implementation of forest management for sustained yield, or of SFM. In Myanmar, the area of productive plantations and total removals has increased, although the area of forest designated for production has also fallen. In Lao PDR and Viet Nam, the area of production forest and of productive plantations has increased but removals have apparently fallen. In other countries, trends are predominantly negative with removals in particular falling steeply.

Protective functions and private ownership trends are mixed

The area of forest designated for protection increased in Cambodia, the Philippines and Thailand, although in all three countries protection forests constitute a small proportion of the total forest area. In all other countries the area of forests designated for protection is falling. Surprisingly, given trends towards devolution of forest management, areas of forest under private ownership have only increased in Viet Nam, Thailand and the Philippines, while in other countries there is either no private forest land or the area is falling.

STATUS AND TRENDS IN FORESTS AND FORESTRY

Table 2.13. Trends towards SFM in Southeast Asia 2000-2010

	Cambodia		Indonesia		Lao PDR		Malaysia		Myanmar		Philippines		Thailand		Viet Nam		SE ASIA ⁽²⁾			
	Annual change	Absolute	%	Absolute	%	Annual change	Absolute	%	Annual change	Absolute	%	Annual change	Absolute	%	Annual change	Absolute	%	Absolute	Unit	
EXTENT OF FOREST RESOURCES																				
Area of forest	-1.3	-145	-0.5	-498	-0.5	-78	-0.5	-114	-0.9	-310	0.7	55	0.0	-3	1.6	207	-0.4	-898	1 000 ha	
Area of other wooded land	-7.8	-17	-0.7	-162	1.5	68	-	-	0.2	41	4.3	346	-	-	-4.7	-69	0.4	207	1 000 ha	
Growing stock of forests	-1.4	-15	-1.5	-189	-0.5	-5	-1.0	-46	-0.9	-14	0.1	2	0.0	0	0.9	8	-1.1	-260	M m ³	
Carbon stock in forest biomass*	-1.5	-7	-1.5	-217	-0.5	-6	-1.0	-35	-0.9	-16	0.1	1	0.0	0	0.7	7	-1.2	-274	MT	
BIOLOGICAL DIVERSITY																				
Area of primary forest	-3.4	-13	-0.4	-203	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	-8.1	-11	-0.4	-230	1 000 ha	
Area of forest designated for conservation of biodiversity	1.7	60	-0.1	-18	0.8	23	5.7	83	5.5	86	0.3	4	0.2	15	3.2	57	0.9	318	1 000 ha	
Total forest area excluding area of planted forests	-1.3	-144	-0.5	-485	-0.6	-91	-0.7	-128	-1.0	-339	0.7	52	-0.6	-91	0.6	61	-0.6	-1178	1 000 ha	
PROMPTIVE FUNCTIONS OF FOREST RESOURCES																				
Area of forest designated for production	-3.7	-155	-0.4	-195	0.6	22	-0.1	-18	-2.2	-501	1.0	57	2.7	62	3.4	187	-0.5	-545	1 000 ha	
Area of productive forest plantations**	-0.8	-1	2.9	79	33.3	15	-1.4	-26	5.3	25	-1.6	-6	0.1	1	6.8	75	1.9	164	1 000 ha	
Total wood removals	-28.6	-41	-3.7	-737	-3.2	-12	-3.9	-1448	0.9	32	-7.6	-118	16.9	-11	-1.6	-50	-3.6	-2.4	M m ³	
PROTECTIVE FUNCTIONS OF FORESTS																				
Area of forest designated for protection	57.1	55	-0.3	-6.1	-1.3	-124	-0.8	-22	-1.0	-15	0.7	4	2.1	25	-0.7	-37	-0.4	-190	1 000 ha	
Area of protective forest plantations**	-	-	-	-	-	-	-	-	-	-	5.2	5	-9.4	-72	3.5	29	7.6	40	0.1	3.2 1 000 ha
SOCIO-ECONOMIC FUNCTIONS OF FOREST RESOURCES																				
Area of forest under private ownership**	0.0 ⁽¹⁾	0 ⁽¹⁾	-4.0	-472	0.0 ⁽¹⁾	0 ⁽¹⁾	-2.7	-11	na ⁽¹⁾	3	na ⁽¹⁾	73	1.0	20	25.1	201	-1.1	-194	1 000 ha	

* Forest carbon in living (above- and belowground) biomass

** Trend between 1990-2005

1 No private forest in Cambodia and Lao PDR; none in Myanmar before 2005; no data in 1990 for the Philippines

2 Countries with no data available excluded from estimation of trends for Southeast Asia

- (dash) – no data available

0 or 0.0 – no change

= Positive change (greater than 0.5%)

= No major change (between -0.5 and 0.5%)

= Negative change (less than -0.5%)

*Sources: FAO (2005a); FAO (2010).

*The proportion
of natural forest
under SFM remains
low*

The International Tropical Timber Organization's *Status of tropical forest management 2005* (ITTO 2006) also assessed progress towards SFM in tropical timber-producing countries and concluded that significant progress has been made since 1988, particularly in relation to designation of permanent forest estate, issuance of related policy and coverage by management plans. The proportion of natural production forest under SFM, however, remains very low and unevenly distributed. In Asia, for example, only about 12 percent of the natural permanent forest estate is estimated to be under SFM and only 5 percent of the natural production permanent forest estate is certified as being sustainably managed.

*Several factors
constrain
expansion of SFM*

The contribution that has been made towards SFM by designation of permanent forest estate and other measures should be viewed in the light of ITTO's lessons learned. In this respect ITTO found that:

- SFM for the production of timber is less profitable to the various parties involved than other possible ways of using the land.
- External financial and technical support is often required to establish SFM and an adequate and reliable global system for funding the additional costs involved in putting SFM into practice is lacking.
- Long-term government resolve and credible arrangements for tenure are necessary.
- Discussing illegal logging and trade is not enough and improved laws and vigorous law enforcement are needed.
- Efforts are needed to confront the almost universal lack of resources needed to manage tropical forest properly – staff, equipment, vehicles, facilities, etc.
- Information on the extent of resources and state of management needs to be improved.

These points outline the general picture in which continued forest loss is explained in terms of the surrounding economic, policy and institutional conditions. As such, designation of forest to one class or another is unlikely to be sufficient where political resolve, resources, law enforcement and other prerequisites are lacking.

*Local-level findings
back large-scale
analysis*

At the local level an assessment in North Luzon, Central Visayas and western and southern Mindanao in the Philippines, showed that progress in relation to 12 indicators related to SFM was particularly poor for underresourced communities, better for state-owned land, with the private sector faring best (Castillo and Guiang 2005). Common failings included:

- Absence of monitoring and evaluation;
- Lack of recognition of property rights within tenured area;
- Insufficient budget;
- Absence of conflict resolution mechanisms; and
- Absence of a current management plan.

These findings apply at the field level in many areas around the subregion and in much of Southeast Asia further declines in forestry may be unavoidable.

Transitions may yet occur, however, and are beginning in some countries

National- and global-scale statistics are, however, limiting and past trends should perhaps not be considered of central importance in predicting the future. In this sense, the general picture must be seen as one of a system in transition. In many countries, forest management is transforming alongside society through increased migration and infrastructural developments, shifting sectoral commitments and changing levels of demand, interwoven with evolving policy processes – both within forestry and outside. In some countries – Viet Nam in particular – vigorous programmatic approaches are helping to rejuvenate the sector and there are also isolated pockets of change, in the Philippines and Thailand for example (Bensel 2008; Leblond 2008). More general advances are likely to depend on a host of factors including political will, financing, institutional capacity and policy implementation, tenure security and attenuation of demands on forests and forest land.

2.8.1. Certification and the implementation of SFM

Several forest management certification schemes are represented in Southeast Asia

Forest management certification, although not fully identified with SFM, provides a means of assessing progress in forest management. The scheme run by the Forest Stewardship Council (FSC) is of global prominence and is the best represented international scheme in Southeast Asia. Two other national certification schemes are in operation in the subregion – the Lembaga Ecolabelling Indonesia (LEI) and Malaysian Timber Certification Scheme (MTCS). The LEI scheme is not directly comparable with the FSC system as environmental and social requirements are generally less stringent.³⁰ The MTCS is more closely comparable, however, and has recently been approved by the Programme for the Endorsement of Certification (PEFC), indicating a major boost for forest management in Malaysia (ITTO 2009g).

Expansion of certification has been slow and faltering

FSC certification has grown rapidly in the Asia-Pacific region over the last decade, although corresponding expansion in Southeast Asia has been relatively slow and faltering. Only 4.0 percent of the total global area under certification is in the Asia-Pacific region and in Southeast Asia the area of certified forest amounts to just 1.2 million hectares or 1.1 percent of the global total. The proportion of forest area covered by FSC certification in Southeast Asia constitutes only a tiny proportion of the total forest area – just under 0.6 percent.³¹ Including areas under MTCC and LEI schemes, the percentage of the total forest area covered by certification in Southeast Asia increases to 3.5 percent.

30 Central point of expertise for timber procurement: <http://www.proforest.net/cpet>

31 2008 FSC-certified area as a proportion of 2005 forest area reported in FRA 2005.

*Natural forests
dominate the
certified area*

In Southeast Asia, natural forest constituted 94 percent of the area certified in 2008, compared to 2 percent plantation forest and 4 percent semi-natural and mixed plantation and natural forest. The majority of the area is in Indonesia and Malaysia as shown in **Table 2.14** and in Southeast Asia as a whole 25 certificates have been issued among five countries. The lack of representation of plantations in the subregion is partly due to the large areas of state-owned plantations in Indonesia, for which certification was cancelled as reflected in **Figure 2.29**. Over 90 percent of the forest area certified in Southeast Asia is on private land compared to 77 percent in the Asia-Pacific region as a whole. The remainder is split between public- and community-owned areas with almost no forest concessions having been certified.

Table 2.14. FSC-certified forest area in Southeast Asia by forest type (000 ha)

	Natural	Semi-natural and mixed plantation & natural forest	Plantation	TOTAL	Number of certificates (2008)
Indonesia	886	16	0	902	8
Malaysia	173	5	35	213	10
Lao PDR	57	0	0	57	2
Viet Nam	0	0	10	10	1
Thailand	0	0	6	6	4
TOTAL	1 116	21	51	1 188	25

Source: FSC data received December 2008.

N.B. As of June 2010, the total area in Southeast Asia had risen to 1 408 thousand hectares as follows: Indonesia (1 105 449 ha), Malaysia (203 842 ha), Lao PDR (81 618 ha), Viet Nam (9 782 ha), Thailand (7 643 ha) (FSC 2010).

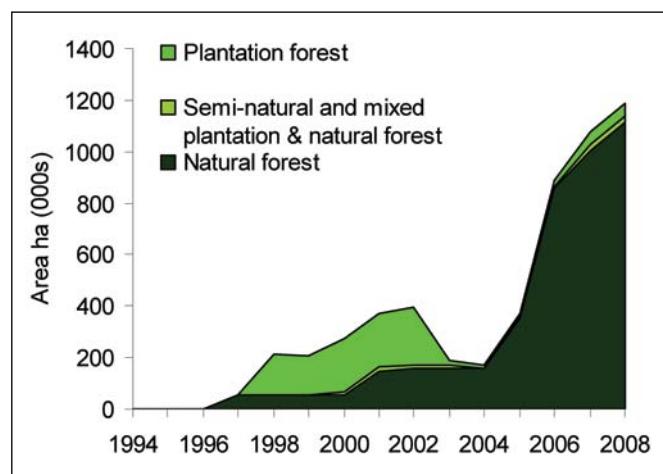


Figure 2.29. Trend in FSC-certified forest area in Southeast Asia by forest type

Source: FSC data received December 2008.

