4 PROBABLE SCENARIOS AND THEIR IMPLICATIONS

Southeast Asian economies are evolving rapidly

Over the past half century, Southeast Asian nations have witnessed a major shift from predominantly subsistence, agrarian economic bases to industrialized societies. These changes have been accompanied by growing urban populations and establishment of a number of regional megacities. At the same time, the agricultural frontier has advanced as demand for land and resources from growing populations – both from within the subregion and outside – has increased. The pace of transition has varied, but in many countries government policies have taken advantage of low labour costs and the locus of manufacturing and some service industries has shifted to Asia (NIC 2008). Economic growth in recent decades has largely been fuelled by exports which in 2007 accounted for 72 percent of Southeast Asia's GDP (WDI 2010).

Economic uncertainty is again playing a leading role in the subregion

Ten years on from the 1998 Asian crisis another financial crisis – this time centred on developed nations and global financial centres – has erupted, pushing a highly dynamic and increasingly multipolar region into uncharted territory and considerable uncertainty. Recurrence of capital flight following the October 2008 credit crunch must once again weaken the subregion's confidence in international financial systems, especially as, this time, the crisis cannot be said to be home grown (World Bank 2008). The subsequent slowdown could have severe impacts on Southeast Asian economies, as the demand for products declines and foreign investment dries up. Countries with a high share of exports in GDP will be more severely affected depending on how long the situation persists.

New drivers of change in forestry are emerging

The effects of environmental shocks on political processes and of 'stealth' influences, such as overseas remittances and migration, on forestry and national development are growing in importance and are set to become increasingly significant as the climate changes and populations mobility rises. Internationally, legislation is increasingly being used to support environmental management where softer approaches have failed, particularly in relation to forest law enforcement and trade. Within the subregion, governance indicators have been falling in all countries except Indonesia and support for SFM may weaken as a result. International efforts to include deforestation and forest degradation in climate change agreements offer hope for additional support for forest management. At the same time, rates of road and infrastructure development across the subregion suggest that in the face of economic growth and agricultural expansion, any reductions in deforestation and degradation will be hard won.

The following Sections develop scenarios for Southeast Asia in 2020, drawing on country papers prepared during the outlook process and additional literature from around the subregion.

4.1 RATIONALE AND METHODOLOGY

A scenario can be thought of as an internally consistent view of the future – not a forecast, but one possible future outcome (Porter 2004). Outlook scenarios may be developed on the basis of broad potential changes in society to help provide perspective on forestry sector development in terms of the overall situation. Scenarios encourage broader thinking, allow expression of generic ideas without risk of censure, present a form of risk analysis and also provide a background against which to develop robust, proactive policy and build system flexibility.

Scenarios were developed according to the following steps:

1. A list of direct and indirect drivers of change in Southeast Asian forestry was developed on the basis of country-level outlook processes, literature review and expert opinion.
2. Information on the direction of change in major drivers and their effects on forestry was collected, as detailed in Section 3.
3. Two regionally important drivers with high expected volatility and uncertainty in their future course and also with a high level of importance to forestry were selected. Based on these two drivers, four basic scenarios were constructed by considering the impacts on forestry of combinations of the two variables at contrasting levels (high/low).
4. The scenarios were further developed by taking into consideration other drivers of change – i.e., those estimated to be less volatile in their trajectories and those estimated to have significant but less important effects.

4.2 PARAMETERS USED IN DEFINING SCENARIOS

From the wide range of drivers of change the two factors selected as being most widely influential and of uncertain future trajectory, and used to develop the scenarios were:

1. **Aggregate demand** – encapsulating responses to economic growth, changes in the distribution of income and structural changes in the economy.
2. **Effectiveness of policies and institutions** – this factor includes the quality of decisions made in regulating demand and the effects of demand and the quality of the systems used to implement policy (institutions and governance).

Comparatively long-term stable developments such as population growth and infrastructure development were not included as key variables in the scenario analysis. Rather, it was assumed that changes would be constant across all four scenarios. Similarly, it was assumed that environmental shocks – storms, natural disasters and climate change impacts, etc. – would be equally likely across all four scenarios despite their potentially pivotal influence on forestry because of the difficulty in predicting events and associated socio-political responses.

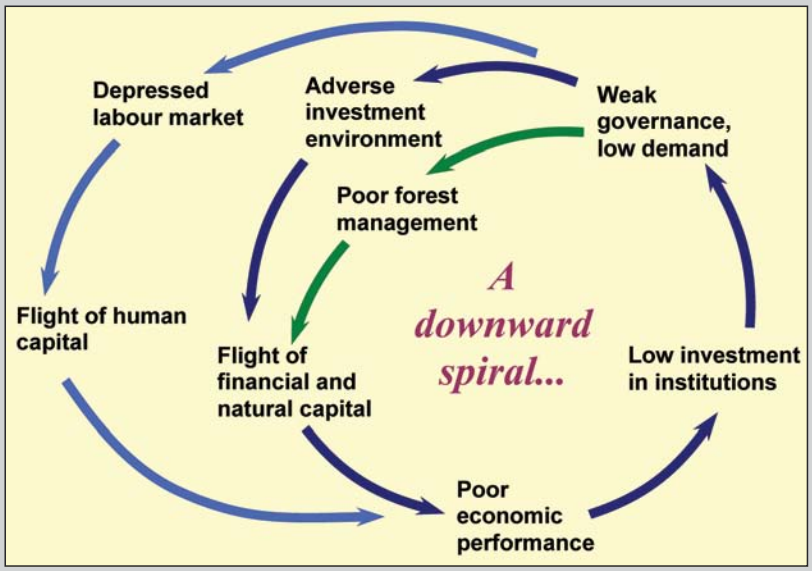
4.3 DEVELOPMENT SCENARIOS

The four quadrants in the table below relate to different levels of the two key drivers of change. Each quadrant is named according to the outcomes that changes in the drivers will cause as summarized in each box.

	Low aggregate demand	**High aggregate demand**
Poor policy and institutional performance	**1. Socio-economic development stalls** Economic growth – *recession; high income disparities and high levels of poverty* Demographic – *little change but more people stay in agriculture* Environmental policies – *low impact* Demand for land and natural resources – *lower*	**2. Unsustainable growth** Economic growth – *at pre-credit crunch rates; mainly based on natural resource exploitation with low investment in human resources* Demographic – *gradual movement away from agriculture* Environmental policies – *low impact* Demand for land and natural resources – *high*
Effective policy and institutional performance	**3. Sustainable development** Economic growth – *recession but development continues on the basis of reformed economic and social policies* Demographic – *little change but more people stay in agriculture* Environmental policies – *high impact but dependent on funding* Demand for land and natural resources – *low*	**4. High-growth development** Economic growth – *at pre-credit crunch rates; low income disparities and low levels of poverty* Demographic – *gradual movement away from agriculture* Environmental policies – *high impact* Demand for land and natural resources – *lower*

Hard times (Socio-economic development stalls)

Socio-economic development stalls as a combined result of the global recession and weak governance. The recession takes a number of years to lift and precipitates social rifts and instability in more fragile areas in the subregion. A multipolar global system emerges and, in comparison with preceding bipolar and unipolar systems, risk of instability is increased (see NIC 2008). People return en masse from cities to rural areas as jobs are lost and some agricultural expansion takes place in frontier areas. Levels of foreign investment and export demand fall as do commodity prices. Countries with less diversified economies and greater dependence on exports and FDI are deeply affected. Greater democratization becomes no more than a long-term prospect as economic globalization without sufficient social and environmental investment undermines liberal institutions and applies increasing pressures to fledgling democracies. As a result, Southeast Asian governments move increasingly towards 'state capitalism' as a model for development.



Policy and institutional weaknesses become increasingly apparent and reliance on the informal sector grows, precipitating a downward spiral. Funding for forestry is constrained by lack of credit availability and poor investment environments. Contraction of the formal economy makes way for increased illegal logging and undermines efforts to implement SFM. Logging activities cease in some areas due to unprofitability while more competitive operators increase volumes to maintain income. The net result is a reduction of direct pressure on forests, although active management is also reduced and small-scale illegal activities proliferate. As a result of the downturn, poverty rates rise in forest areas and demand for NWFPs and woodfuel also increases. Environmental shocks provide impetus for policy reform, but responses are weak and populations remain at risk as forest cover in fragile watersheds and coastal areas is disturbed and cleared. Neglect for investment in research and education and human resources compounds the problem and places the long-term management of forests in jeopardy.

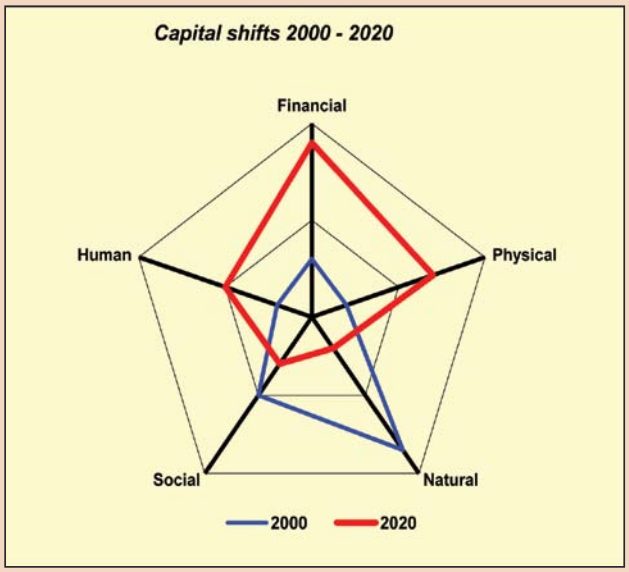
Calls for environmental and social justice go largely unheeded due to weak governance and lack of financing to support reform. Due to falling profits and growing corruption, the private sector retreats and abandons efforts to join with civil society in improving environmental and social conditions. International engagement and development assistance diminish and flight of human capital to more prosperous regions is seen. Falling global carbon emissions and reduced pressure on land and forest resources due to the downturn dissuade investment in REDD and forests are left in limbo in relation to carbon funding.

The global economic balance shifts towards Asia while United States and EU markets become less important timber export destinations due to low growth in consumption and stringent legality and certification requirements. Land allocation processes undertaken prior to the recession yield benefits as the recession fades and investment becomes available to increase production of forest products. Elsewhere, investment is discouraged by overlapping jurisdictions, an overbearing state keen to extract revenues and unstable tenure. Except in a few countries where the forestry sector becomes more fully fledged, a long-term decline in forest products production is seen in Southeast Asia and remaining forest resources are trapped in a cycle of degradation without reinvestment or clear allocation of rights and responsibilities.

Overburn (Unsustainable growth)

Economic growth continues at a rapid pace and many people benefit from newfound wealth but the risk of economic crisis resulting from structural inadequacies and speculative investment remains. The private sector leads development and creates demand for improved governance frameworks and quality control, but institutions cannot keep up and corruption flourishes. Employment in industry and services expands rapidly nonetheless and urban populations swell while only the young and old remain in rural areas. Investment in long-term planning is limited and environmental costs mount as desires for short-term profits gain the upper hand. Economic activity is geared towards export markets while domestic needs are largely ignored and domestic demand remains low as a result. Social and political polarization increases but while economic growth persists problems are pushed aside.

Natural resources are exploited intensively and little attention is paid to sustainable management and associated human resources development. Remaining natural forests are damaged by overharvesting and weak law enforcement while investment in plantation establishment is limited. Demand for forest products is high and as resources are exhausted, supplies are increasingly sourced from countries where natural forests remain or efficient plantation sectors have been established. Switching to materials with a larger carbon footprint than wood such as concrete, plastic, steel and aluminium also occurs. Increased focus on urban sectors reduces demand on land, however, and logged-over forests in more remote areas are left to regenerate with a proportion of the original biodiversity intact. International efforts to reduce deforestation and degradation fail as a result of mechanistic complexity, limited institutional capacity and competition resulting from high land and commodity prices. By 2020, national levels of financial and physical capital have increased substantially, while social and natural capital have been severely eroded.