National schemes have shown varying progress

Just over 1 million hectares are certified under the LEI scheme; 84 percent natural forest, 15 percent plantation and 0.5 percent community forests (LEI 2008). Another 4.8 million hectares are certified by the Malaysian Timber Certification Council (MTCC); 96 percent is under state forest department control; and 3 percent is privately-owned.

Barriers to certification include cost and complexity

Barriers to forest management certification and to the implementation of SFM in the Asia-Pacific region in general have been ascribed to a suite of issues operating at the firm, national and regional level (Gale 2006). Key issues include:

- Costs of implementation – auditing costs are high due to the lack of a regional certification industry and need for international expertise.
- Human resource requirements – implementation of complex criteria requires professional management and well-trained staff who are often not locally available.
- A premium for certified wood does not generally exist – within the Asia-Pacific region especially, consumers are indifferent to legality and sustainability.
- Governments have sometimes mobilized against forest certification as a potential threat to business as usual.

Gale (2006) also draws attention to the impediment to sustainable development imposed by “an Asian model of development dominated by narrow business-government coalitions that are actively hostile to [...] sustainable forest management”.

3

KEY DRIVERS OF CHANGE

Cross-sectoral impacts continue to dominate change in forestry

Across most of Southeast Asia, change in forestry is largely driven by what happens outside the sector. Increasing populations, rising purchasing power and increasing levels of international trade are placing greater demands on forests. Road network development is widening accessibility and international investment in agriculture is driving new trends in rural economic activity. Extraction of forest products and establishment of agriculture and planted forests, are altering the extent and species composition of forests and reshaping the rural landscape. In general, low wages, rich soils, favourable climate and higher prices for agricultural goods motivate deforestation (Chomitz 2007). Unclear land tenure and weak governance also exacerbate deforestation, although even where tenure is secure and governance is strong forest clearance may be the preferred option. Changes in the composition of economies away from rural sectors and development of urban middle classes may, however, drive demand for environmental services and away from extractive uses of forests.

Policy is often driven by 'hidden hands'

Mediating current changes, institutional developments are playing an increasing role and sea changes in policy have taken place as a result of influences that are often paid scant attention in forestry. Environmental shocks and calls for social and economic justice, land allocation processes and the effects of overseas remittances and off-farm employment are examples of the 'hidden hands' driving change in forestry in Southeast Asia. These influences have in some cases proven stronger than more direct efforts to promote sustainable management of forests and may provide greater stimulus for forest transitions in the future.

Cultural developments also affect forestry

Cultural alterations are also helping to pave the way for changes in forestry and rural development. APFSOS I in 1998 noted the increasing integration between communities, mass organizations, environmental NGOs, governments and the private sector. In recent years, global increases in environmental awareness have signalled further modification in the stimulus for forest governance reform in the subregion. There is a wide range of developments likely to affect the direction of progress with SFM. Those identified by ITTO are summarized in **Box 3.1**.

Box 3.1. Developments that may affect progress with SFM

ITTO listed the following drivers as key influences on progress towards SFM in tropical countries:

- The expansion of planted forests and the use of agricultural tree crops for timber may reduce pressure on the natural forest by supplying an increasing proportion of wood production.
- Declining timber prices and/or increased prices for agricultural products would undermine efforts towards SFM.
- Greater focus on the management of high-value timber species, an expanded range of species and/or increased value addition could increase the profitability of natural forest management.
- Climate change could affect forest growth, yield and even survival. A general drying in the tropics could lead to an increased incidence of forest fire and drought-related changes to forest structure. Conversely, increased rainfall could lead to higher rates of forest growth and could also cause more erosion, landslides and flooding.
- Greater security of tenure may help to increase sustainable management.
- The situation of those peoples who live in or near the forest is unlikely to remain static. If living standards improve and migration to urban centres continues, local pressures on forest may decrease.
- Decentralization may align forest management more closely with local interests, but there is no guarantee that this will favour SFM.
- As affluence increases, public pressure could induce governments to improve management and pay more attention to environmental values.
- The global community could increase its payments for the global environmental services provided by natural tropical forests, thereby improving the economic viability of SFM.

Source: ITTO (2006).

3.1. DEMOGRAPHIC CHANGES

By 2020, an additional 64 million people will join the subregion's population

The total population of Southeast Asia in 2010 stood at 593 million – 9 percent of the global total. By 2020, an additional 64 million people will join the subregion's population, representing net growth of 11 percent (UN Population Division 2006). Indonesia accounts for 48 percent of the subregion's forest area and 41 percent of inhabitants with a population comparable with that of continental Southeast Asia (**Figure 3.1; Table 3.1**). The Philippines and Viet Nam are the two most densely populated major countries in the subregion, although in line with the regional situation, population growth rates have been slowing in both (**Table 3.1**).

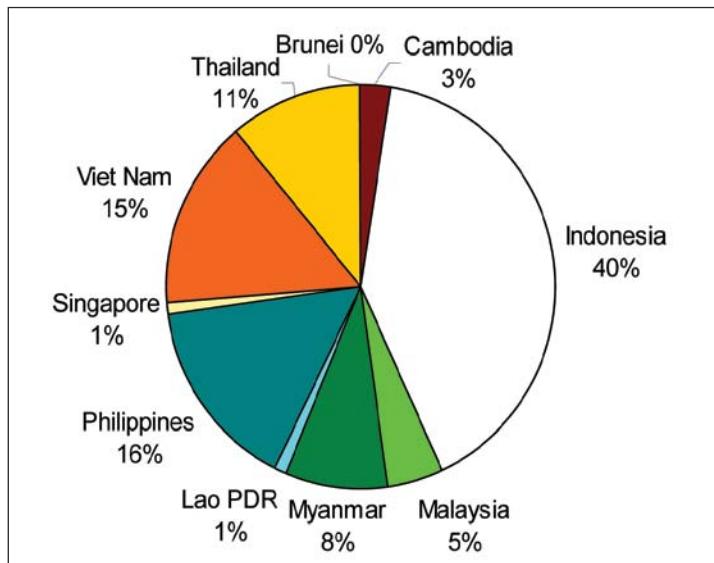


Figure 3.1. Population distribution among Southeast Asian countries, 2010

Source: UN Population Division (2006).

Rural to urban migration is accelerating

With increasing levels of socio-economic development, subsistence-based economic systems are giving way to increased industrialization and service delivery while rates of rural to urban migration are accelerating. The Philippines is unusual in having very high overall population density and also being highly urbanized (**Figure 3.2; Table 3.1**). Viet Nam has a similarly high population density but the rural proportion is far higher. A similar, although less pronounced, situation exists in Thailand. In contrast, Cambodia, Lao PDR and Myanmar have considerably lower population densities than other countries in the subregion and large proportions of the population are rural. In Malaysia, population density and the rural proportion are relatively low, although considerable differences exist between states.

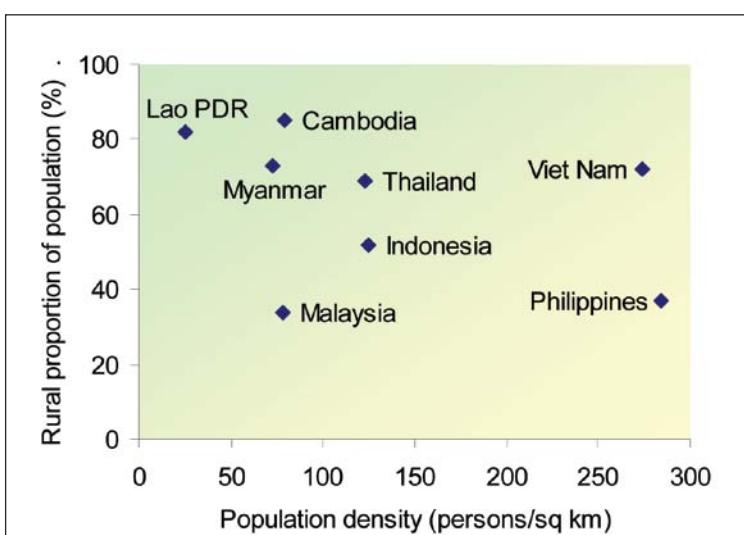


Figure 3.2. Population density and rural proportion of the population in Southeast Asian countries

*Population growth
is centred in urban
areas*

In Indonesia, Malaysia and the Philippines population growth at the national scale contrasts with falling population trends in rural areas as shown in **Table 3.1**. In Cambodia, Lao PDR and Viet Nam, rural population is still expected to rise but at a pace below the rate of overall population growth. Myanmar and Thailand lie between these two groups with low rates of population growth and rural population densities expected to remain relatively level up to 2020.

Table 3.1. Total population, population density and rural population percentage in Southeast Asia

	Population 2005 (000)	Population density/km ²	Total population			Rural population	
			Annual change (%)		(%)	Annual change (%)	
			1990- 2005	2005- 2020		1990- 2005	2005- 2020
Cambodia	13 956	79	2.5	1.7	85	2.3	1.2
Indonesia	226 063	125	1.4	1.0	52	-0.5	-1.0
Lao PDR	5 664	25	2.2	1.6	82	1.9	1.2
Malaysia	25 653	78	2.4	1.5	34	-0.1	-0.4
Myanmar	47 967	73	1.2	0.8	73	1.0	-0.2
Philippines	84 566	284	2.2	1.7	37	-0.1	-0.5
Thailand	63 003	123	1.0	0.5	69	0.8	0.0
Viet Nam	85 029	274	1.7	1.2	72	1.0	0.3
SE Asia	556 602	129	1.6	1.1	56	0.3	-0.3
Asia-Pacific	3 604 129	127	1.4	1.0	61	0.5	-0.1

Source: UN Population Division (2006).

*Rural depopulation
will affect forestry
in various ways*

Data in **Table 3.1** demonstrate that, notwithstanding the recent economic downturn, rural livelihoods are becoming less attractive. The long-term effects of rural depopulation on forestry are dependent on a number of factors. Although regrowth and expansion of forests may occur as people leave the land, low rural incomes and inappropriate land-tenure systems and policy environments may motivate depletion of remaining resources. The current swing towards large-scale commercial agriculture as a driver of forest clearance and the increases in road density around the subregion suggest that variations in population density are likely to correlate less and less with forest cover either within or between countries (Laurance 2007a; DeFries *et al.* 2010). The effects of trends in overall and rural population growth will, however, be largely mediated by rural development policy and governance. Where policy promotes forest conversion or where governance is weak, high rural population densities are likely to have detrimental effects on forest resources. Exceptions, where high population densities stimulate investment in forest resources have, however, been reported – in Cebu in the Philippines for example (Bensel 2008).

The subregion's workforce is set to increase

Figure 3.3 shows age distribution in Southeast Asia in 2005, together with forecasts for 2020. The rapid ageing trend will result in a 14 percent increase in the non-working population (below 14 or above 60 years) by 2020. At the same time, a 24 percent increase in the working population is expected. The transition to a more balanced age structure is likely to increase demand on forest resources in unison with the effects of overall population growth. Whether new demands favour forest products or forest services will determine the impacts on forests. Growing environmental awareness among the current younger generation may precipitate increased movement towards forest protection. This opportunity will, however, also depend on economic growth and the provision of alternative sources of income. The quality of policies and institutions and governance will also play a determining role.

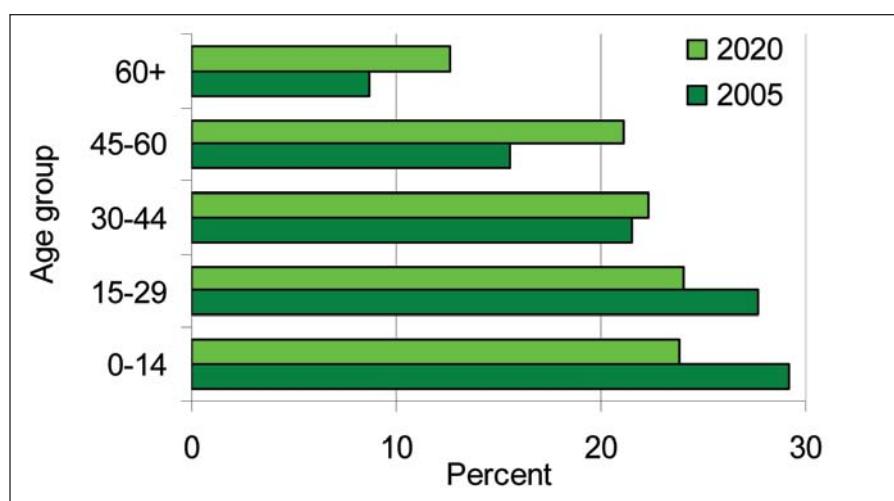


Figure 3.3. Age distribution in Southeast Asian countries, 2005 and 2020

Source: UN Population Division (2006).

Outmigration and overseas work can benefit forests

In addition to population growth and domestic migration and urbanization, outmigration is increasingly recognized as a driver of change in rural development. The advantages of outmigration in terms of overseas remittances have been recognized by several Southeast Asian economies, particularly the Philippines, Indonesia, Thailand and, more recently, Viet Nam (IOM 2003). Thailand has also become a magnet for migrants from neighbouring countries, including seasonal workers from Lao PDR and workers with poor prospects in their own country, particularly Myanmar citizens. Several effects can immediately be foreseen and anecdotal evidence exists for each. Firstly, capacity to manage forests in countries of origin is reduced while pressure on land for agricultural production and capacity to extract timber may be reduced. Secondly, low labour requirements may make forestry an attractive option for those leaving farms to work overseas and remittance payments may also be used to intensify agricultural production or educate children, both of which may act to reduce pressure on forests.

*Return to rural areas
during economic
recession has limited
effects on forests*

The effect of the 2008/2009 economic downturn on demography and forestry is difficult to assess given scant data on population movements. In the aftermath of the Asian economic crisis, reversals in rural-urban migration trends were, however, reported. In Indonesia, there was considerable movement as job losses forced people to return to the provinces and in Malaysia, migrant workers were redeployed to rubber and palm plantations (Asian Migrant Centre 1998). Fears of increasing rates of deforestation were, however, largely unrealized (see **Box 3.2**). Since the beginning of 2009, workers in Southeast Asia have been reported to be returning to villages in response to the economic downturn (New York Times 2009). The Indonesian Government has estimated that across all sectors, 200 000 migrants may have to return home (BBC 2009). The ultimate scale of migration is difficult to estimate, but effects on forestry are likely to be less significant than the effects of policies pursued in response to the downturn.

3.2. ECONOMIC CHANGES

*Economic woes
continue to affect
the region*

Asia-Pacific economies have been rocked by several major events during the last decade: the bursting of the ‘high-tech bubble’ and the World Trade Center attacks in 2001, the SARS epidemic in 2003 and preceding these, the Asian economic crisis beginning in mid-1997. Indonesia, Thailand, Malaysia and the Philippines were among the most severely affected. Subsequently, China, the region’s largest producer and importer of forest products, emerged as the main growth engine in interregional trade and became an important export destination for economies in Southeast Asia (ADB 2003). More recently, the global financial system has been thrown into crisis by the 2008/2009 credit crunch and its economic repercussions. The effects on forestry are likely to be mediated by many factors and while deforestation and forest degradation are immediate concerns during periods of volatility, the connection was not found to be strong in relation to the 1997/1998 economic crisis (Pagiola 2001).

3.2.1. Income

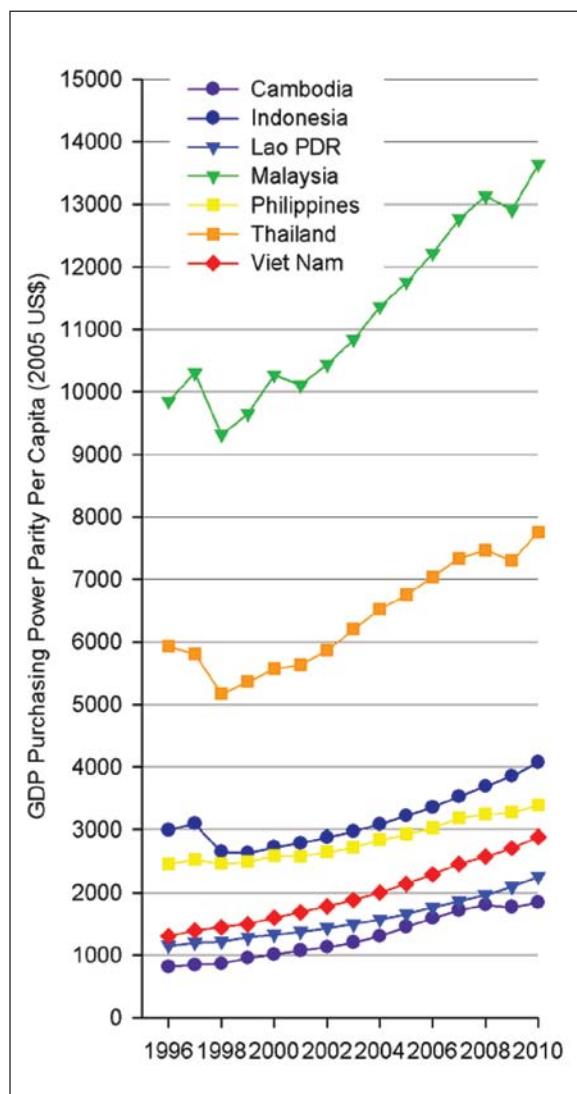
*Countries have
been challenged in
different ways by
recent economic
turns*

Table 3.2 shows that GDP in Southeast Asian countries expanded rapidly after 2002 following the region’s recovery from the Asian economic crisis and a global commodities boom. While economic expansion was seen in all countries, the subregion’s two biggest economies, Indonesia and Thailand, moved down the subregional ranking – partly due to the severity of the 1997/1998 crisis. Growth in Cambodia was most impressive, albeit from a low baseline, and Viet Nam also recorded high rates of expansion. At the Asia-Pacific level, however, growth rates in Southeast Asia in response to the rise of China and India have been significantly lower than the 8–9 percent per annum seen in South and East Asia between 2004 and 2007 (ADB 2009).

Table 3.2. GDP in Southeast Asian countries 1997-2007

	GDP (2000 US\$ billion)			Average annual growth (%)		Share of SE Asia GDP	
	1997	2002	2007	1997-2002	2002-2007	2002	2007
Cambodia	2.9	4.3	7.1	8.1	10.6	0.5	0.8
Indonesia	179.6	178.7	233.2	-0.1	5.5	31.1	27.6
Lao PDR	1.5	1.9	2.7	5.7	7.1	0.3	0.3
Malaysia	87.6	99.4	133.0	2.5	6.0	15.2	15.7
Philippines	69.7	80.7	106.8	3.0	5.8	12.1	12.6
Thailand	125.3	132.1	173.2	1.0	5.6	21.7	20.5
Viet Nam	26.3	35.7	52.6	6.3	8.1	4.6	6.2
SE Asia	577.0	631.6	844.4	1.8	6.0	100.0	100.0

Source: WDI (2010).



Southeast Asian countries have maintained their relative positions regarding standard of living as per capita purchasing power parity has increased (**Figure 3.4**). Rates of increase have been highest in lower income countries: Cambodia, Viet Nam and Myanmar, although absolute gains have been considerably greater in the advanced economies.

The 2008/2009 credit crunch, however, caused a sharp downturn in growth rates across the subregion (**Table 3.3**). Thailand, Malaysia, Indonesia and the Philippines withstood the initial crisis well – partly as a result of measures taken following the 1997/1998 crisis – while low income countries were less affected due to their limited integration into the global economy (World Bank 2009a). The subsequent economic slowdown disproportionately affected Malaysia, Thailand and Cambodia where reliance on export markets is highest.

Figure 3.4. GDP per capita purchasing power parity for Southeast Asian countries 1996-2010 (constant 2005 international dollars)¹

Source: WDI (2010), World Bank (2010).

¹ 2009 estimate and 2010 forecast assume pro-rata growth between GDP and per capita GDP at purchasing power parity.

Export dependent countries were hardest hit.

In Southeast Asia as a whole, GDP growth fell from 6.5 percent in 2007 to 1.2 percent in 2009, but was forecast to rebound to 5.1 percent in 2010 and 5.3 percent in 2011 (ADB 2010). Countries with limited external linkages escaped the worst effects while export-dependent countries were hardest hit. **Table 3.3** shows how high levels of export dependence were closely correlated with GDP fluctuations. Malaysia and the Philippines were hit by weakening electronics exports, while Cambodia and Indonesia suffered from reduced demand for labour-intensive export goods in major markets, although in Indonesia government stimulus and consumer confidence sustained growth (World Bank 2009b). Cambodia's economy saw the steepest drop in the subregion as garment exports and tourism were hit, while Thailand, as a food-exporting country, also suffered (World Bank 2009a; ADB 2009). The economies of Viet Nam, Lao PDR and Indonesia performed relatively well while in the Philippines, remittance payments and an economic stimulus helped weather the crisis (World Bank 2009b; ADB 2010).

The region may experience lower levels of growth to 2020

Overall, developing Asia weathered the 2009 downturn well and was the first global region to emerge from the crisis. Risks to the global outlook could, however, negate recent growth trends (ADB 2010). While economic stimulus continues, there are concerns that developed countries are converging on 'lower growth equilibrium' and that export-led recovery cannot be relied upon to reinflate developing economies in East Asia. Significant risk remains for several Southeast Asian economies and GDP across East Asia is expected to grow at more modest rates than anticipated before the downturn (World Bank 2010). Maintained fiscal stimulus in China and regained economic momentum may provide support for developing East Asia, but, excluding China, growth in that subregion in 2009 was only 1.3 percent, only slightly stronger than in sub-Saharan Africa (World Bank 2009b; World Bank 2010).

Foreign investment is falling and poverty may increase

The subregion also experienced a precipitous drop in foreign direct investment (FDI) following the 2008/2009 downturn. Cambodia and Lao PDR are particularly dependent on FDI as shown in **Table 3.3** and countries that rely on external borrowing, such as Indonesia and the Philippines, are also vulnerable to such reductions (ADB 2009). Declines in remittances, which are particularly important in the Philippines, are also damaging economies. Indonesia, Thailand and Viet Nam, as significant exporters of overseas workers, may also suffer if the rebound is not sustained (IOM 2003). Asia's strong performance in poverty reduction has been dampened by the downturn and wage rates have fallen while jobs have been lost from export, manufacturing, construction and services sectors (World Bank 2010).