Society is strained by a widening generation gap and urban populations become increasingly detached from a rural ethos. Conservationist civil society groups form in urban areas and forge alliances with international environmental NGOs in efforts to prevent further environmental degradation. Governments remain weak and malleable, however, and change in the environmental arena proves difficult to effect in the face of high opportunity costs related to the continuing economic boom. Poverty rates increase where markets fail to reach and erosion of tenurial rights in rural areas forces rural populations off the land. The probability of environmental disasters increases due to changing weather patterns, increasing population densities, expanding infrastructure development in marginal areas and inadequate social and environmental safeguards.

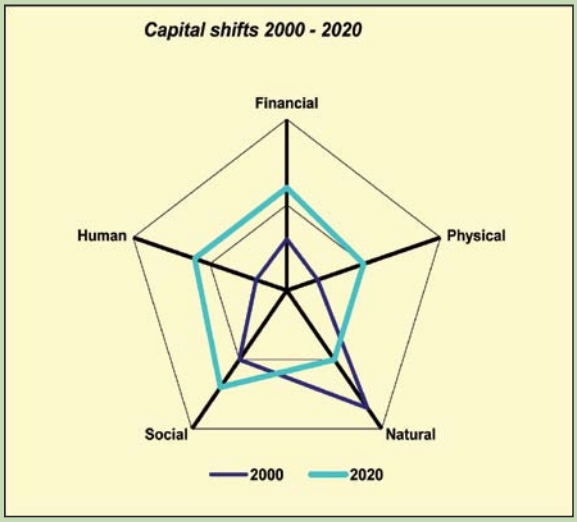
Towards 2020, the mounting social and environmental costs of unconstrained pursuit of economic growth become increasingly apparent as does the threat posed to long-term economic growth. Movement towards more inclusive development is effectively forced on society, but with considerably higher costs and higher levels of social disruption than if steady investments had been made over the years.

In many localities in 2020, the forestry sector is in a state of collapse having been relentlessly exploited without reinvestment. Wood products are increasingly imported due to poor institutional frameworks discouraging investment in planted forests. Market responses lead to a gradual rectification, but the rural landscape is irrevocably changed with few remaining fragments of degraded natural forest in a sea of industrial plantations. Only decades into the future does society fully recognize the losses that took place for want of greater foresight.

Slow and steady (Sustainable development)

Economic growth is constrained by falling domestic and international demand, but policy reform and prudent investment in institutional strengthening and environmental rehabilitation stimulate increased social cohesion and environmental robustness. Increasing energy prices drive efficiency improvements and a move towards renewables and recycling while environmental shocks create impetus for wide-reaching policy reforms and a general 'greening' of the economy. The shift is strengthened by pressure on the private sector to improve corporate social and environmental responsibility. Mechanisms and incentives available to support forest conservation and sustainable and legal management of production forests are fully utilized and as the efficacy of policy reforms is realized, social capital is strengthened in a virtuous cycle.

Those seeking new opportunities are attracted to overseas jobs, but the improved quality of national investment environments and increasing national pride ensure that revenues contribute to national development through familial links. Gradual shifts in employment towards services and industry occur as society develops, although agriculture remains of central importance and investment yield returns, particularly from export markets. Poverty levels fall as a result of effective rural development programmes and agricultural extensification rates fall. Clarification of jurisdictions in nominally state-owned areas also contributes in dampening demand for land while more modest levels of global economic growth reduce land grabbing.



Forest resources in many areas, having been degraded over many years, are no longer economically viable for production, and diminished conservation values discourage investment for biodiversity conservation purposes. A rethink of forestry sector objectives results in a revision of targets with greater emphasis on quality and less focus on the extent of forest resources than before. Forestry institutions are increasingly divided into production and protection divisions and while productive functions remain under government regulatory control, the private sector is increasingly engaged to manage forest resources for economic purposes.

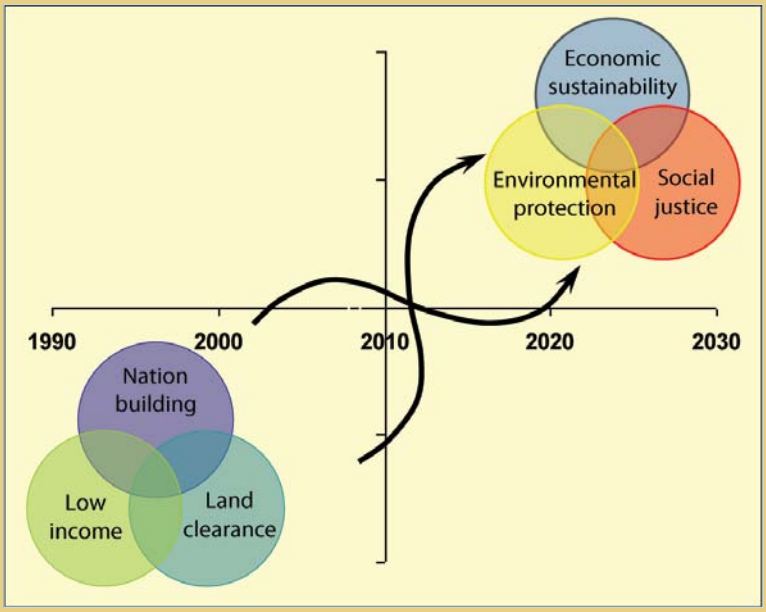
A stable and efficient institutional environment encourages farmers to plant, grow and harvest trees without undue hindrance or risk. As a result, wood products are increasingly sourced from outside natural forests and pressure is relieved. Improvements in law enforcement and governance stimulate greater investment in, and better management of, forest resources. As a result, income derived from timber extraction rises, leading in turn to greater interest in forestry as an economic sector. Establishment of policy and regulatory frameworks favourable to investors also stimulates corporate investment in plantations and a general upturn in sector productivity and competitiveness is seen. At the same time, focus on promoting sustainable production technologies increases domestic employment as well as environmental sustainability.

By 2020, a switch from natural to human, financial and physical capital is seen and increased attention to equity results in rising levels of social and human capital. Migration of working age populations out of rural areas in search of wages gains pace, but rising standards of living in rural areas encourage leavers to return, bringing investment and higher levels of human resource capacity.

Environmental shocks continue to take their toll in human terms and also put strain on the national economy and infrastructure. National and overseas relief is, however, at hand and sound planning by effective institutions promotes infrastructural improvements which reduce risks associated with future disasters. Improved monitoring of the condition of forest resources also provides information necessary for responses in relation to the unforeseen effects of climate change on forest ecosystems.

Living on the edge (High-growth development)

High economic growth rates are regained following the prolonged scare of economic depression. Institutional performance is improved in response to this sobering alert and the looming threat of climate change. Strain is, however, placed on society and the environment as a result of continued high rates of consumption and socio-economic development. A future in which environmental rehabilitation is increasingly implemented as income increases is credibly envisaged, although corresponding institutional frameworks remain only partially established and full implementation takes some time. A degree of imbalance develops between public and private sectors as economic growth continues to strengthen. Regulatory efficiency is, however, improved and proactive policies are implemented to maintain economic growth while ensuring preservation of social and environmental capital. Environmental shocks serve as turning points and help drive the transition towards a sustainable and low-risk future. A period of considerable strain is experienced as the size and composition of economic sectors and institutions is adjusted, but strong leadership inspires confidence throughout the transition.



Demand for agricultural land increases, but as a result of secure tenure and equitable distribution of land, as well as technological developments, expansion into forest areas is limited. Some forests managed for sustainable yield are, however, overcut by eager logging companies and much secondary forest is converted for crop production, with attendant losses of biodiversity. Large cities and rural areas diverge in social and economic terms as the former set their sights on international standards of living while rural areas remain relatively unchanged. Calls from urban middle classes for environmental protection assert pressure to cease logging and large areas of forest are put under protection with a resulting reduction in wood production and decline in the number and availability of rural jobs.

Forestry institutions are challenged as demand for forest goods and services increases. In response, efforts are made to ramp up productivity – of both goods and services – through improved regulation and encouragement of investment. In the process, forest authorities are obliged to work with a wide spectrum of stakeholders in seeking solutions that balance diverse requirements. Indecision over long-term plans for forestry mount, however, and more hidebound forestry institutions are forced to reinvent themselves under threat of being outflanked and superseded by environmental organizations and rural development actors. A transition develops in which a clear line is drawn between the protection and production roles of forests. In some countries, forestry agencies champion the change while in others their role is diminished. Closer to 2020, caveats in the redefined roles of forests become apparent as populations increase and zonation of strictly protected areas is undertaken to allow limited production in areas of high demand.

In comparison with the *Slow and steady* scenario, forest resources are less extensive and more highly degraded, but the hope that rising affluence will make for higher levels of investment in the future is maintained. The point at which this will occur remains contentious, however, and some begin to question the wisdom of a more narrow economic focus in an increasingly unpredictable world.

Uncertainty recommends that strengthening institutional flexibility should be a key goal

The four scenarios outlined represent a set of possibilities given different prevailing economic and institutional conditions. Unexpected turns could derail the more likely outcomes and divert the course of events towards a new and unexpected position. Even withstanding radical changes, the different scenarios draw attention to the need for policy and institutional mechanisms to reflect risk by incorporating measures aimed at flexibility and responsiveness. Contingencies aimed at spreading risk and efforts to invest simultaneously in both long- and short-term goals are likely to increase the robustness of sector performance. Poor policy performance, on the other hand is likely to be detrimental to sector performance, not just directly, but also through the reduced levels of investment – both social and economic – that are often associated with volatility. Forestry, with its multiple outputs – wood, poverty reduction, climate change mitigation, biodiversity conservation and watershed protection – is well suited to providing benefits under altered circumstances and through institutional responsiveness the performance of the sector is best guaranteed.

The following Sections outline what is likely to be seen in 2020 given the most likely scenarios. Fluctuations in the bottom line between scenarios are most likely to result from poor positioning of forestry within the overall economic framework and scenarios cannot therefore be seen as deterministic predictions of the future under alternate external conditions.

5 FORESTS AND FORESTRY IN 2020

'Hard times' and 'Slow and steady' scenarios are considered most likely

The 2008/2009 economic downturn and its subsequent effects on regional economies and trading patterns suggest that a business as usual scenario is unlikely to unfold. In this Section the two most likely scenarios from the preceding Section are instead considered: *Hard times* and *Slow and steady*. The key differences between the two scenarios reside in the level of institutional commitment to forests and forestry and the capability to turn that commitment into reality. *Slow and steady* is a reform scenario whereas *Hard times* represents business as usual, or worse, under low-growth conditions. Both assume that economic growth rates will be constrained in comparison with rates seen over the decade up to 2008/2009. Policy recommendations outlined in Section 6 are proposed measures that, within forestry, would act to bridge the gap between the two scenarios.

Multiple drivers could promote a transition to sustainability

The jump from a *Hard times* to a *Slow and steady* scenario parallels changes that would be involved in a 'forest transition' – defined roughly as a reversal in the forest cover trend from negative to positive, but also a transformation to management systems that prioritize *sustained* production of goods and/or services. The stimulus for reforms precipitating forest transitions may develop domestically through, for example, growing pressure from environmental groups, the influence of environmental shocks, claims for social and economic justice or through efforts to increase efficiency through greater use of renewables and recycled goods. A transition could also be promoted through international technical and financial assistance as well as less formal means of knowledge and technology transfer. Similarly, international measures in relation to trade of sustainably and legally produced forest products and forest environmental services could promote SFM. More broadly, reversals in forest decline may result from reduced pressure on land, increasing economic development and structural shifts in the economy, wood scarcity and policy measures both within and outside forestry, and particularly in relation to agriculture (Mather 2007).