Table 3.3. Exports and FDI as percentage of GDP in 2007 and GDP growth and forecasts to 2010

	Export of goods & services (% of GDP)	Net inflows of FDI (% of GDP)	GDP growth (%)			
			2007	2008	2009e	2010f
Cambodia	65.3	10.4	10.2	6.7	-2.0	4.4
Indonesia	29.4	1.6	6.3	6.0	4.6	5.6
Lao PDR	37.4	7.9	7.5	7.5	6.7	7.7
Malaysia	110.2	4.5	6.3	4.6	-1.7	5.7
Philippines	42.6	2.0	7.1	3.8	0.9	3.5
Thailand	73.3	3.9	4.9	2.5	-2.3	6.2
Viet Nam	76.8	9.8	8.5	6.2	5.3	6.5

e = estimate, f = forecast

Sources: WDI (2010); World Bank (2010).

The downturn may be deep and lasting without appropriate responses

The main fear in the subregion is for a protracted recession through which the financial sector would be jeopardized (ADB 2009). Economic recovery will be supported by middle-income countries investing in physical and human capital to move up the value chain, while low-income countries have an opportunity to increase manufacturing and integrate into global and regional production networks. Increased attention to regional integration, and commitment to the Association of Southeast Asian Nations (ASEAN), is required given prospects for slower growth in advanced economies (World Bank 2010).

Effects on forestry will be mixed

The effects of the downturn and rebound on forestry are difficult to judge, but analysis of the situation following the 1997/98 Asian economic crisis suggests that impacts may reverberate for an extended period even after 'recovery' (Box 3.2). China is currently promoting domestic consumption and this is likely to increase import growth, particularly of raw materials, but also of consumer goods (World Bank 2009a). In relation, Southeast Asia is in a good position to regain momentum from resumed global growth given open trade regimes and export-oriented economies. However, growth in the coming years is likely to lag behind that seen over the past decade due to the need to increase savings in export markets and banking and financial risks remain (World Bank 2009a). Larger economies with greater purchasing power and less reliance on exports are likely to fare better due to greater potential reliance on domestic consumption. In this regard, Indonesia and the Philippines are better placed than smaller and more prosperous nations, although other factors are also at play.

*Forestry – through
its multiple roles
– can play to the
prevailing trend*

In the long term, it is generally recognized that high rates of economic growth place greater demands on land and forest resources and in forest-rich, less developed countries, the downturn is likely to result in some relief of pressure on forests. More affluent societies can, however, better afford non-commodity forest values than those where weak governance, shortages of alternative livelihood options or undeveloped economies place excessive demands on natural capital (e.g., Lanly 2003). It is important to note, however, that because of the multiple functions of forests, management can be adapted to suit different circumstances. During a downturn, for example, forests can be valuable in providing employment, supplying building materials and acting as safety nets, whereas when growth rates are high, forest values may be more associated with providing materials for, and employment in, export industries, acting as an ecotourism attraction and means of income generation for absentee landlords.

Box 3.2. The Asian economic crisis and deforestation

The Asian economic crisis of 1997/1998 resulted in a protracted economic slow down, price and exchange rate fluctuation and increased rates of poverty around the region (World Bank 2007). Reversals of rural-urban migration were seen as workers returned to rural areas following job losses. Lower remittances from those still working away from home and changes in relative prices of consumed and produced products were also recorded (Pagiola 2001).

In the Philippines, Thailand and Indonesia, initial concerns that the crisis would result in increased rates of deforestation were largely unrealized due to lower than expected rates of return migration and forests having already been cleared in many areas to which people returned. Even where workers returned to frontier areas increases in forest clearance were not recorded except in parts of Riau and Sulawesi in Indonesia. There were, however, widespread increases in collection of forest products as a result of rising commodity prices and reduced income (Pagiola 2001).

Some reduction in expenditure on protected areas and public works programmes, and road building in particular, were also reported but the overall impact of the economic crisis on deforestation was assessed to be less than had been feared. The most significant effects were thought to be through changes in relative prices and coping strategies of rural households. Immediately following the crisis, and despite substantial increases in palm oil prices, oil-palm plantation establishment in Indonesia fell due to the collapse of the financial sector and resulting lack of investment (Pagiola 2001).

Ten years after the crisis, statistics show that rates of oil-palm plantation establishment had been regained in Indonesia and increased rapidly after 2001 (see Section 3.3). The change in relative prices brought about by the collapse of the rupiah made export markets considerably more attractive. In combination with low oil prices and high palm oil prices over the past decade, the rapid rates of forest conversion observed in Indonesia are unsurprising.

3.2.2. Structural changes in economies

Sectoral shifts in economies will continue to affect forestry

With increasing levels of socio-economic development in the subregion, sectoral shifts will continue to affect forestry. In general, movement away from agriculture and towards industry and services relieves pressure on forests as subsistence agricultural production diminishes. Income growth can at the same time finance forest protection, although population density and rural development policy also play major roles. Additionally, foreign investment in agriculture has brought a new dimension to rural development in Southeast Asia in recent years and may challenge established trends.

Economies are gradually moving away from agriculture

In Cambodia, Myanmar and Thailand, large proportions of the population are employed in agriculture as shown in **Figure 3.5**. Shifts in employment from agriculture to industry and services in Cambodia, and to a lesser extent, Thailand, the Philippines and Viet Nam, are also evident. In Cambodia, 78 percent of the population was employed in agriculture in 1990 compared to 60 percent in 2004. In Thailand, the Philippines and Viet Nam reductions of around 7-8 percent were recorded between 1997 and 2004/2005. In Indonesia there was no net change and in Myanmar and Lao PDR, although a shift away from agriculture is probably taking place, supporting data are not available.

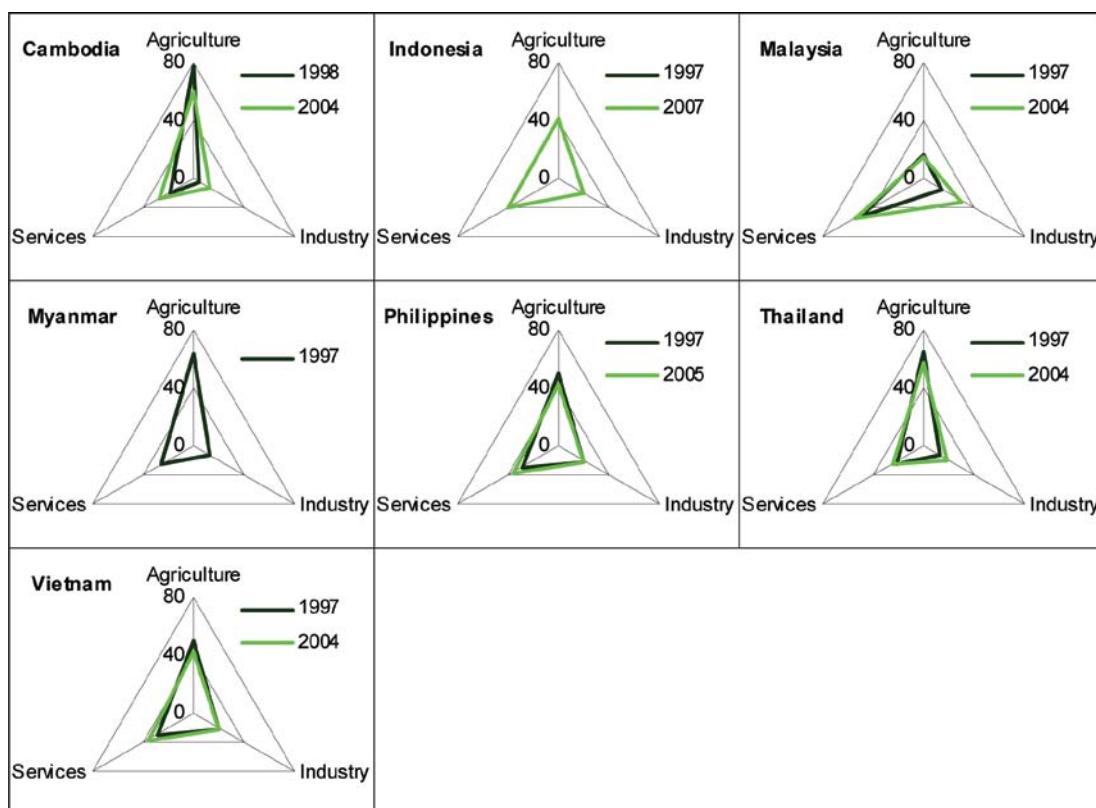


Figure 3.5. Employment by sector in Southeast Asian countries 1997 – most recent

Source: WDI (2010).

Malaysia has shifted away from agriculture

Malaysia, the most developed of the larger economies in Southeast Asia, has undergone a marked transition from agriculture to industry. The share of agriculture (including forestry and fisheries) as a percentage of GDP declined from 29 percent in 1970 to 13 percent in 1996 while manufacturing more than doubled, from 14 percent in 1970 to 35 percent in 1996 (Othman 2000). Due to the geographical divisions in Malaysia, and the concentration of forests in Sabah and Sarawak, the effects of sectoral shifts at the national level are, however, difficult to determine.

Rural population growth may balance structural shifts in economies

Relatively high rates of rural population growth in Cambodia and Lao PDR (see Section 3.1), are likely to negate the effects of shifts in economic structure on forestry. In the Philippines where the rural population is declining and in Thailand and Viet Nam where growth is low or zero, shifts towards industry and services may have greater impact. In Thailand, forest regrowth and abandonment of agricultural land has, for example, is already being reported, as outlined in the following Section.

3.2.3. Economic viability of forest management

Trends in society are changing the economic position of forests

The economic viability of forest management for wood production is dependent upon many factors: timber demand; market access; availability of financing; industrial efficiency; benefit distribution; technical and management capacity; and the policy and institutional framework. Southeast Asia's natural forests have historically provided wood at low cost to consumers both within and outside the subregion. With depletion of commercially valuable species, falling stocks and slow returns on investments, the economic viability of forestry relative to other land uses is changing. The legacy of high-impact logging, high grading and unsustainable management of forests has also come to influence both the present and the future economic viability of forest management (Samsudin *et al.* in prep.). The rising value attributed to non-consumptive uses of natural forest has also led to greater forest protection, which often rules out harvesting. While mechanisms are being established to internalize costs associated with production of environmental services from forests, there is still some way to go before revenues become available.

Investment in forestry has focused on pulp wood production

With sustainable management of natural production forests yet to emerge on a large scale in the subregion, plantations have become an increasing focus for wood production. The comparative profitability of wood production has, however, often been lower than other land uses associated with higher priced products, shorter return periods or less product competition such as oil-palm and rubber. The longer rotation periods necessary for sawlog production have generally proved less popular and pulp log production has been a more common focus for investment. With increasing recognition of local rights and trends towards allocation of land to local levels, this pattern is likely to be reinforced given the preference of smallholders for short investment periods.

Deforestation rates are linked to commodity prices

Fluctuations in the rate of deforestation have been observed in response to global commodity prices (Stern 2006). Currency depreciations in Southeast Asia following the 1997/1998 crisis were severe and long lasting. In 2005, Lao PDR, Indonesia and the Philippines currencies were trading at 12, 30 and 54 percent of their 1997 US dollar exchange rates respectively. Such depreciations across the subregion increased the attractiveness of export markets and the high forest product and agricultural prices that resulted are likely to have contributed to increased deforestation and degradation – especially where institutions were weak (Angelsen and Kaimowitz 1999).