With the objective of providing policy-relevant information for consideration at national and subregional levels, the following Sections outline what may be expected in relation to forest resources, forest products and forest services.

5.1 FOREST RESOURCES

Forest resource depletion is the dominant trend in Southeast Asia

Demand for land and resources, high economic growth rates and weak governance have led to deforestation and forest degradation across Southeast Asia. Population movement towards urban areas has had a mitigating effect while growing affluence, along with social and cultural development, has increased demand for forest services in several countries. As international markets for agricultural products grow, demand for land from foreign sources is posing new threats to remaining forests. Significantly, FAO has stated that without more land being made available for food production at the global level, many more people will be facing famine by 2050.[1]

Forest transitions are beginning in Southeast Asia

Forest transitions of different character are, however, beginning in Southeast Asia despite the overall trend of forest degradation and slow plantation development. Using national forest area as an indicator and disregarding transboundary displacement of deforestation and forest degradation,[2] it may be argued that transitions are taking place in Thailand and Viet Nam.

In Thailand forest cover loss has decoupled from economic growth

In Thailand, forest protection measures implemented two decades ago are taking effect. Trees are also regrowing on abandoned agricultural land and forest area has stabilized despite continuing changes in variables previously driving deforestation. For example, a doubling of road density in Thailand over the past decade, together with an 8 percent increase in population density, was associated with negligible reduction in forest cover (WDI 2010; FAO 2010). Plantations on private land are also expanding but are not included in official statistics (RFD/DNP 2009).

In Viet Nam planted forests are expanding

In Viet Nam, forest area is expanding following protection measures, tenure reform and large government reforestation programmes. Primary forest area continues to fall, however. Nonetheless, the correlation between road network expansion and overall forest area has been reversed and although road densities are high and increasing, forest cover is also rising, albeit attributable to establishment of plantation forests.

'Transitions' have been associated with export of deforestation

A similar transition is taking place in China as a result of logging bans and reforestation programmes enacted in response to environmental concerns (Mather 2007). In all these cases transitions have been associated with 'export' of deforestation and forest degradation to adjacent countries and for this reason it is important to consider regional aspects of SFM.

1 *Food production 'must rise 70%'* http://news.bbc.co.uk/2/hi/europe/8303434.stm

2 Meyfroidt and Lambin (2009) argue that as a result of progressive logging bans in Viet Nam, forest extraction equivalent to 39 percent of forest regrowth between 1987 and 2006 was displaced to other countries including Cambodia and Lao PDR in the 1990s and then also Malaysia, Myanmar and Indonesia.

Markets may be driving a transition in the Philippines

A different kind of forest transition may be taking place in the Philippines where forest area is also reported to have been increasing. The reversal has probably taken place as a result of various logging bans and expanding reforestation and afforestation schemes, particularly driven by the private sector. At the local level there have also been reports of markets playing a leading role in forest cover expansion. Results from Cebu suggest that a transition has resulted from increasing demand for forest products rather than through centralized regulatory approaches to protect forest resources (Bensel 2008).

Other countries are in the first stages of forestry development

At the national aggregate scale, figures suggest that countries in Southeast Asia other than the Philippines, Thailand and Viet Nam largely remain in the first stages of forestry development. Resource extraction and agricultural expansion remain dominant and, in spite of well intentioned forest policy, measures to conserve, protect and sustainably manage forest resources have yet to be fully demonstrated. At the same time, plantation subsectors remain poorly developed and wood production from areas outside of natural forests remains limited.

Transitions of different types are likely to become more widespread

In the longer term, it is likely that forest transitions of one sort or another will be seen more widely as socio-economic development progresses and measures to promote SFM are strengthened. The qualitative aspects of transitions are likely to differ between countries as a result of differing demand balances between, for example, forest products, biodiversity, carbon and watershed values. In some countries forest transitions may, however, not occur at all due to high population densities, low income and deteriorating governance (Laurance 2007a). The following Sections propose what may be seen in 2020 in terms of forest extent and quality.

5.1.1. Forest cover

Forest cover is likely to fall to 46 percent by 2020

If current trends continue, forest area in Southeast Asia will fall from 49 percent in 2010 to 46 percent in 2020 – a loss of 16 million hectares, an area just less than the size of Cambodia (**Figure 5.1** and **Table 5.1**).[3] In Cambodia, Indonesia, Lao PDR and Myanmar forest cover is still falling rapidly and it remains to be seen if and when long-term slowing in forest conversion and unsustainable logging will take place. In Malaysia, Thailand, the Philippines and Viet Nam, different trends are evident due to a decoupling of the long-term relationship between forest cover and driving variables such as population density, agricultural area and road length.

3 Model projections were based on the relationship between population density and forest cover. Because of differences in the relationships between forest cover and population density for different groups of countries, separate models were used to estimate forest cover for: (i) Cambodia, Indonesia, Lao PDR, and Myanmar; (ii) Malaysia and Thailand; and (iii) the Philippines and Viet Nam. Population density was calculated using medium fertility variant projections from the UN Population Division. All models included 'year' as an independent variable to account for the time series nature of the data and dummy variables were included for each country to allow for absolute differences in forest cover resulting from natural endowment and stage of development.

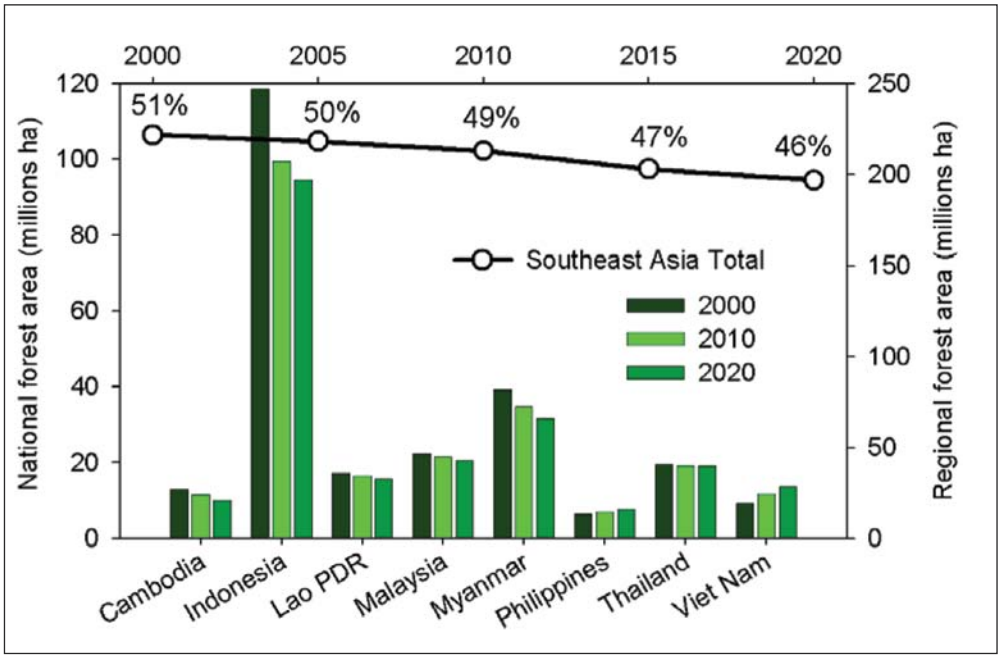


Figure 5.1. Forest area in Southeast Asian countries 1990-2020

Source: FAO 2010 and FAO projections

Table 5.1. Forest area in Southeast Asian countries 1990-2020

	Forest area				Projections	
	1990	**2000**	**2005**	**2010**	*2015*	*2020*
Cambodia	12 944	11 546	10 731	10 094	*9 528*	*8 839*
Indonesia	118 545	99 409	97 857	94 432	*84 638*	*79 077*
Lao PDR	17 314	16 532	16 142	15 751	*15 191*	*14 736*
Malaysia	22 376	21 591	20 890	20 456	*20 264*	*20 038*
Myanmar	39 218	34 868	33 321	31 773	*30 624*	*29 234*
Philippines	6 570	7 117	7 391	7 665	*7 791*	*8 193*
Thailand	19 549	19 004	18 898	18 972	*19 363*	*19 934*
Viet Nam	9 363	11 725	13 077	13 797	*15 373*	*16 875*
Southeast Asia[1]	245 879	221 792	218 307	212 940	*202 772*	*196 925*

1- Excludes Brunei Darussalam, Singapore and Timor Leste.

Source: FAO (2010) and FAO projections.

Cambodia's forests will continue to decline

In **Cambodia**, projected rates of forest loss are similar to those of the past decade, although it is possible that a reduction in the rate of allocation of economic concessions due to the global economic downturn could reduce rates of forest conversion. Implementation of REDD-related strategies could also slow rates of forest cover loss.

Indonesia's deforestation rate may accelerate

In **Indonesia**, the rate of deforestation is forecast to increase despite recent slowing of conversion rates. Plans to establish community industrial plantations, along with REDD-related efforts and a slow recovery from the global economic slowdown may, however, slow the net rate of deforestation. Continued improvements in standards of governance could also accelerate implementation of SFM.

Forest cover loss in Lao PDR is forecast to increase

In **Lao PDR**, the rate of forest loss is forecast to increase due to the comparatively high current ratio of forest cover to population density. Current information suggests that forest conversion is likely to be driven by expansion of agriculture, unsustainable agricultural techniques, road and dam construction, mining and unsustainable logging. Falling government effectiveness and low voice and accountability suggest that there will be little impetus to avert these drivers. Current moves to implement REDD-related activities should help reduce deforestation and degradation, although human resource capacity at both national and field levels, and overall government effectiveness, are likely to remain obstacles.

Forest cover stabilization in Myanmar may be some way off

In **Myanmar**, the lack of a land-use plan and confusion over rights and responsibilities combined with uncontrolled logging, lack of investment or international support and poor political and economic conditions suggest that forest cover stabilization may be some way off. Sustained demand for timber and teak in particular, and lack of engagement in REDD also militate against future reductions in deforestation. In general, corruption is likely to increase in Myanmar due to poor incentives and high rates of inflation. The government is likely to be forced to rely heavily on natural resource extraction, although much will depend on possible government transformations (see **Box 5.1**; Thaung 2009).

In Malaysia, forest cover will stabilize

In **Malaysia**, the situation differs between states but permanent forest reserves are, in general, still threatened by agriculture and plantations are slow in taking off. A rising proportion of production forests are under internationally recognized sustainable management but the value of secondary forest and the implications with respect to maintaining forest area remain a concern. Logs are reportedly still plentiful in Sarawak but timber quality has fallen and the quality of logging remains low. As such, management for sustained production may not prove economically viable in many areas. It has been suggested that forestry is a sunset industry in Malaysia, although this position is strongly refuted by the government. It is, however, likely that natural forest area will fall, as projections suggest, while establishment of plantation resources will closely follow market demand. Key factors determining natural forest cover in Malaysia are likely to include the low value of previously logged forest, the implications for sustained management for production and future decisions in the light of reassessed land opportunity costs (Samsudin in prep.).

Forest expansion in the Philippines may result from falling population pressure in rural areas

In the **Philippines**, forest cover has recently been reported to have been increasing since 1990, where previously it was estimated to have been falling (FAO 2010; FAO 2005a). The more recent data is thought to present a more realistic picture although forest degradation still takes place. Long running tenure and financing problems in forestry, failure to adopt a clear SFM policy, increasing corruption and focus on oil-palm and *Jatropha* expansion make the increase in forest cover difficult to explain. The increases may be attributable to numerous tree planting initiatives and a slowing of deforestation associated with reduced internal migration to forested areas and increased outmigration – both of which have reduced pressure on forests. As such, local responses may be playing a more significant role in bringing about change than in other countries in the subregion where forest protection and centrally supported afforestation efforts have been responsible for increases in forest cover (Bensel 2008).