Maintenance of natural forests is highly dependent on policy and its implementation

Up until the 2008/2009 economic downturn, although wood product prices were comparatively high in Southeast Asia due to weakened currencies and the global commodities boom, SFM failed to make significant ground. Where increases in harvesting do not result in increased investment in the resource base, forest product production is unlikely to be sustained. In Cambodia, for example, it has been suggested the government should have received over US\$100 million in logging revenues in 1996, but only received US\$10.7 million (Dauvergne 2001).

The economic downturn is affecting forestry in several ways

So far, exchange rate depreciations associated with the current downturn have been small, and effects similar to those seen after the 1997/1998 crisis are unlikely to materialize. Being an integral part of the larger economy, however, the forest sector has been affected in other ways by the downturn (FAO 2009):

- Demand for wood and wood products has declined significantly resulting in scaling down production, decline in trade, mill closures and increased unemployment.
- As existing capacities remain underutilized or closed down, investments in new capacities are being deferred or dropped.
- Recession has dampened the ability and willingness to pay for environmental services and has affected demand for environmental services, including carbon markets, ecotourism, etc.
- Continued economic woes could adversely affect investments in SFM, especially as the capacity of key players like governments, the private sector and communities decline.

...there are also opportunities

The economic downturn has, however, also provided opportunities for the pursuit of more sustainable approaches to management. As attention shifts to rebuilding real assets, creation of employment and the pursuit of green development, forestry could become a core area for economic renewal investments. In relation, forests and wood products have many factors working in their favour during financial crises (Ze Meka 2009):

- The impact of the crisis on wood prices has so far been less dramatic due to trade playing a lesser role in timber prices than for many other commodities.
- The versatility of wood utilization leads to diverse market opportunities.

- The flexibility of forest management (there is no obligation to harvest trees when the market is unfavourable).
- The possibility of combining timber, NWFPs and environmental services to optimize forest output under varying economic conditions.

SFM in production forests may not appear on a large scale

In the long-term it is likely that forest management for production will only remain economically viable where institutional arrangements are conducive to SFM. Without implementation of improved management, high-paying markets may become unavailable and, perhaps more importantly, the productive functions of forest are unlikely to be maintained.

3.3. TRADE

Trade looks set to increase yet more in Southeast Asia

Trade plays a critical role in the economies of almost all Southeast Asian countries. Indonesia, the least trade-dependent country in the subregion, still derives almost a third of GDP from trade while Malaysia, Thailand, Viet Nam and Cambodia are much more heavily dependent (**Table 3.3**). With falling barriers to trade and expanding transport routes, Southeast Asia is likely to see increased economic integration and transboundary business activity in the coming years.

ASEAN's trade relations with China and India are strengthening

Implementation of the ASEAN Free Trade Area (AFTA) Common Effective Preferential Tariff agreement (CEPT) of 1992, commits the six original ASEAN member countries to abolish import duties on goods from 1 January 2010 and from 1 January 2015 for Cambodia, Lao PDR, Myanmar and Viet Nam. Concurrently, ASEAN and China have established a free trade area for the original ASEAN members, with inclusion of Cambodia, Lao PDR, Myanmar and Viet Nam planned for 2010. With effect from 1 January 2010, Malaysia Indonesia, the Philippines and Thailand have joined with China in a free trade block that will eliminate duties on all products (ITTO 2009k). Although trailing China in terms of trading importance, India has also made efforts to cultivate relations with ASEAN through the Look-East policy in 1992. This looks set to influence Myanmar most of all, given India's focus on using the policy to develop its remote northeast region.

GMS institutional and infrastructure developments are supporting increased trade

In the Greater Mekong Subregion (GMS) a Cross-Border Transport Agreement (CBTA) has been developed to facilitate cross-border movement of people, goods and vehicles to improve economic benefits and increase international competitiveness (ADB 2005). The agreement parallels road developments in the subregion that will significantly improve connections to markets for previously isolated and undeveloped areas (see Section 3.5.1). For example, Lao PDR, the only landlocked country in the subregion, is becoming increasingly transected by all-weather roads linking neighbouring countries and deep water ports. Lao PDR is also in the process of accession to the World Trade Organization (WTO) – the last country in the subregion to join.

Tariff reductions will mostly have minor effects on the forestry sector

The effects on forestry of falling regional trade barriers are likely to be mixed. As only more processed wood products generally carry import tariffs, changes are for the most part likely to affect forest products indirectly through the effects of increased economic development on consumption. Additionally, high tariffs on value-added products may not be removed under upcoming trade agreements if the products are deemed sensitive. Tariffs and non-tariff trade barriers in large and high-paying export markets are also likely to be of more importance to regional exporters of processed wood products than barriers in neighbouring countries.

Perceptions of tropical hardwoods in international markets are more important

The perception of tropical wood as a product inextricably linked to illegal logging and environmental degradation is of great significance to the forest product trade in the subregion and it is feared that big importers may shy away as a result. Although consumers in high-paying markets have often been unwilling to pay a premium for certified timber, it is possible that public procurement policy and corporate strategies may lead the way for an exodus from tropical timber markets. Import restrictions in the EU and United States look set to change trading patterns in the region unless measures are taken to improve forest sector control (**Box 3.3**). Under such a scenario, trade with less discerning partners may expand, although timber prices could fall and reduce the viability of forest management for wood production.

Box 3.3. Changes to import restrictions in the European Union and United States

The European Commission (EC) is now considering new legislation designed to remove illegal wood from the supply chains of products destined for the European market. The proposal has been influenced by the Lacey Act Amendment passed in the United States in May 2008, but differs in some significant respects. The Lacey Act makes it an offence in the United States to trade in any wood product sourced in contravention of the laws of any other country. It therefore strongly implies, but does not require, that timber-trading companies in the United States implement management systems to minimize the risk of any illegal wood entering their supply chains. The act is already causing strong reaction and activity amongst timber retailers and pressure is being applied to overseas suppliers.

In contrast, while not making it illegal to trade in wood products in contravention of the laws of another country, the EU's proposed legislation places an obligation on European operators to implement a 'due diligence system' to minimize the risk of illegal wood entering supply chains. Currently, draft amendments to the legislation are being reviewed by the European Parliament. The earliest that requirements are likely to be imposed on EU operators would be the second half of 2011.

Source: ITTO (2009c; ITTO 2009l).

3.4. AGRICULTURAL EXPANSION

Agricultural expansion is the primary reason for forest conversion in Southeast Asia

The primary reason for forest conversion in Southeast Asia is establishment of cash crop plantations and agriculture, which in recent years has had a stronger impact on forest cover than logging (Stibig *et al.* 2007). **Figure 3.6** shows expansion of agricultural area in Southeast Asia and indicates an increase in the subregional growth trend from 0.7 percent *per annum* between 1997 and 2002 to 1.2 percent between 2002 and 2007. The highest recent rates of conversion were in Lao PDR, Myanmar, Indonesia and Cambodia while small reductions in agricultural area were recorded in Thailand and Malaysia. The reductions in Thailand result from a number of causes including voluntary conversion to other land uses including plantation forestry; land confiscation, especially for forest conservation and at higher elevations; and voluntary abandonment of land often linked with unprofitability (Leblond 2008). Although not directly associated with increase in forest area, these trends represent reversals at the agricultural frontier and decoupling between economic development and deforestation.

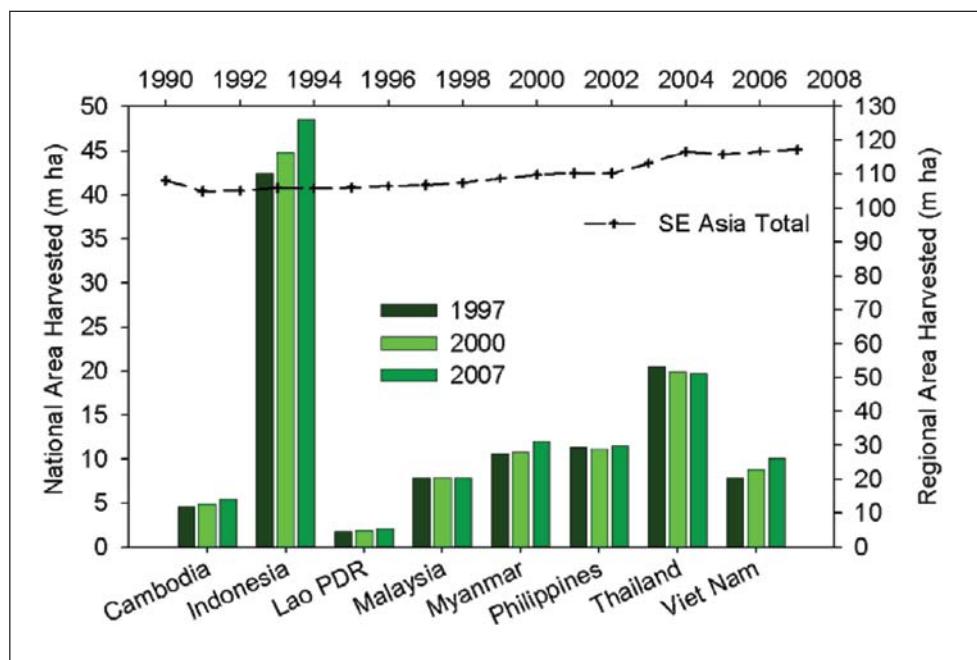


Figure 3.6. Agricultural area in Southeast Asian countries, 1997-2007

Source: FAO (2009).

A few agricultural crops account for a large proportion of deforestation

The overall trend in the subregion is largely due to the expansion of cultivation of a relatively small number of agricultural products (Stibig *et al.* 2007). In Cambodia, Lao PDR, Myanmar and the highlands of Viet Nam the production of rubber, cashew nuts, coconut and sugar cane, and of cacao, coffee and tea in highland areas has been a major cause of forest conversion. Changes in coastal zones in Myanmar, Thailand and Viet Nam

have taken place as a result of demand for land for shrimp ponds and agriculture and mangrove forests have been lost as a result. Shifting cultivation in the uplands of Myanmar, northern Lao PDR and Thailand has resulted in loss of mostly secondary forest and in central Myanmar, large areas of forest have been cleared for rice paddy establishment in upper Bago Division and around Nay Pyi Taw. In Sumatra, Kalimantan and the Philippines, forest conversion is taking place for smallholder agriculture. Conversion of forest land for establishment of pulp plantations has also taken place in Riau and Jambi provinces in Sumatra, in East Kalimantan and West Papua (Stibig *et al.* 2007). At the subregional level, two of the most important crops in terms of forest conversion are rubber and oil-palm.

Rubber plantations are expanding in forest areas

Southeast Asia's 7 million hectares of rubber plantations are located primarily in Indonesia, Thailand and Malaysia.² Smaller areas are found in Viet Nam, the Philippines and Myanmar. In upland areas in Lao PDR rubber plantations have expanded greatly in recent years as rubber prices increased (Alton *et al.* 2005). Overall, between 2002 and 2007, expansion rates were highest in the Philippines (6.5 percent per year), followed by Viet Nam, Thailand and Myanmar. Rubber has been a particularly important cause of forest conversion in Lao PDR, Cambodia, Thailand and the central highlands of Viet Nam (**Figure 3.7**; Stibig *et al.* 2007).