In Thailand, forest cover is expected to increase gradually

In **Thailand**, the agricultural frontier has, to a lesser or greater extent, been closed, rural population growth rates are falling and in association, forest cover is expected to continue a gradual increase to 2020 (**Table 5.1**). Despite the current logging ban, forest encroachment remains an issue in Thailand and is likely to remain important due to population pressure at the local level and demand for land for industrial crop production. Forests are, however, regrowing in different parts of the country on abandoned agricultural land and in areas where shifting cultivation has been eradicated. Short rotation pulp wood plantations are also expanding and are likely to expand further in the future as past constraints are increasingly overcome.

In Viet Nam, forest cover is likely to increase at a high rate

In **Viet Nam**, although deforestation and forest degradation of natural forests will continue, forest cover is projected to increase at a high rate as rural population density falls and afforestation programmes expand. Forest land allocation is, however, advancing at a slower pace than expected and this may affect forest area expansion. The profitability of forest products production and the size of the forest products industry may also be affected by inefficiencies inherent in allocating small parcels of forest land to many people. Falling demand or production inefficiencies may impact national forest cover expansion given the significance of plantations in Viet Nam's forest estate.

Box 5.1. The outlook for forestry in Myanmar

For 2020, the following predictions are made in relation to forestry in Myanmar:

- Unless there is political reform and stakeholder inclusion, Myanmar will lose all opportunity to keep abreast with other developing countries in the region.
- Economic sanctions will affect all sectors and force the government to maintain heavy reliance on extraction of natural resources, including forest resources.
- Forest resources will continue to be depleted unless timber export is well regulated.
- Rural people will suffer disproportionately from natural disasters associated with climate change, deforestation, forest fire and illegal forest activities.
- The good intentions of Myanmar's Forest Policy will not be achieved without institutional reforms, significant reinvestment from the government and international assistance.
- Export of raw logs will remain dominant unless sufficient energy is available for development of value-added industries.
- Institutional weakness will persist due to militarization and poor prospects for professional staff.
- Illegal logging, particularly in border areas, will continue unless Myanmar is included in regional and international efforts.
- Forest governance will remain a challenge, particularly in rebel-controlled areas.
- Corruption and lack of transparency in all sectors, including the forestry sector, will jeopardize policy and institutional intentions.
- Amidst uncertainty and challenges, community forests will gradually emerge.

Source: Adapted from Thaung (2008).

Reversals in deforestation trends may take many years

In the subregion as a whole, lower rates of economic growth are likely to lead to a slowing in forest conversion and forest degradation as demands on forest resources decline. Conclusion of climate change negotiations and firm commitments to reduce global carbon emissions, as well as agreement on REDD, are likely to lead to progressive reductions in deforestation and degradation. Even with strong international commitment it is, however, likely to take years before deforestation and degradation are slowed due to low institutional capacity and the need to divert pressure on forests at a systemic level. Preventing leakage of forest degradation to other areas or to neighbouring countries constitutes another challenge that will need to be overcome. Challenges are likely to be particularly significant in countries with poorly developed institutions – where rates of forest cover are often highest.

High demand for forest products and land will slow transitions

Higher rates of growth in the more advanced Asia-Pacific economies are likely to result in continued pressure on forest resources in countries supplying timber and agricultural products. In the case of countries with limited institutional capacity and large remaining areas of forest – Cambodia, Lao PDR and Myanmar – deforestation rates could remain high and under such circumstances, international efforts to reduce deforestation and forest degradation are likely to be severely challenged. The future contributions of deforestation and degradation in Southeast Asia to global emissions are likely to be considerable if no action is taken (see **Box 5.2**).

Slower rates of economic growth must be seen as an opportunity

Under both the *Hard times* and *Slow and steady* scenarios it is likely that deforestation and forest degradation will decline due to lower rates of demand on land and forest resources. Under the *Slow and steady* scenario, however, lower rates of economic growth are seen as an opportunity to make long-term investments in environmentally and socially focused projects and activities that provide a foundation for stable future economic growth. Although having to proceed on limited budgets, measures such as labour-intensive reforestation and forest rehabilitation efforts could have positive effects on forest resources and future national production if appropriately managed. Under the *Hard times* scenario a return to growth would be likely to be associated with a return to unsustainable resource exploitation.

Box 5.2. Forest conversion and future carbon emissions in Southeast Asia.

Deforestation and degradation in Southeast Asia contribute significantly to global carbon emissions. Future reductions in forest area and continued agricultural conversion to supply growing populations with timber and agricultural products will have inevitable consequences on the global carbon balance. Using forest carbon density figures published in FAO's 2010 *Forest resources assessment*,[1] and assuming all carbon is emitted as CO_2, projected reductions in forest area between 2010 and 2020 as shown in **Table 5.1**, equate with losses of 6.61 giga-tonnes CO_2 equivalent (see **Table 5.2**).

In addition to losses of forest carbon and sequestration of carbon by replacement agricultural crops, total emissions are critically dependent on soil carbon emitted during forest conversion. On some soils carbon emissions may exceed one and a half times the emissions from deforestation and forest degradation (Uryu *et al*. 2008). A scenario is depicted in **Table 5.2** in which assumptions are made that 50 percent of forest area decline is converted to oil-palm and 50 percent to grassland/pasture, and that 25 percent of the land converted is situated on peat swamp.[2,3] Emissions from peat decomposition and burning are calculated using figures from Riau, Indonesia (Uryu *et al*. 2008). Under this scenario, total emissions of 8.72 giga-tonnes are forecast between 2010 and 2020 – almost 20 percent more than China's total CO_2 emissions for 2005.[4] Mean annual emissions equate to 85 percent of total EU15 transport emissions for 2010.[5]

It should be noted, however, that estimates of agricultural sequestration and forest carbon density vary greatly and therefore the figures shown should be treated as indicative only. For example, carbon sequestration by oil-palm has been estimated as low as 40 tonnes/hectare over the entire life cycle (Dewi *et al.* 2009). Similarly, logged-over forest in Indonesia may contain from between 70 and 200 tonnes/hectare and primary forest may contain as much as 400 tonnes/hectare (Dewi *et al.* 2009).[6]

Table 5.2. Scenario for forest-related carbon storage change in Southeast Asia 2010-2020

Element	Carbon (t/ha)	Change in area (000 ha)	Carbon (Mt)	CO_2 equivalent (Gt)	Assumptions
Forests	113	-16 015	-1 804	-6.61	All above- and belowground forest carbon emitted, soil carbon unchanged
Peat soils	335	-4 004 (25%)	-1 342	-4.92	Emissions through forest conversion from decomposition and burning of peat soils
Pasture	8	8 007 (50%)	64	0.23	Complete conversion to pasture with soil carbon remaining unchanged
Oil-palm	88	8 007 (50%)	705	2.58	Complete conversion to oil-palm, soil carbon remaining unchanged
TOTAL	-	-	-2 377	-8.72	

[1] Carbon densities were calculated using figures for carbon stocks in forest (FAO 2010). Forest carbon stocks in 2020 were then estimated using 2020 forest cover forecasts shown in Table 5.1 assuming no change in forest carbon density.
[2] Pasture and oil-palm carbon densities were calculated using data cited in Campbell *et al.* (2008).
[3] Hooijer *et al.* (2006) estimate that 25 percent of deforestation in Southeast Asia takes place on peatlands.
[4] Emissions database for global atmospheric research: http://edgar.jrc.ec.europa.eu/datasets_list.php
[5] European Environment Agency: http://dataservice.eea.europa.eu/atlas/viewdata/viewpub.asp?id=733
[6] Forest carbon figures used include carbon in above- and belowground biomass, dead wood and leaf litter and soil carbon (FAO 2010). Where countries did not submit figures for carbon contained in dead wood, leaf litter or soil, estimates were used based on ratios with living biomass derived from records submitted by countries in the subregion where all data were present.

5.1.2. The production and protection roles of forests

Areas of forest designated for both production and protection have increased

In past decades, the proportions of forest area designated for production and for protection have increased at the subregional level as increasingly specific functions have been defined across a wider area of forest and the proportion of forest classified for other purposes[4] has fallen. The share of forest designated for production in Southeast Asia increased from 38 percent in 1990 to 49 percent in 2010, while the area of forest designated for

4 Social services, multiple purpose, other or no/unknown primary function.

protection and conservation combined increased from 31 to 39 percent (see **Figs. 2.7, 2.19** and **2.24**). Major shifts towards production were reported in Myanmar, while in Thailand and Viet Nam conservation and protection functions became increasingly dominant.

Perceived scarcity of forest-related goods and services affects the roles of forestry

Key factors determining the future balance between the production and protection roles of forests include the forest products supply-demand balance and the level of forest degradation in relation to demands for environmental protection and related services. Financing for forest protection is also likely to play an increasing role. In relation, it is commonly observed that the first stage of forest development – resource extraction and forest clearance – persists until forest goods and services are perceived as becoming scarce. At this stage, efforts are often made to protect forest resources and increase production of forest products outside natural forests. Broadly speaking, the efficacy of these efforts is dependent firstly upon political will, but also on government effectiveness in the face of pressure to continue forest resource exploitation. Where pressure on forest resources is high and governance is weak, forest resources are less likely to be protected or sustainably managed.

Plantation productivity could be significantly increased

The effectiveness of tree plantation programmes as a means to increase forest products production and protect land and water resources is commonly related to the extent of degradation of natural forests and the effectiveness with which natural forest resources are protected. Currently, the productivity of plantations in Southeast Asia falls well below potential and the current planted area could provide a much higher proportion of the subregion's roundwood production if optimally managed.

Environmental shocks may precipitate changes in the roles of forestry

Given the considerable importance of natural disasters in influencing environmental and forestry policy in the past – in China, Thailand and the Philippines for example – future events in other countries may elicit similar responses. In combination with growing levels of environmental awareness in the subregion, predictions that climate change will lead to more severe floods and droughts increases the probability of political responses aimed at environmental protection.

REDD is likely to promote forest protection

It is probable that international funding to reduce emissions from deforestation and degradation will reduce timber production from natural forests in participating countries. Although this could increase demand for forest products from plantations, supply from non-REDD countries may also increase. Greater forest protection across a number of countries could also result in increasing dependence on imports from outside the subregion. Although REDD could also support management of forests for sustained production, this remains a relatively unexplored area.

Increased forest protection will have varying effects around the subregion

In response to increased forest protection for watershed and carbon values, the area of natural forests designated for production may fall in countries where widespread forest protection measures are not already in place (Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar and the Philippines). Amongst these countries, those with better governance – Malaysia, Indonesia, Philippines – are likely to see increasing rates of plantation establishment. Demand from existing wood-processing industries is likely to provide further stimulus and Malaysia and Indonesia may therefore see higher rates of establishment than the Philippines. In Thailand and Viet Nam, where forests are protected and plantation expansion rates are higher, increasing demand is likely to raise rates of plantation expansion.

A 'Hard times' scenario would only delay negative trends in forestry

Under a *Hard times* scenario, unsustainable logging and cash crop expansion rates would fall as a result of reduced demand but, at the same time, implementation of REDD frameworks could be hindered by poor institutional performance and low investment. As such, forests would still be open to renewed threats as demand recovers. It is also likely under a *Hard times* scenario that interest in plantation establishment rates would be dampened by low investment and poor investment environments.