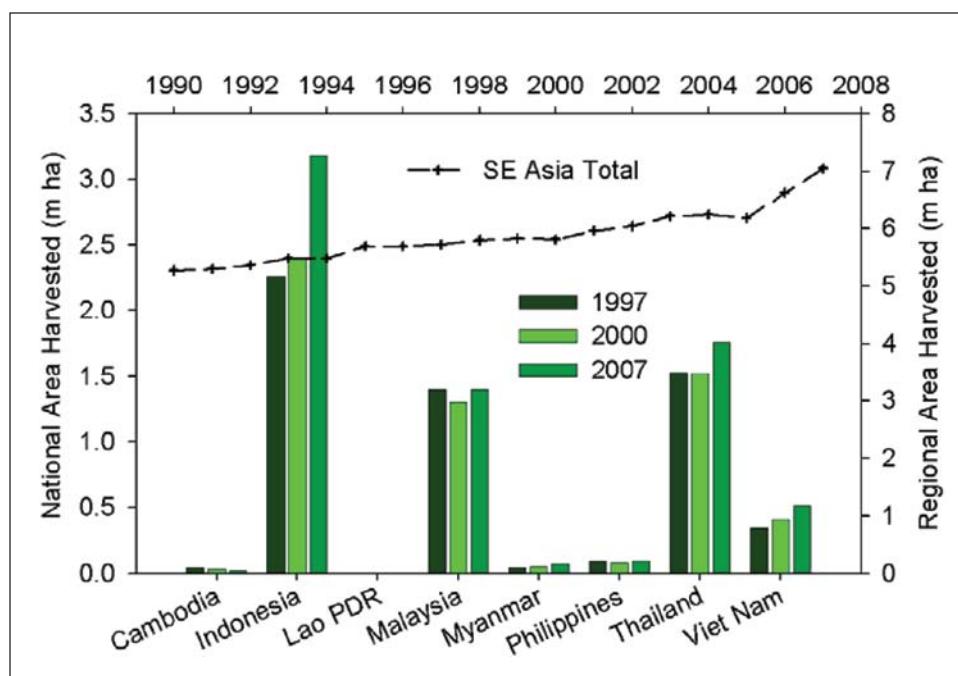


Figure 3.7. Area of rubber harvested in Southeast Asian countries, 1997-2007

Source: FAO (2009).

2 Although now counted as a forest species under the FAO definition (see Section 2.1.3), rubber is included in this Section due to the marked effects of rubber plantation establishment on natural forest area in recent years.

Oil-palm is particularly important in Malaysia and Indonesia

Oil-palm is often established in logged-over forest

Expansion of oil-palm plantations is particularly relevant to forestry in Southeast Asia given projected increases in energy demand and the status of Malaysia and Indonesia as the world's largest producers of palm oil (**Figure 2.8**). In 2007, Malaysia had an estimated 3.8 million hectares of oil-palm, while Indonesia had around 4.6 million hectares (FAO 2009). Rates of increase in Malaysia between 2002 and 2007 stood at 2.7 percent *per annum*, having slowed from 6.6 percent between 1997 and 2002. In Indonesia, expansion stood at 15.8 percent *per annum* for 2002 to 2007 compared with 11.5 percent between 1997 and 2002.

Claims have been made that expansion of oil-palm plantations in Malaysia and Indonesia has often been at the expense of recently logged over forest areas, primary forests and carbon-storing peat swamps (Hooijer *et al.* 2006). In eastern Sumatra, along the coastal plain of Sarawak and in many areas of Kalimantan, logged-over forests are being cleared for the establishment of oil-palm plantations. In West Papua, oil-palm plantations are also beginning to be established (Stibig *et al.* 2007). In southern Thailand and southern Myanmar, oil-palm establishment has also been an important cause of forest conversion (Stibig *et al.* 2007). The importance of biofuels as fossil fuel alternatives and strategic concerns over energy supply together with high palm oil prices suggests that oil-palm plantation establishment may be an important factor in forest conversion for some years to come. In the Philippines, for example, biofuel consumption has been supported by legislation and production is to be centred within forest lands (**Box 3.4**).

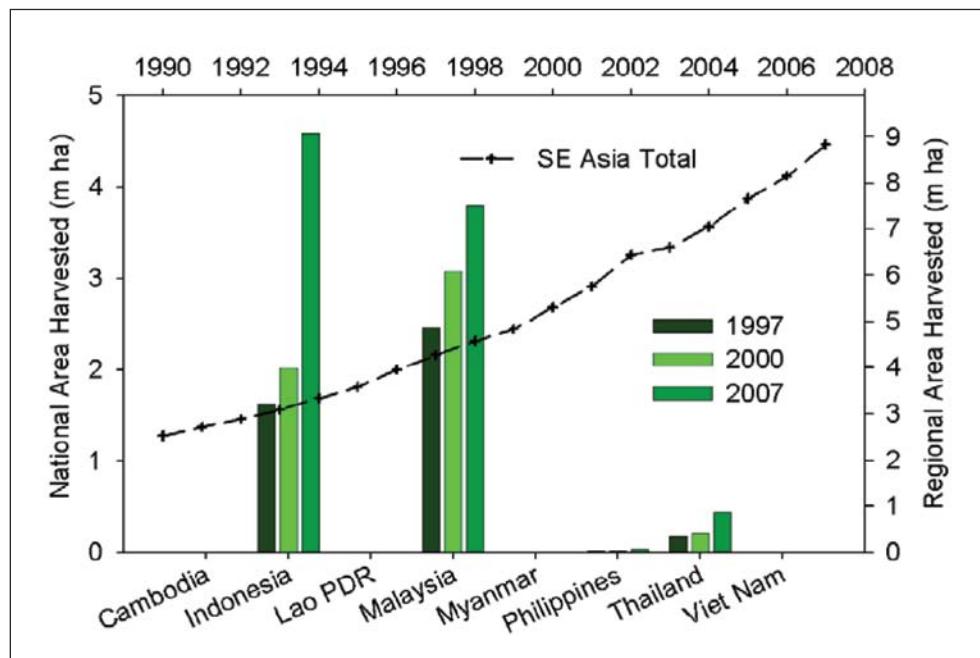


Figure 3.8. Area of oil-palm harvested in Southeast Asian countries, 1997-2007

Source: FAO (2009).

Box 3.4. Biofuel developments in the Philippines

The increasing price of fossil fuel as well as the emission of greenhouse gases has prompted the government to pass the Bio-fuels Act of 2006 (RA 9367), which requires the gradual replacement of diesel with biodiesel. Within two years about 5 percent of gasoline and diesel was to have been replaced by bioethanol and biodiesel, respectively. Currently, a 1 percent replacement biodiesel is available at some gasoline stations in Metro Manila. To support this policy, the government is promoting the planting of Jatropha as a source of biodiesel. About 2 million hectares of forest land are planned to be planted with Jatropha and 600 000 hectares of coconuts, mostly in forest areas. The DENR has already provided 375 000 hectares of forest lands to PhilForest, a subsidiary of the Natural Resources Corporation which is the corporate arm of the DENR, for the planting of *Jatropha*.

Source: FMB (2009).

3.5. INFRASTRUCTURE DEVELOPMENT

Roads and dams are increasingly affecting forests in Southeast Asia

Infrastructure developments, and particularly transport infrastructure, have long been associated with economic expansion, the spread of markets and extraction of natural resources. In Southeast Asia, road developments have provided access to markets for many isolated populations and have also increased opportunities for investment and trade. At the same time, forest resources have been depleted as loggers, farmers, agribusinesses and developers have moved in. Dam construction has also had significant impacts, particularly in environmentally sensitive upper watershed areas where forests provide valuable services including erosion control and maintenance of water quality, as well as biodiversity conservation.

3.5.1. Roads

Road densities are increasing in the subregion

In Southeast Asia, road densities are highest in countries with the highest population densities and lowest forest cover – the Philippines, Viet Nam and Thailand (**Figure 3.9**). Relationships between population density, road length and forest cover are not linear, however. For example, while recorded road density in Thailand doubled over the past decade and population density rose by more than 8 percent, forest area fell by only around 6 percent. Similarly, road densities are high in Viet Nam, although forest cover is increasing.

Road alignment should take valued habitats into account

For countries in the earlier stages of development, road construction has more significant and direct effects on forest area by increasing access to forest areas, improving market access and raising land value. Increased road densities are more likely to accelerate deforestation and forest degradation where regulatory quality is low and it is therefore important for appropriate

safeguards to be implemented in relation to road developments and for road alignment to be considered in relation to valued habitats. In Viet Nam, for example, the initial proposal for the Ho Chin Minh Highway now under construction included passage through 13 protected areas (ICEM 2003). Improved transport links, however, also improve access to markets for tree growers and to national parks and protected forests for tourists and certain aspects of forest management may therefore garner support.

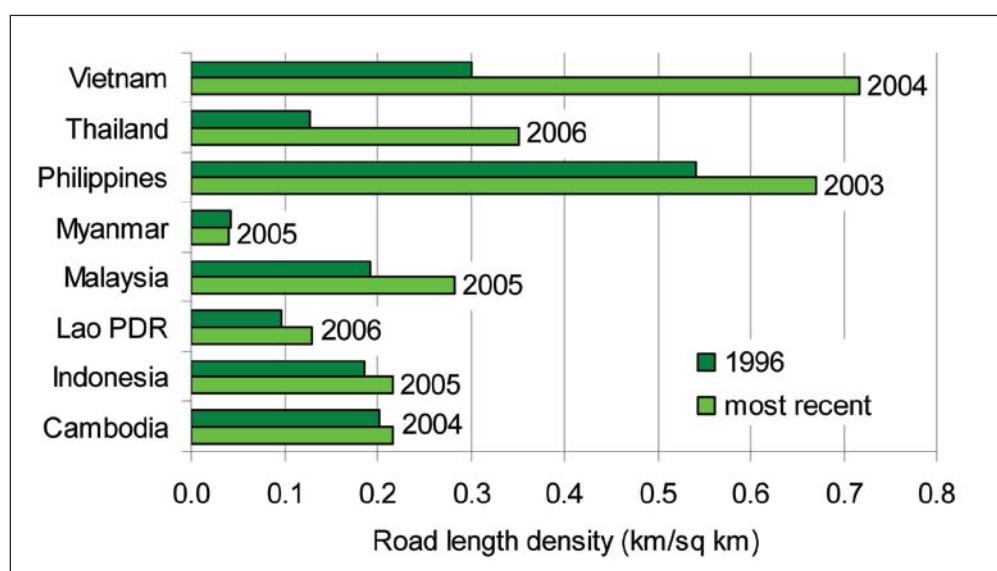


Figure 3.9. Change in road density in Southeast Asian countries, 1996-most recent

Source: WDI (2010).

The GMS programme is having significant impacts in the Mekong countries

Forests are directly and indirectly impacted

Road development is having greater impacts on forests in continental Southeast Asia as compared with insular Southeast Asia (Stibig 2007). The GMS programme, supported by Mekong region governments, the Asian Development Bank, as well as the private sector, emphasizes infrastructure development in the Mekong countries.³ Road developments undertaken as part of the programme are impacting directly on forest cover and on the accessibility of forest areas (**Figure 3.10**).

The 1 500-km-long ‘East-West Economic Corridor’ links the Indian and Pacific Oceans through Myanmar, Thailand, Lao PDR and Viet Nam. The GMS programme is stimulating economic development across the subregion, but has been criticized for inadequacy of social and environmental safeguards (AMRC 2006; Vientiane Times 2009). Concerns are that the programme will increase access to and facilitate illegal trade in wildlife, timber and other forest products, while also impacting directly on forests. Areas particularly affected include the northwest and southern parts of Lao PDR and northeast Cambodia (Stibig *et al* 2007). In Lao PDR, Cambodia and Viet Nam, protected areas adjacent to areas of development are also threatened by biodiversity and resource loss (Corbett 2008; see also **Box 2.15**).