A 'slow and steady' scenario would see increases in both production and protection

Under a *Slow and steady* scenario, economic and institutional weaknesses will constrain forestry development to a lesser degree and, even if natural forests continue to be degraded, the role of productive and protective plantations could expand where institutional frameworks are supportive. Where forestry agencies fail to meet the new demands on forestry, they could be superseded by environment agencies if protection- rather than production-related objectives are prioritized.

5.1.3. Forest health and vitality

Forest health and vitality are threatened in numerous ways

The health and vitality of forests are threatened by stressors including uncontrolled logging, hunting and collection of NWFPs, fire, spread of invasive species, and outbreak of pests and diseases. The extent and intensity of these effects is likely to increase as human influences spread into less accessible areas and the subregion's climate changes. The detailed effects of climate change on forest ecosystems are complex and poorly understood. At the level of organisms and species, changes in temperature, rainfall, wind and humidity are likely to affect many processes – growth, phenology, pollination, seed dispersal, pest and disease resistance, etc. Different effects on different species are likely to affect species' competitive ability and alter ecosystem composition and balance in unpredictable ways. For example, climate change may in various ways both disrupt and improve plant defences, and interactions with fire may cause either negative feedback loops or destabilizing positive feedback loops (Seppälä *et al.* 2009). Habitat fragmentation and disturbance also opens opportunities

for invasive species and reduces the chances of migration of endemic species. As a result of this complexity, adapting forest management to meet the challenges of climate change is a poorly understood area, but it is generally recognized that maintaining healthy, expansive and interconnected forest ecosystems will provide greater opportunity for response and adaptation.

Unresponsive institutions will exacerbate the threats

Assuming a *Hard times* scenario where institutions remain unresponsive and inflexible, the effects of climate change combined with more direct sources of anthropogenic stress – increasing infrastructure development and habitation, logging, widespread use of fire as a management tool and accidental fire, etc. – could prove devastating to the subregion's forests. A laissez-faire approach to forest management could lead to the collapse of forest ecosystems across the subregion similar to a recently documented case in Kalimantan (see **Box 2.7**). In addition, forest resources could become a net source of greenhouse gases if temperature rise exceeds 2.5°C (Seppälä *et al.* 2009).[5] This outcome will be more rapidly achieved if forest health and vitality are jeopardized. Under a *slow and steady* scenario, forest degradation may be brought under control through uptake of incentives and mechanisms that reward SFM and conservation.

Monitoring and responsive management are necessary

In general, there is a need to implement responsive management systems and to improve ecosystem resilience. Forest monitoring to quickly detect and tackle outbreaks of pests and diseases, implementation of fire control measures, restoration of forest functions after disturbance, reduced impact logging, increases in the number of locations where particular habitats are managed and efforts to connect habitats and landscapes are all necessary. Many of the necessary measures are contained in the concept of SFM and are frequently compatible with forest-related climate change mitigation measures. Seppälä *et al.* (2009) also cite the need to adopt adaptive and flexible management and institutional measures and take advantages of opportunities as they arise.

REDD-related measures will improve monitoring

In countries developing REDD frameworks (Cambodia, Indonesia, Lao PDR, Thailand and Viet Nam), preparations will include design of systems for intensified forest monitoring. Examination of the state of forest resources in unprecedented detail will provide a much stronger foundation for developing effective mitigation strategies and more accurate cost assessments. Monitoring will also provide valuable information for adaptation-related interventions. Forest health and vitality in non-REDD countries (Malaysia, Myanmar and the Philippines) may receive less attention unless similar mechanisms are established.

5 A rise in temperature of 1.1 - 6.4°C above late twentieth century temperatures is predicted for Southeast Asia by the end of the twenty-first century (Cruz *et al.* 2007).

Grass roots action will be necessary to maintain forest health and vitality

In the longer term, and in spite of improved monitoring, many thorny issues will need to be addressed at the field level if SFM is to advance more rapidly. Many of the most pressing concerns lie largely outside the control of the forestry sector and therefore, improving the health and vitality of forests may take many years during which time degradation may be severe. Slow uptake of SFM in the past, lack of widespread implementation of codes of harvesting practice and criteria and indicators for SFM, together with fragmentation of protected areas and so forth suggest that forest resources in the subregion will change significantly as the climate changes and human influences increase. Detailed monitoring of forest resources undertaken through activities to prepare for REDD will, however, provide an unprecedented opportunity to assess status and trends in forest resources and could act as a turning point in forest-related decision-making.

5.1.4. Extent of forest area under sustainable management

Demarcation of a permanent forest estate has still not taken place in many countries

The main issues defining the future of SFM in Southeast Asia concern rates of natural forest clearance and timber production in natural forests. Discussion of SFM is most relevant once a permanent forest estate has been demarcated and forest area has been stabilized. This has taken place to a lesser or greater extent in Viet Nam, Thailand and Malaysia. In Myanmar, there is no national-level land-use plan and although SFM has been widely practised in the past, the situation has deteriorated significantly (Tun 2009). In the Philippines, although a permanent forest estate has been demarcated, only around half has actual forest cover and a similar, although less extreme, situation prevails in Indonesia (FMB 2009; CPFS 2009). In Lao PDR, production forests and conservation areas have been demarcated but a protection forest system has yet to be established and forest area is changing rapidly.

Expansion of SFM depends on many factors

Pockets of sustainable management may nonetheless exist, notwithstanding the situation at the national level. Data on the extent of SFM is scarce but if certified areas are used as a guide it can be assumed that only a minority of forests are under sustainable management (see Section 2.8.1). The main determinants of future expansion in the area of forest under sustainable management in 2020 include:

- Demand for products from sustainably managed forests.
- Political will to improve social and environmental aspects of forest management and economic sustainability.
- Technical and management capacity to implement sustainable management.
- Economic viability of secondary natural forest to be profitably managed for production given past high grading and alteration of species composition following logging.
- External financing for sustainable management.

Increased demand for sustainably produced products may be on the horizon

Increases in demand for products from sustainably managed forests depend to a large extent on consumer requirements and the existence of appropriate systems of verification. Recent experience suggests that although certification provides an incentive for SFM in terms of market access, a price premium has not always been available. As market chains evolve, corporate buyers enact 'green' procurement policies and public procurement policies proliferate, it is likely that market links will strengthen and premiums will grow. International measures to promote trade in legal and sustainably produced products are also likely to play a leading role. A recent poll has shown that European citizens overwhelmingly want stricter controls on illegally sourced timber and legislation is under development and should be implemented in the coming years.[6] Implementation of measures associated with the US Lacey Act and similar legislation in the EU will be particularly important (see **Box 3.3**).

Economic and human resource constraints may yet limit SFM expansion

In several countries, capacity to manage forests sustainably may be lacking despite political will. Constraints are most severe in the least developed countries where governance is weak and illegal logging is widespread. In areas where commercial species are found at lower density and/or forest growth is less vigorous, the economic viability of production is likely also to impose significant constraints. This is particularly true for areas that have been degraded in the past by destructive logging. Overharvesting and high grading, multiple re-entry to logging coupes as demand for new species has risen, and lack of implementation of reduced impact logging techniques have all reduced the value of forests in the subregion. 'Recapitalization' of forest resources in many areas will require active rehabilitation efforts and protection before production can resume.

A 'Hard times' scenario will undermine SFM

Under a *Hard times* scenario, it is likely that hopes of implementation of sustainable management across large areas of forest will be constrained for the following reasons:

- Technical complexity in the face of institutional weakness;
- Lack of economic viability due to the proliferation of secondary tree species following past rounds of uncontrolled logging;
- Reductions in governance standards and lack of donor support; and
- Continuing apathy of business-government coalitions in regard to SFM.

Under this scenario, sustainable management of natural forests for production is likely to take place almost exclusively in project-supported model forests. Without widespread institutional reform and strengthening, REDD implementation will also come up against the same non-financial obstacles that have constrained the spread of SFM in the past – overlapping jurisdictions, land tenure issues, conflicting claims, low law enforcement and governance capacity and limited technical capacity, etc.

6 Massive majority want EU timber law (http://www.panda.org/wwf_news/?160821/Massive-majority-want-EU-illegal-timber-law)

Even with institutional improvements SFM will need external financing

Under the *Slow and steady* scenario, SFM will be less constrained by external financing and forestry-based responses to environmental shocks and social justice claims have a better chance of being implemented. Under these conditions, SFM may expand in some countries, but only with external financing due to the reduced economic viability of secondary forest for production. In the less advanced countries and provinces in the subregion, deeply-entrenched social issues and insurgency may, however, forestall even the most concerted efforts to institutionalize sustainability.

5.2. WOOD AND WOOD PRODUCTS

Economic conditions will determine trends

Wood and wood products markets are significantly affected by the global and regional economic climate. The effect of the global economic downturn on forest products markets in Southeast Asia has been substantial and industry may struggle to cope with low demand and price volatility in the longer term.

A continued downturn could significantly reduce production

The 2008/2009 global slowdown initially resulted in steep reductions in demand from outside, as well as within the subregion – as happened following the 1997/1998 crisis (see **Box 2.8**). If the current economic rebound is not sustained, the sawnwood, plywood, pulp and paper and furniture industries in Indonesia, Viet Nam, Malaysia and Thailand are likely to further suffer. Falling investment in construction is particularly likely to impact the sawnwood and furniture industries and investments in paper production are also likely to be curtailed. A lack of new investment could also threaten the long-term future of the wood products industry as technology becomes outdated and comparative efficiencies decline. In the longer term, exchange rate fluctuations could affect the position of producer countries. Weaker currencies will attract more foreign customers but investment accumulation will be limited and no competitive advantages will result (Sasatani 2009).

A rebound could result in resource depletion if sustainability is not prioritized

A sustained economic recovery is likely to result in increased wood production, but further depletion of natural resources will eventually reduce the competitiveness of forest-rich countries. In the medium term, inflation could also reduce the competitiveness of major forest products producers through rising wages, utility fees and raw material costs (Sasatani 2009). Additionally, under conditions of rapid economic growth, shrinking labour forces in rural areas could lead to reductions in wood production.

International trade restrictions will have pivotal effects...

Trade restrictions in high-paying markets outlined in the previous Section are likely to have pivotal effects on forest products markets in Southeast Asia if fully implemented. In relation, **Table 5.3** shows the value of trade flows that could be affected by EU and United States legislation. Although the EU and the United States only account for 10 percent of Southeast Asian exports of major forest products by value (US$13.1 billion), Malaysia and Indonesia,

which account for 87 percent of the total, could be affected by new market barriers. Countries in Southeast Asia exporting wood to manufacturing centres in, for example, China could also be affected where products are destined for re-export to the EU or United States.

Table 5.3. Value of Southeast Asian exports of major forest products[7] to the EU and United States, 2007

Reporting country	United States		EU		Total value
	Value (000 US$)	% of total forest products trade	Value (000 US$	% of total forest products trade	of exports (000 US$)
Cambodia	-	-	-	-	14 776
Indonesia	287 000	4.4	275 531	4.2	6 572 860
Lao PDR	-	-	725	0.9	77 480
Malaysia	154 000	3.8	419 625	10.4	4 033 627
Myanmar	-	-	35 993	9.3	385 686
Philippines	18 825	10.0	33 637	17.8	189 013
Thailand	20 028	1.3	38 856	2.4	1 592 101
Viet Nam	15 229	6.7	1 494	0.7	225 963
SE Asia*	**495 082**	**3.8**	**805 861**	**6.2**	**13 091 506**

* - Excludes Brunei Darussalam, Singapore and Timor Leste.

Source: FAO (2009); FAO (2008c).

...the furniture trade is particularly vulnerable

By value, 72 percent of total wooden furniture exports from Southeast Asia went to the EU and United States markets in 2007 (US$5.6 billion; **Table 5.4**). The total value of exports of wooden furniture from Southeast Asia rose marginally from US$7.8 billion to US$8.0 billion between 2007 and 2008 having previously jumped by 20 percent from 2005 to 2007. The most significant exporters are Viet Nam, Malaysia and Indonesia, which accounted for 87 percent of the subregion's total exports to the EU and United States in 2007. To maintain these flows, exporting countries will need to address legality concerns with great rapidity.

7 Industrial roundwood, sawnwood, wood-based panels, woodpulp and paper and paper board.

Table 5.4. Value of EU and United States import of wooden furniture from Southeast Asia, 2007

Exporter	United States		EU		TOTAL
	Value (000 US$)	% of wooden furniture trade	Value (000 US$)	% of wooden furniture trade	Value (000 US$)
Cambodia	21	6.7	133	42.5	312
Indonesia	616 900	33.8	804 702	44.1	1 826 156
Lao PDR	13	1.0	29	2.2	1 307
Malaysia	839 779	38.8	484 650	22.4	2 161 662
Myanmar	0	0.0	7900	69.2	11 424
Philippines	160 911	65.8	22 039	9.0	244 456
Thailand	346 411	38.3	212 547	23.5	904 348
Viet Nam	1 313 516	48.9	810 501	30.2	2 687 882
SE Asia	**3 277 550**	**41.8**	**2 342 501**	**29.9**	**7 837 547**

Source: UN Comtrade 2010 (importers as reporting countries).

5.2.1. Production, consumption and trade of forest products[8]

With high growth rates forest products production will rise

Production forecasts for the major wood products groups for Southeast Asia according to a baseline projection are shown in **Figure 5.2** (see **Box 5.3** for note on forecasting assumptions). Industrial roundwood production is projected to increase in line with demand while sawnwood production would increase at lower rates as supplies of larger logs become limited and processed board types become more widely used – in accordance with past trends. Woodpulp and paper production is expected to increase more rapidly in response to population growth and increasing rates of literacy. Difficulties with plantation establishment and increased protection of natural forests could, however, disrupt this trend as could measures to introduce or increase levels of paper and fibre recycling.

8 This Section shows projected trends in wood products production for Southeast Asia (Jonsson and Whiteman 2009). Figures for all countries under baseline and downturn scenarios are shown in **Appendix 2**.

Box 5.3. Forest products production, consumption and trade forecasts – key assumptions

Projections of wood products production and consumption have been prepared based on statistical analysis and modelling of historical data about forest products production and consumption (Jonsson and Whiteman 2009). The forecasts presented in this Section must be viewed in the context of the following assumptions:

1. Continuation of economic growth on the basis of trends in evidence prior to the 2008/2009 economic crisis. The downturn scenario assumes growth rates are 25 percent lower than those projected prior to the economic crisis.
2. The forecasting model does not include possible future resource constraints and output does not therefore explicitly take into account declining natural forest resources.
3. The forecasting model does not include possible future policy interventions such as forest protection measures, changes in international trading regimes, etc.

Given these assumptions, the forecasts could be realized if a sustained economic rebound comes about, if resource constraints do not appear, or if there are no significant policy changes affecting forests and forestry in the next decade.

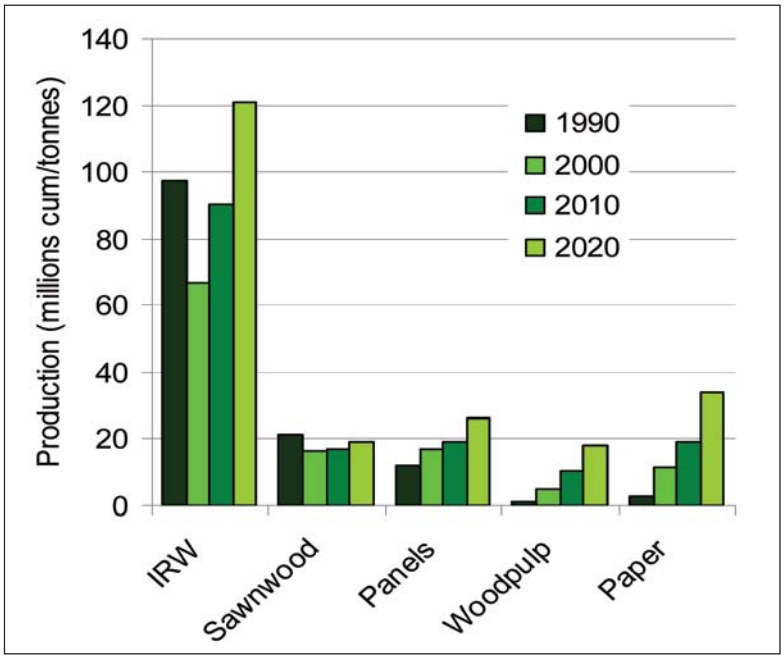


Figure 5.2. Projected wood products production in Southeast Asia to 2020

Note: Industrial roundwood, sawnwood and panels are shown in cubic metres, woodpulp and paper in tonnes.
Source: Jonsson and Whiteman (2009).

A downturn is expected to affect Lao PDR and Cambodia most severely

Under a downturn scenario, with growth rates 25 percent below those assumed under the high-growth scenario, overall levels of production and consumption of wood products in 2020 are expected to be between 10 and 20 percent below the baseline scenario. Production and consumption in Lao PDR and Cambodia are expected to be most affected, with reductions in comparison with the baseline of around 20 and 35 percent respectively by 2020. In other countries, reductions of 10 to 20 percent are forecast.

Paper and paper board will be hardest hit

Production and consumption of paper are expected to be harder hit by a downturn than other products, while panel consumption is expected to decline more than production given that exports to countries with higher rates of economic growth would continue.

Changes in international trade regimes may have huge effects on wood products markets

Even with a rapid return to high rates of economic growth, legality-related regulations aimed at imports of wood to EU and United States markets may significantly alter trade flows. Public procurement policies and corporate decisions are likely to have similar effects. With a large proportion of higher value-added products destined for these markets being manufactured in a few key countries with wood sourced in low-income resource-rich countries, the leverage of such measures on regional trade is immense. Both producer nations and intermediate processing countries are likely to be significantly affected where capability does not exist along the market chain to meet legality and sustainability requirements. Under such circumstances, producers and manufacturers will need to find new markets either within or outside the region. Even where manufacturing is sustained, margins are likely to fall as a result of movement to lower paying markets.

Industrial roundwood

Industrial roundwood production may rise

Under the baseline scenario roundwood production is expected to increase (**Figure 5.3**). A large part of this is forecast to come from Indonesia and Malaysia although the growth is partly an artefact of past statistical inaccuracies.[9] Net exports (production-consumption) are expected to increase slowly to 8.7 million m^3 or 7 percent of production in 2020. Under the downturn scenario, production growth is expected to fall from 3.0 to 2.0 percent per annum (see tables in **Appendix 2**). These forecasts could, however, easily be diverted from if forest protection measures proliferate as a result of climate change-related agreements or environmental shocks, if international trade regimes change significantly or if there is widespread exhaustion of forest resources.

9 The forecast rate of increase in production for Indonesia after 2005 is overestimated due to the lack of inclusion of informal or illegal production in figures submitted to FAO prior to 2005 and used to parameterize the forecasting model. Increases in production in 2010 and 2020 demonstrate alignment of the model with the higher levels of production actually taking place (see MoF 2007). Malaysia's production for 2000 was retrospectively revised upwards to 24.38 million cubic metres subsequent to model parameterization and forecasts for 2010 and 2020 are therefore unlikely to be accurate.

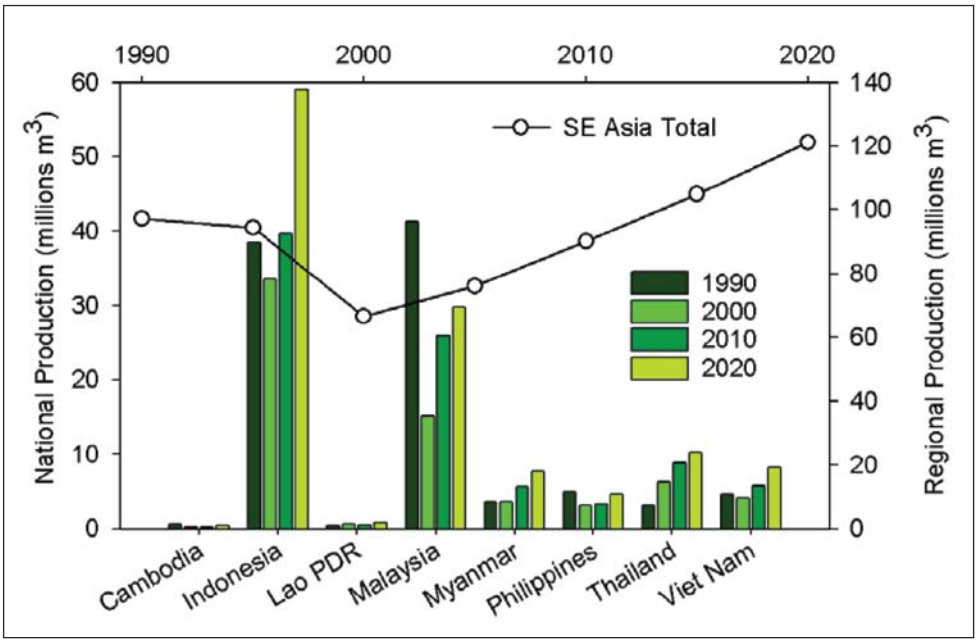


Figure 5.3. Production and forecast production of industrial roundwood in Southeast Asian countries, 1990-2020

Source: Jonsson and Whiteman (2009).

Sawnwood

Sawnwood production may also rise but there is little certainty

Having fallen by 25 percent between 2000 and 2005, sawnwood production in Southeast Asia is forecast under the baseline scenario to increase at 1.2 percent *per annum* between 2010 and 2020, reaching levels close to those seen over a decade ago.[10] In contrast to the mid-1990s, however, when Malaysia and Indonesia were the subregion's foremost producers of sawnwood, most of the increase up to 2020 is expected to come from Viet Nam (see **Appendix 2**). The remainder is expected to come largely from Indonesia, while production in Malaysia and the Philippines is projected to decline. Significantly, Thailand's net imports are expected to increase from just over half a million cubic metres in 2005 to almost 3 million in 2020 and imports to Philippines and Viet Nam are also forecast to increase (Jonsson and Whiteman 2009). Under the downturn scenario, lower annual rates of increase in production are expected due to reduced demand.

10 Sawnwood data reliability has been problematic in the past and forecast increases in production may partly reflect underreporting.

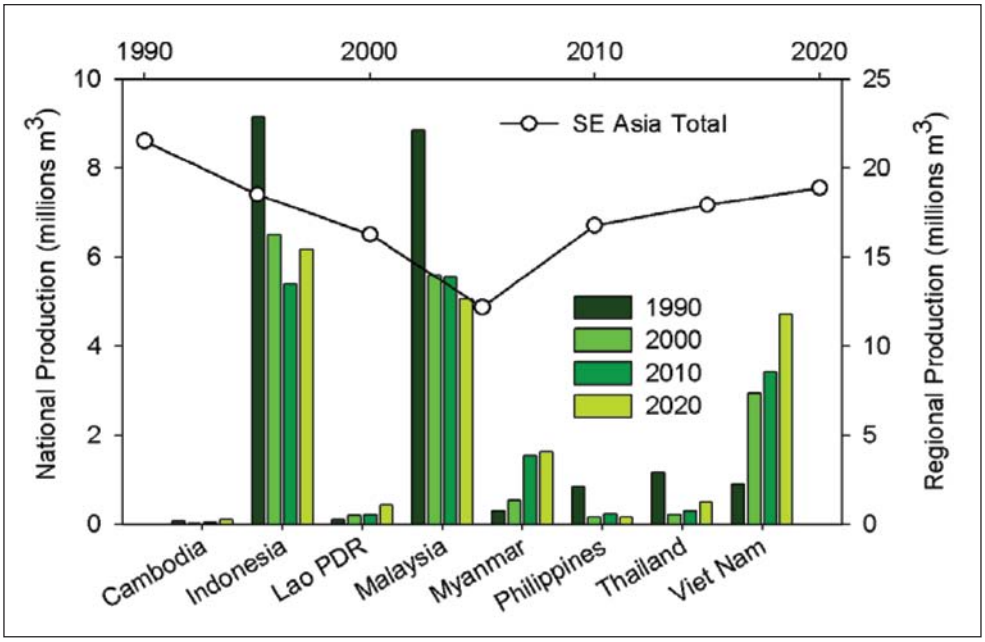


Figure 5.4. Production and forecast production of sawnwood in Southeast Asian countries, 1990-2020

Source: Jonsson and Whiteman (2009).