3 See: <http://www.adb.org/GMS/>

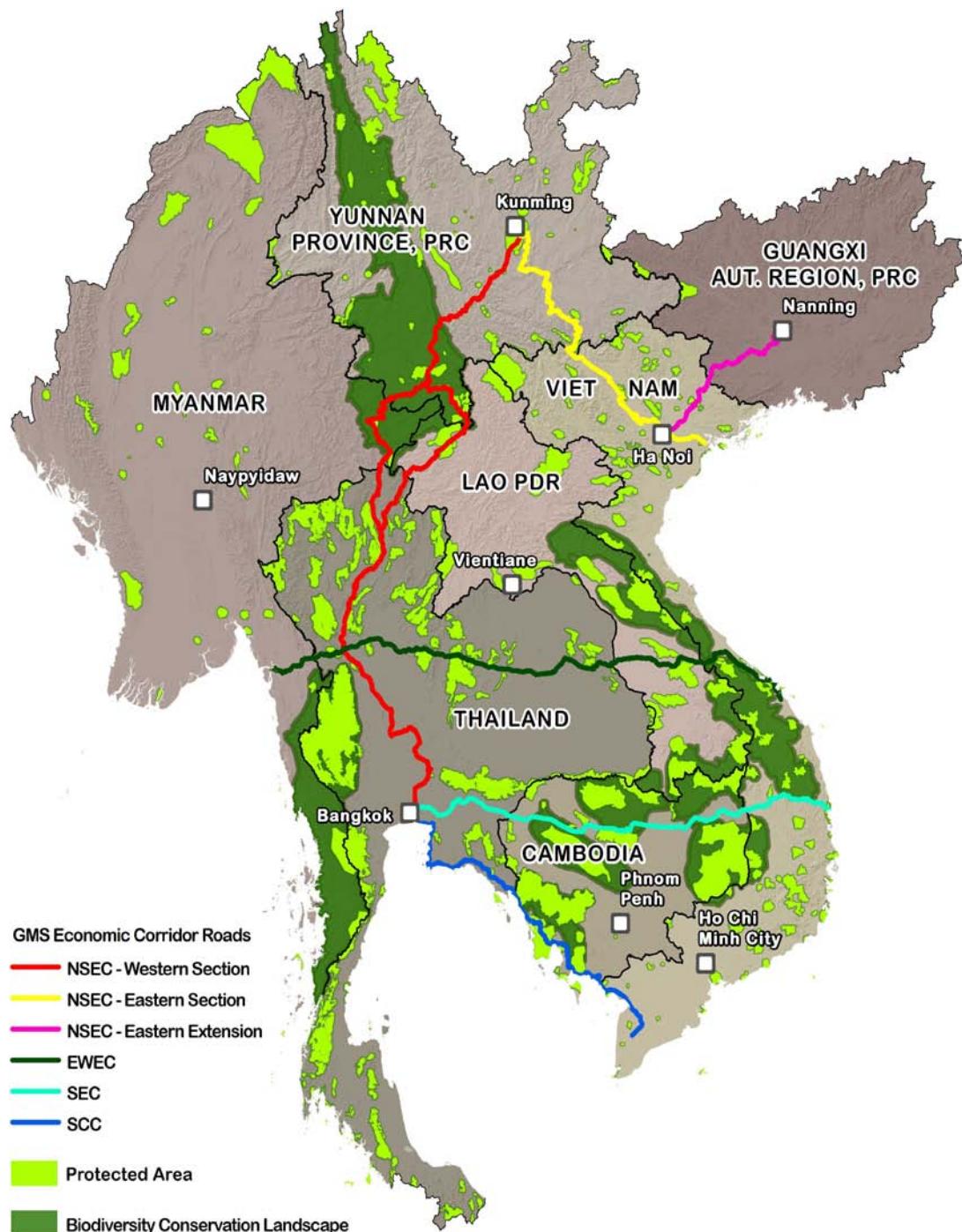


Figure 3.10. Major road developments in continental Southeast Asia

Source: ADB.

Improved enforcement and customs cooperation are necessary

Impacts on forests associated with road building may be alleviated through heightened attention to law enforcement in vulnerable areas as well as regional cooperation in areas such as customs inspection and information sharing. Without such measures, the current expansion of roads in the subregion will undoubtedly have huge impacts on forest resources and sector targets

3.5.2. Dams

Hydropower is an attractive energy source for the subregion

The impacts of activities in the energy sector on forestry in Southeast Asia have been expanding with accelerating economic development. The Philippines and Thailand are highly dependent on energy imports and, although still net energy producers, both Malaysia and Indonesia are increasing their net energy imports. Without alternative sources of energy, hydropower development is a particularly attractive option, both for domestic electricity consumption and for export.

Dams' adverse impacts are difficult to mitigate

Dam developments are commonly associated with forest loss – particularly in upland areas. In Sarawak, the Bakun Dam project has received years of attention in connection with the inundation of around 70 000 hectares of primary rain forest. Project completion is expected in 2010, but as clearance of the inundation area began in the 1980s, well before dam construction, forest-related issues are now foregone. In relation, a report by the World Commission on Dams (2000) suggested that many dam-related impacts are difficult to mitigate. Governments in the subregion have, however, begun experimenting with offsetting ecosystem and biodiversity losses through investment in conservation, regeneration and protection of high value habitats as detailed in **Box 3.5**.

Lao PDR is of central interest in subregional electricity generation

Lao PDR, the most mountainous country in the subregion, is of particular interest in relation to dams given the national strategy to become the 'battery of Southeast Asia' – six large dams are under construction and at least 12 more are at advanced planning stages (International Rivers 2008). The Nam Theun II Dam provides a high profile example, but many other dams are being built and in the Upper Mekong tributaries of Lao PDR, dam development has been a major cause of deforestation, particularly where forests have been cleared above the inundation area (Stibig *et al.* 2007). Impacts are expected to increase in coming years as demand for energy in the subregion grows and more and more hydropower development projects are implemented.

Box 3.5. Dam construction and forestry in Lao PDR

Domestic energy consumption is rising by 8 to 10 percent annually in Lao PDR and in 2004, 97.5 percent of electricity came from hydropower (Leechuefoung 2006). In the near future, the Lao Government hopes to export electricity to China, Viet Nam and to Cambodia. The Lao National Committee for Energy has identified reduction in reliance on revenues from forest products as a potential benefit of dam development, but dam constructions have often been accompanied by forest clearance and past experience shows that logging is hard to control.

Issues surrounding the Nam Theun II Dam provide some insight into the difficulties associated with the environmental impacts of dam construction. The proposed dam has attracted significant attention from many groups over a number of years (ADB 2001; World Rainforest Movement 2003). Much of the controversy

involves the adjacent Nakai Nam Theun National Biodiversity Conservation Area, which has been threatened by logging activities associated with clearance of the dam inundation area (World Rainforest Movement 2001). A number of timber-processing facilities were set up in the area and, following clearance of the reservoir area, large-scale logging continued in the dam catchment area (World Bank 2000). This not only had potential effects on the life span of the dam, given erosion and siltation risks, but also ran contrary to the initiative whereby the project would contribute US\$1 million *per annum* towards management of the catchment area (ADB 2001). Considerable efforts have been required by the government and its partners to bring the situation under control (World Bank 2002).

3.6. THE POLITICAL AND INSTITUTIONAL ENVIRONMENT

Southeast Asia is subject to considerable outside influence – both economically and politically

Southeast Asia has long been an area of confluence between larger regional and global powers and has experienced continuous change in recent years. The rise to global eminence in the 1990s of the Asian Tigers and their retreat following the 1997/1998 Asian financial crisis provided a sharp indication of the unpredictability of the global economy (Economist 2008a). A sluggish and patchy recovery suggested the need for governance and economic reform. Confidence in the Southeast Asian economic miracle and ASEAN as a growing regional power subsequently diminished (Anwar 2008). The efficacy of management models built on the principle of harmonious relations was also brought into question (Church 2006).

Polarities are changing and new alliances are being formed

The experience of continuing experimentation with democracy, of regional cooperation and of policy reform in communist and former communist states has brought rich variety to an already diverse subregion. From a global perspective, Southeast Asian countries have been drawn in many directions by a wide range of powerful influences. The small size of Southeast Asian economies and the diversity of governments within the subregion have increased the risk of pursuing contradictory policies while possibly also eroding efforts to improve governance (Croissant and Faust 2008). In this context, the strength of ASEAN has yet to be proven, although its role as a conduit to the international arena for member nations has been demonstrated (Dalrymple 2000).

3.6.1. Trends in governance

Forestry stakeholders are changing with the changing roles of forestry

Historically, governments, the private sector, the military, communities and civil society organizations have played different roles in Southeast Asian countries and continue to do so. In almost all countries, business-government coalitions, often with military support, have dominated forestry. Depletion of forest resources, calls for social and economic justice and demands by growing middle classes for forest protection are, however, hastening transference of power to civil society and to local communities.

The direction of governance and potential effects on forestry are unclear

Surveys showing that East Asians place greater emphasis on good management and standard of living than democracy may, together with the strong economic performance of some of the subregion's authoritarian governments, act to slow democratic reform (NIC 2008). Growing frustration at the workings of democracy in some countries and curtailment of prerequisites such as press freedom, suggest that 'state capitalism' may become a preferred development model. In relation, it is unclear whether governance in the subregion will improve with greater movement towards or away from democracy (Economist 2008b). Gale (2006) suggests that business-government coalitions, which are dominant in the Asian model of development, may even work against implementation of sustainable development by allowing business interests to dominate, although emerging 'forest transitions' in China and Viet Nam challenge this position (Mather 2007).

Indicators allow assessment of trends in governance

Changes in World Bank Aggregate Governance Indicators between 1998 and 2008 were assessed to provide an indication of the extent to which forestry is likely to be supported by wider national developments in the coming years (Kaufmann *et al.* 2008). Six indicators cover various areas of governance: (i) Control of Corruption; (ii) Rule of Law; (iii) Regulatory Quality; (iv) Government Effectiveness; (v) Political Stability; and (vi) Voice and Accountability.⁴

Governance standards declined during the last decade

Taking all indicators and countries into account, the overall picture is of decline in governance standards over the past decade – reductions in scores are evident in almost 75 percent of cases. The notable exception to this trend is Indonesia, where falls in governance indicators after 1998 were reversed by 2002 and have since improved in all categories (see **Appendix 1**). In general, scores in Southeast Asia are particularly low for 'control of corruption' and 'voice and accountability', but better for 'government effectiveness'. 'Regulatory quality' and 'political stability' suffered the steepest declines in score across the subregion between 1998 and 2008. These results suggest that forestry will not, in the short term, benefit from significant improvements in governance except in Indonesia.

Each country has strengths and weaknesses

The best governed countries in the subregion are Malaysia and Thailand, while Lao PDR and Myanmar have the lowest overall scores. Reduced political stability and declines in voice and accountability are key concerns in Thailand. In Viet Nam, voice and accountability is poor, although rule of law and political stability have improved in the last decade. In the Philippines, political stability and corruption are key issues and show declining trends. In Indonesia, although governance remains relatively weak, all indicators are improving. In Cambodia, there has been very little change in the overall standard of governance during the past decade, although political stability has improved. In Myanmar, all indicators of governance are low and falling.