Wood-based panels

Panel production in Malaysia is expected to rise rapidly

Production of wood-based panels is expected to increase in all countries by 2020 with around 60 percent of the increase coming from Malaysia and over 10 percent each from Thailand and Indonesia (**Figure 5.5**). Overall, panel production is forecast to increase faster than industrial roundwood or sawnwood production. Surplus production is expected to increase by almost 4 million cubic metres by 2020 and net exports from the subregion are expected to increase as a result. Under the downturn scenario, slower expansion in production is expected and net exports are also expected to increase more slowly.

Fibreboard and particle board production is likely to grow fastest

With respect to the mix of panel types, it is likely that due to reductions in the availability of large logs and increasingly obsolescent technology in Indonesia, plywood will lose ground to more processed board types such as fibreboard and particle board (Sasatani 2009). With respect to these board types, the competitiveness of the furniture industry, especially in relation to labour cost inflation, is likely to be central. If rates of economic growth remain high, manufacturers may, in the longer term, move to countries where labour costs are lower with resulting repercussions on the wood-panel industry (Sasatani 2009).

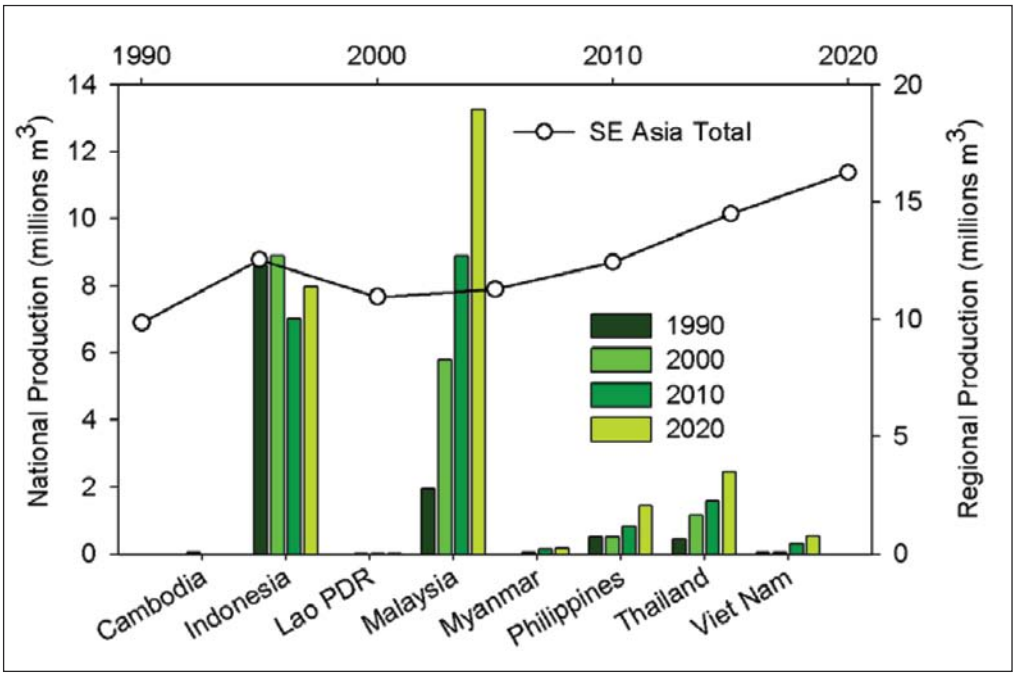


Figure 5.5. Production and forecast production of wood-based panels in Southeast Asian countries, 1990-2020

Source: Jonsson and Whiteman (2009).

Paper and paper board

Paper production is forecast to soar but much depends on economic conditions

Paper and paper board production growth is forecast to accelerate rapidly in the subregion – from 3.2 percent *per annum* between 2000 and 2005 to 6.0 percent *per annum* between 2010 and 2020 (**Figure 5.6**). Over half of the increase in production is expected to take place in Indonesia with the rest divided in decreasing amounts between Thailand, Malaysia and the Philippines. Economic growth and increasing levels of education will mean that consumption of paper products in the subregion as a whole will increase at rates similar to production. Production surplus is, however, expected to increase in the subregion, particularly in Indonesia, and as a result increases in exports are expected. All other countries, except Thailand, are expected to increase net imports as domestic consumption growth outpaces increases in capacity. Under the downturn scenario, production growth is expected to be lower due to reduced demand and lower levels of investment in new pulp and paper production facilities. Reductions in production can also be expected if paper recycling expands while increased use of electronic media could affect consumption of newsprint and other types of paper.

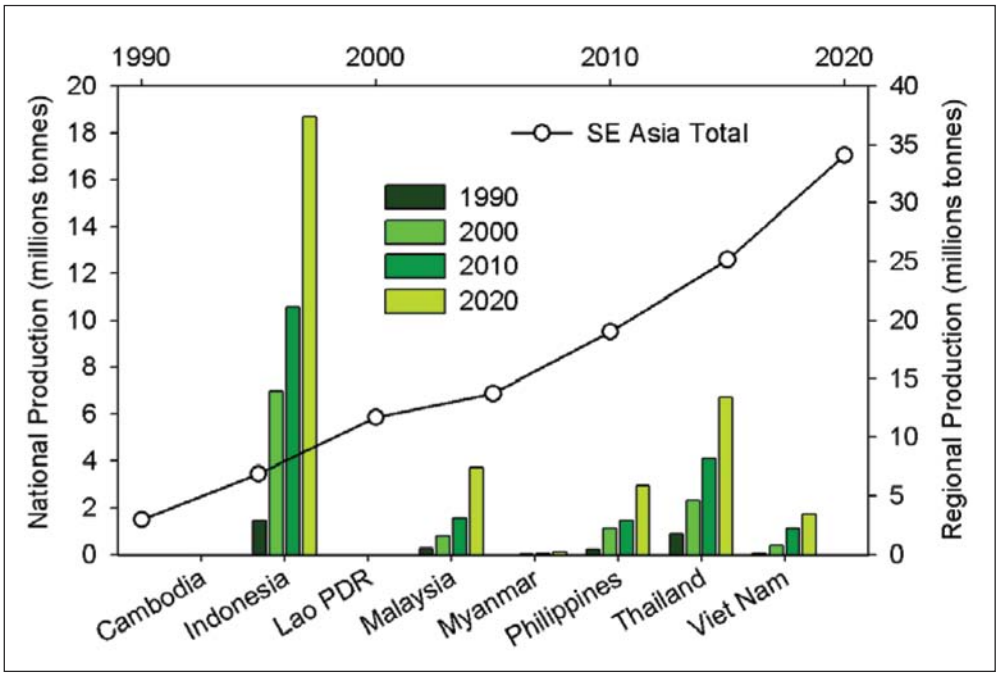


Figure 5.6. Production and forecast production of paper and paperboard in Southeast Asian countries, 1990-2020

Source: Jonsson and Whiteman (2009).

5.2.2. Overview of the future forest products supply-demand balance

Future forest products production is in the balance

The future of forest products production in Southeast Asia is very much dependent on investment and the market and policy environment, including such factors as demand, resource availability, management competency, investment conditions, and energy and labour costs (Sasatani 2009). Governance factors are likely to play a key role, and with falling standards of governance in most of the subregion during the past decade the outlook is mixed at best (see Section 3.6.1). Without significant alteration, the next decades may witness a decline in all forms of industrial activity, including forest products production (see **Box 2.3**).

Resource constraints may be decisive

Resource limitations are likely to constrain supply associated with future market growth and limit expansion of exports to China and other countries. Katsigris *et al* (2004) estimate that although Thailand, Viet Nam, Lao PDR and Cambodia (and the Philippines), have very little remaining supply and Myanmar, PNG and Malaysia will probably exhaust supplies by 2015-2020, the Russian Far East has over 20 years of timber remaining – notwithstanding catastrophic fire, which has caused great damage in the past. It is therefore probable that towards the end of the time horizon of this outlook study, sources of wood supply will move outside the subregion.

Plantation expansion holds promise for increasing supply

Although increased demand for wood products is unlikely to be met through sustainable management of natural forests for production, resource constraints and anticipated increases in forest protection could stimulate expansion of plantation resources. Plantation expansion and productivity in Thailand, Indonesia and Viet Nam – the main investors in industrial plantations in Southeast Asia – has, however, been slowed by a numerous impediments in the past.

Great effort will be needed to maintain competitiveness in forest products production

It is likely that the forest products industry in Southeast Asia will also be affected by growing international concern over sustainable resource management (see **Box 3.3**). Buyers may even turn away from tropical timber products altogether due to the reputation of tropical forest management and preferences for lighter coloured woods. Slumps in EU imports may result in restructuring of the wood industry, which could have lasting adverse effects on tropical producers (ITTO 2009k). Sustained high levels of economic growth in China could avert a fall in demand, although the competitiveness of sections of the Southeast Asian forest products industry may fall due to supply constraints and lack of investment in technology. The propensity for domestic processing in China and associated low wage rates may also challenge less efficient forest products producers in Southeast Asia.

5.3. NON-WOOD FOREST PRODUCTS

NWFPs and their associated markets face an uncertain future

With widespread transition from subsistence to market-based economic systems across the subregion, many NWFPs and their associated markets face an uncertain future. A vast number of products with a wide array of uses provide essential contributions to the livelihoods of many people in the subregion. On the other hand, many functionally equivalent products are already available in mainstream markets and inferior products are unlikely to be accepted. Transition between subsistence and market systems will require selection of NWFPs that have potential for cultivation and commercialization. At the same time, unsustainable exploitation of NWFPs may occur through commercialization, depleting resources available for subsistence and removing NWFP value from the overall value of the forest (e.g., FAO 1998; Angelsen and Wunder 2003). This has been particularly prevalent in India, where lack of compliance to responsible management and incentives for commercial exploitation are causing the disappearance of many NWFPs (Ram Prasad, personal communication).

Many barriers inhibit sustainable management

Despite a high dependence on NWFPs among forest users, many barriers inhibit sustainable management and income generation including tenure security, lack of processing skills and limited market access (CFI 2006). For product markets to expand, domestication and intensification of production will be necessary to improve production efficiency and stability, allow investment and generate revenue. Low profits are, however, a frequent constraint. The diversity of NWFPs, the unique and divergent ecology of different species and the need for relatively sophisticated techniques and institutions for successful management mean that only some products are likely to become more widely marketed while others will remain minor products.

Depletion of wild stocks is likely to continue

Overall, a trend of depletion and unsustainable management of NWFPs paralleling the general situation in forest management is likely to continue without concerted efforts to improve management systems. Under a *Hard times* scenario, commercial demand for NWFPs is liable to fall while subsistence consumption rises. Higher rates of economic growth without improved performance are likely to result in depletion of NWFPs to a greater extent. A *Slow and steady* scenario could see improvements in sustainable management and economic benefits. Comprehensively addressing NWFP development at the national, provincial and local levels is one way to safeguard social and environmental values associated with this diverse group of products as markets expand (see **Box 2.11**).