⁴ Governance scores in 1998 and 2008 for Southeast Asian countries are shown in Appendix 1 together with percentile rank for 2008 and change in rank between 1998 and 2008.

*Corruption
has increased
significantly*

Corruption constitutes a significant threat to forestry and to national economies, particularly where revenues from logging are substantial. Control of corruption scores,⁵ which correlate closely with rule of law, regulatory quality and government effectiveness in Southeast Asian countries, are shown in **Figure 3.11**. Potential scores range between -2.5 and +2.5, but all countries in Southeast Asia, except Malaysia, score below zero and exhibit falling trends – with the exception of Indonesia. In the Asia-Pacific region as a whole, corruption has also shown a marginal increase. Reasons for the relatively poor performance in Southeast Asia are unclear.

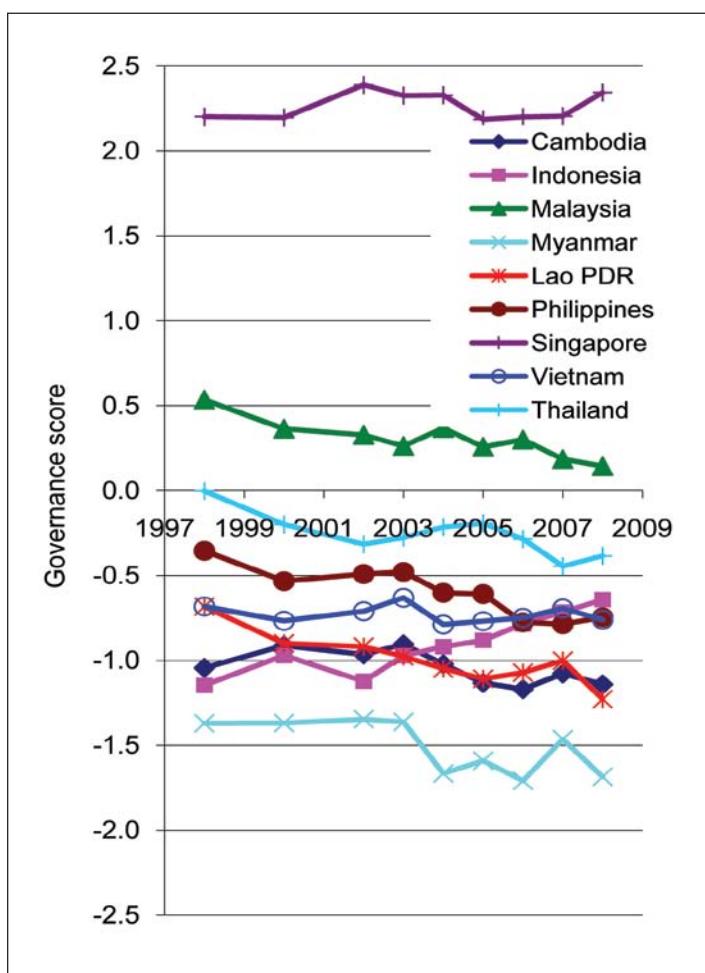


Figure 3.11. Control of corruption scores for Southeast Asian countries, 1998-2008

Source: WDI (2010).

5 Measuring perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests.

Voice and accountability have fallen

As a measure of the role of civil society, ‘voice and accountability’ scores for Southeast Asian countries fell between 1998 and 2008, with the exception of Indonesia. In 2008, the Philippines and Indonesia topped the table for Southeast Asia while Thailand’s ranking fell significantly between 1998 and 2008 (**Appendix 1**). Comparison of 2008 voice and accountability scores with trends in forest management shown in **Table 2.13** show a negative correlation, i.e., countries with high levels of voice and accountability, such as Indonesia and the Philippines, suffer from poor forest management while Viet Nam, which scores low, appears to manage forests better. In Malaysia, levels of voice and accountability have declined in recent years. According to some observers, non-state actors are only partially involved in policy-making while low levels of public awareness and fragmentary approaches by civil society groups are having a negative effect on forestry (Tong 2009b). At the same time, efforts have been made by the government over past decades to develop criteria and indicators for SFM and establish a national forest programme through wide consultation with non-state actors.

3.6.2. Forest law enforcement and governance

Illegal logging is a serious problem and is increasingly recognized at the international level

In several Southeast Asian countries the socio-economic contribution of forestry remains poorly realized and underestimated due to benefit capture by unaccountable interests. Lack of collection of royalties and taxes has also undercut markets for products from sustainably managed sources while mounting social and environmental costs have been overlooked. In particular, uncontrolled logging has resulted in extensive environmental damage and resources supporting the subsistence needs of rural populations have been removed, often without recompense. The Forest Law Enforcement and Governance (FLEG) ministerial conference in Bali, Indonesia, in 2001 constituted a first milestone in efforts to curb illegal logging and trade at the international level. Attended by representatives of Cambodia, China, Indonesia, Lao PDR, the Philippines, Thailand and Viet Nam, the resulting Bali Declaration recognized, amongst other things, the environmental, social and economic importance of forest law enforcement and governance and the necessity of involving both importing and exporting countries in corrective efforts. Demarcation of forest areas, enforcement of property rights and improved stakeholder involvement were among the main areas identified to remedy flaws in existing systems (IISD 2001).

Indonesia continues to struggle with illegal logging

For over a decade, the government in **Indonesia** has made efforts to control illegal logging and associated timber trade (Iskandarsyah and Wicaksono 2009). In 2001, Indonesia made a clear political statement and commitment on combating illegal logging during the Bali ministerial meeting. In 2002, however, illegal roundwood consumed by the timber industry was estimated at 42.2 million

m^3 . By 2005, this figure had fallen to 20.3 million m^3 (MoF 2007). Various announcements and international and bilateral agreements have been made concerning illegal logging and trade, including a memorandum of understanding between Malaysia and Indonesia (Broadhead 2006; ITTO 2003). In 2005, the President of Indonesia issued an instruction to eradicate illegal logging and downstream activities and announced a programme to combat corruption which included specific reference to combating illegal logging. The government has since strengthened control capacity and established a Special Forest Ranger Quick Response Unit (Iskandarsyah and Wicaksono 2009). Harmonized legality standards to differentiate legal and illegal timber are also being developed, although progress has been slow.

Cambodia has had a turbulent decade of forest governance

In **Cambodia**, strengthening implementation of forestry policy and improving forest law enforcement and governance have been priority issues since 1998 (Savet and Sokhun 2003). A number of obstacles confronting forestry, including corruption and clientelism have, however, remained untouched by the technological fixes promoted by donors (Rotha 2009). Steps taken to control illegal logging after 1998 were unsuccessful and a logging moratorium was announced in 2001. This resulted in closure of mills, a reduction in illegal logging and also shifts in the focus of illegal logging from commercial to small-scale operators, from few players to many and from export to domestic markets. Key factors determining the future success of FLEG efforts include the degree of responsibility allocated to the Forest Crime Monitoring Unit and the capacity provided to implement direct action (Rotha 2009). Alternative livelihoods for military groups and greater regulation of harvesting and environmental management are likely to reduce illegal logging, although current road network expansion is at the same time liable to expand opportunities.

In Lao PDR, efforts to combat illegal logging are beginning

Forest governance in **Lao PDR** is still at a relatively early stage of advancement and many problems exist with overlapping and conflicting legislation and directives, unclear jurisdictions, frequent government breaches of written law and a general lack of management or procedural norms (Hodgdon 2008). To control illegal logging, an effort beginning in May 2007 was made to close over 2 000 wood-processing factories across the country. Although overcapacity in the wood-processing sector is a key driver of illegal logging, a large share of the illegally traded timber is roundwood and effects of mill closure are therefore likely to be minimal. A new Department of Forest Inspection provides an additional means of improving forest sector governance, although greater government resolve is required in relation to forestry sector governance before detailed inspection becomes a relevant activity.

In Malaysia increased reliance on imported timber is affecting resolve to combat illegal forest activities

In **Malaysia**, uncontrolled logging became a concern in the early 1990s and in response the National Forestry Act was amended in 1993 in that licence holders and contractors were made jointly liable for illegal logging, penalties were increased and police and armed forces were empowered to undertake surveillance of forestry activities. Illegal logging incidents in Peninsular Malaysia subsequently dropped dramatically. Logging in forest areas claimed by indigenous communities continues to create conflicts, however, particularly in Sarawak (Tong 2009b). At the national level, three factors hinder further advances (Brown *et al.* 2004):

- The government is resistant to international calls for change, due to low levels of foreign debt and international aid.
- Extra-government influence within Malaysia is weak.
- The government considers that it has 'got it right' on ethnic redistribution.

Malaysia has committed itself to eliminating illegal logging at the national level and to combating the smuggling and trade in illegal timber. Policy and institutional structures regulating wood-based industries have, however, proved inadequate in the face of increased dependency on imported timber and some conflict of interest has resulted (Wells 2007).

Efforts are being made to combat illegal logging in Myanmar but more support is needed

Forest governance in **Myanmar** is affected by the prevailing political and socio-economic situation. Although the Myanmar Selective System (MSS) includes procedures to verify the legality of logs, it is doubtful whether it continues to be implemented or whether the annual allowable cut is adhered to (Thaung 2009). The Ministry of Forestry is attempting to address forest governance issues although no independent mechanism to verify timber legality has been established. Talks between China and Myanmar have also been held in relation to logging operations in border areas, but concrete actions and greater involvement of regional military commanders and ethnic leaders are still required. A weak judicial system, law enforcement officers' low pay and replacement of technical officers with military personnel in forestry agencies also pose problems. With the current lack of foreign assistance and low investment in forestry, it is doubtful that the situation will improve in the near future unless reforms are implemented.

In the Philippines the resources to enforce laws are lacking

In the **Philippines**, an Executive Order issued in 1987 states that possession of timber or forest products, without the legal documents, constitutes illegal logging. In relation, laws are considered sufficient, but resources to monitor, investigate, arrest and prosecute forest law violators are limited (Castillo 2009). It is therefore necessary to strengthen forest law enforcement capability at all levels and several moves have been made from establishing a Police Environmental Desk Officer in every police station to designating special prosecutors and courts to handle illegal logging cases. One of the more significant developments in recent years has been the establishment of an Environmental Ombudsman and an associated team of investigators and

prosecutors in 2004 to receive and investigate complaints against public officials. In addition, future implementation of national Criteria and Indicators for Sustainable Forest Management should assist with attempts to improve forest governance.

Breaches of forest law remain a problem in Thailand and have become a sensitive political issue

In **Thailand**, illegal logging is still reported at considerable levels and conflicts between authorities, villagers and civil society organizations and between conservation-oriented and people-oriented NGOs are widespread and often fierce. The 1989 logging ban and subsequent forest conservation efforts led to tense opposition between conservation-oriented and people-oriented groups. It is estimated that more than 1 million households in national parks, wildlife sanctuaries and national forest reserve lands are considered illegal by law. As such, the challenge of balancing forest conservation with other forest functions still remains at an early stage in Thailand (Ongprasert 2009).

FLEG-related efforts have not yet had significant impact on the ground

Despite increased attention to forest law enforcement and governance around the subregion, significant changes on the ground have been slow in developing. Converting rhetoric into action has proved challenging as a result of conflicting priorities, lack of resources and reluctance to stem the flow of forest products for reasons that are not immediately tangible. The reductions in governance scores in much of the subregion suggest that in the future, forestry development may be guided to a greater extent by local-level exigencies, private sector development and civil society action. The following Sections outline possible scenarios given potential shifts in economic growth and institutional performance.