Attention should be given to products for which there is greater market demand

From an economic angle, promotion of NWFPs could yield significant local level benefits and, in this respect, attention should be focused on domesticating species for which there is market demand (FAO 2002). To support sustainable production, access rights to forest products must be established and strategic development of NWFPs is necessary, with increased focus on building market links, cost benefit analysis and private sector development (Warner *et al.* 2008). Promotion of forest products that are abundant and available in the long term is likely to yield greater success. Perhaps most importantly, entrepreneurial activity will be necessary for NWFP development given the difficulty of centrally managing such a vast array of diverse products. Where species are not domesticated, many of the challenges facing SFM and wildlife conservation will have to be overcome for sustained production to be a realistic possibility. In many countries the level of institutional development required may forestall sustainable management and the falling quality of governance in many countries is likely to hinder implementation of frameworks supporting sustainability (see Section 3.6.1).

5.4. SERVICE FUNCTIONS OF FORESTS

Production of environmental services from forests is likely to fall

With a forecast 3 percent reduction in forest cover in Southeast Asia by 2020, simple quantification suggests that overall production of forest services will be reduced (see **Figure 5.1**). On a qualitative level, reductions in health and vitality due to overharvesting, substitution of primary forest with plantation forest in the national forest estates, fire and pests and diseases will similarly reduce production of services. Poor management of protection forests and increasing encroachment into protected areas in many countries in the subregion suggest that a reduction in rates of loss of forest services is the most positive outcome that can be expected (see Sections 2.4.1 and 2.4.3).

Forest biodiversity will remain under threat

The balance between demand for environmental services and demand for land and forest products will play a key role in the future production of forest services and it is increasingly likely that international mechanisms will support production of environmental services. At the same time, population growth and economic development will lead to increasing pressure on forests and forest land.

5.4.1. Biodiversity

Protected areas must be supported at all levels

Protected areas have been cited as "the main hope for biodiversity conservation" (Sodhi *et al.* 2004). The remoteness and porosity of protected areas and their frequent location in border areas, however, makes biodiversity conservation a multinational and multidisciplinary issue. Key factors determining the future effectiveness of protected areas in forest biodiversity conservation include:

- Financing and budget allocation – particularly in relation to staffing and management planning;
- Law enforcement in relation to collection and trade of timber, NWFPs and wildlife;
- Control of access and prevention of encroachment;
- Monitoring and evaluation;
- Awareness and education – particularly among consumers;
- Sensitivity in road placement and development activities.

The future holds both threats and opportunities

Several factors will contribute to these efforts in coming years – improved forest monitoring and financing in association with REDD efforts and growing levels of awareness and increasing effectiveness of wildlife enforcement networks. There are also growing threats – increasing purchasing power of consumers of wildlife and NWFPs, expanding road networks in sensitive areas and falling governance standards in much of the subregion (see Section 3.6.1).

Much rests on institutional performance

Under the *Hard times* scenario the future for forest biodiversity looks bleak. Although low rates of economic growth will reduce demand for products, including wildlife and timber, increasing poverty is likely to increase reliance on wildlife and forest resources for subsistence needs. Failing governments and weak civil society will be hard pressed to stem the tide. Trends in governance, economic growth and infrastructure developments suggest that impacts in Cambodia, Lao PDR, Myanmar and Viet Nam would be most severe. As primary forests are exploited, the role of secondary forests in biodiversity conservation would be expected to become more significant.

Even with institutional commitment threats will remain

Under the *Slow and steady* scenario, a better outlook can be foreseen with virtuous circles developing as institutional commitment brings increased international funding. Even with institutional commitment, however, pressures for land development and demand for forest products and wildlife may be difficult to control as major development projects are undertaken.

5.4.2. Forests and climate change

Implementation of standard SFM practices will improve climate change resilience

The potential effects of climate change on forest ecosystems are poorly understood and are likely to alter ecosystem balance and composition in unpredictable ways. Uncontrolled logging, hunting and collection of NWFPs, fire, drought, invasive species, and pests and diseases, will all impose additional stress on forests. Without appropriate interventions, it is possible that the effects of climate change acting in concert with these pressures will prove devastating. Management to help forests adapt to climate change will involve maintaining forest health and ecosystem diversity and resilience as well as implementing systems for monitoring and responding to changes. Much of what is likely to be necessary is contained within standard practices for SFM (Broadhead *et al.* 2009). Uncertainty and slow implementation suggest, however, that the near-term future for sustainable management of natural forests in Southeast Asia is far from assured. Advances may depend more on the rate at which wider socio-economic development proceeds than the direct effectiveness of forestry-related efforts.

Climate change-related mechanisms provide the best hope but success is far from assured

The greater inclusion of forestry in international climate change mitigation and adaptation arrangements will provide greater support for forests and forestry *if* effective methods of engagement with the sector and related sectors can be found. In relation, challenges to implementing REDD are likely to be substantial in many countries. In particular, implementation of national monitoring and implementation frameworks may entail measures that will conflict with other existing priorities and sensitivities in the same way that past measures to better control forestry have done in the subregion. Additionally, many of the most pressing concerns lie outside the control of the forestry sector, e.g., competing claims and conflict among social groups

and between urban and rural people; trade-offs between food production and environmental protection; conflicting demands on forests; cronyism and endemic corruption; weak capacity, lack of political commitment, etc.

Significant advances will be necessary for REDD to be successful

Leakage of emissions through displacement of deforestation and degradation and substitution of wood with other materials constitutes another serious risk to REDD – and in turn to forest conservation. In many countries, controlling leakage at the national level will require unprecedented levels of coordination between government agencies with forestry sector involvement. Gaps in information and separation of institutional jurisdictions in relation to timber removals, forest conversion/clearance and wood products production and trade constitute leakage risks that could significantly undermine REDD. Without significant advances in institutional capacity and coordination it will not be possible to implement sound national-level REDD strategies in many countries and many years of effort will be required before standardized implementation frameworks embedded within national institutional frameworks can be expected.

Establishment of REDD frameworks will nonetheless provide significant advances

Notwithstanding achievement of overall goals of REDD efforts, there will be many points along the way at which opinions will be formed and reformed as issues are confronted in detail. One of the most interesting areas of REDD preparations will be intensified forest monitoring. Examination of the state of forest resources in unprecedented detail will provide a much stronger foundation for developing effective mitigation strategies and more accurate cost assessments. Monitoring will also provide valuable information for adaptation-related interventions.

Concerted efforts are necessary for synergies between climate change efforts and forestry to be realized

The situation with respect to forests and climate change in 2020 is closely related to overall progress towards SFM and implementation of plans that strive to maintain forest health and vitality, reduce risk, prevent forest degradation, maximize productivity, etc. Although a turning point for forestry may be close at hand for a few countries, far more effort will be required to redirect the pressures to which forestry is currently exposed in many others. This will require significant inputs, not only at the national and international levels, but especially at the field level – and not only in forestry, but also in related sectors where action to reduce pressure on forests is most needed.

5.4.3. Forests and water

The contribution of forest to watershed protection will remain varied

The total area of forest with protection as a designated function varies greatly across the subregion (**Table 2.9**). In general, protection forests in the subregion are poorly protected and managed, although sea changes in forest policy have taken place in a number of countries as a result of events linked to removal of forests and loss of associated protective functions. The degree to which forests are physically implicated in changes in the qualitative and quantitative aspects of hydrology has been questioned, but public and political opinion often strongly links perceived or actual environmental changes to changes in forest cover (see Section 2.4.3).

Much depends on policy changes in response to environmental shocks

By 2020, it is likely that forests will play a larger role in relation to links with hydrological processes. For example, it is likely that climate change-related increases in the frequency and severity of storms and increased road building in sloping areas are likely to result in increased incidence of landslides in the subregion (see **Box 2.16**). Such events could trigger measures to protect forests in sloping areas. Past indications in Asia suggest that this will take place through regulatory measures rather than payments for water-related services. It is likely that changes will be seen in countries where measures have yet to be taken and where protection forests are poorly managed and topography is steep. As such, changes in the role of forests in watershed protection are most likely to be seen in Lao PDR and parts of Indonesia.

5.5. WOOD AS A SOURCE OF ENERGY

Traditional woodfuel use will fall

Wood energy has widely differing systems of production and use and there are likely to be a range of responses to economic growth, demographic changes and shifts in energy policy in the subregion. With respect to traditional woodfuel use, falling poverty and increasing distribution of alternative forms of energy in the subregion make it highly likely that consumption at the national level will fall in coming years. More broadly, factors associated with climate change, energy efficiency and energy dependency at the national level will play a central role. In addition, there is an array of ecological, economic and social issues that will come into play. In general, the contribution of forestry to future energy production will be influenced by:

- The competitiveness of wood-based energy in reaching the objectives of recent energy-related policies;
- Availability of alternative sources of energy;
- The costs and benefits of wood energy-related systems in social, economic and environmental terms; and
- Policy and institutional issues that provide the framework within which forestry acts.

Commercial wood energy use trends depend on technological developments

It is accepted that a major shift in the importance of wood energy will follow the development of economically competitive technology for production of liquid cellulosic biofuels. At that point, forest products will compete directly with agriculture for a share in the biofuels market. Forest products will also become a source for transport fuel and, as such, large markets where energy consumption is significantly affected by policy measures (e.g., the EU, United States) will potentially fall open to forest-derived energy from developing countries around the world. Where trees are not favoured for biofuel production, the contribution of forestry to energy production may be more confined to efficiency gains in current uses and the increased use of wood residues from existing forestry operations. Under these conditions, wood consumption for bioenergy production will be less controlled by energy markets than by trends in roundwood production, extent of forest resources and demands that compete for wood residues.

5.6. OVERVIEW OF FORESTS AND FORESTRY IN 2020

Deforestation and forest degradation will continue at lower rates

In 2020, forests and forestry in Southeast Asia will have evolved considerably. The extent and quality of forest resources will have declined, although at slowing rates, and only in remote and inaccessible areas will large tracts of primary forest remain. In some countries, almost all forests will have been degraded by logging and hunting. In others, particularly higher income countries, protected areas will provide the mainstay for biodiversity. In lower income forest-rich countries, although pockets of primary forest in protected areas will remain, this may be more through remoteness than enforcement of management plans. Throughout the subregion, wildlife and prized species will be severely depleted as access to remote forests increases and markets grow. Protection forests will remain under threat from growing populations moving into more marginal areas, although environmental shocks and increasing incomes may mean that greater effort is put into watershed management with forests playing a leading role.

Forest products production will gradually decline

Planted forests will be more widespread in countries where institutional frameworks are better developed and governance is stronger. Traditional tenure rights will continue to stall expansion of large-scale plantations in many countries and allocation of land to smaller local units will also mean that economies of scale are interrupted. With increasing wage rates, declining supplies of wood from natural forests and slow rates of plantation development, main centres of forest products production will have moved outside the subregion. Some countries may maintain their positions where competitive advantages can be created, but volumes are likely to fall and imports from, for example, China may increase.

REDD will play an increasing role

Under these circumstances, international trade regimes will have waning influence on forest management in Southeast Asia towards 2020. Closer to the Outlook time horizon, however, international forestry-related climate change mechanisms and financing will become more fully functional and as rural land conversion rates slow and institutional jurisdictions become clearer, greater possibility will exist for investing in forestry for climate change mitigation. Until that time, REDD is likely to be used as a means of increasing funding for protected areas and community forestry. At the same time, REDD-funded improvements in forest monitoring could have a pivotal effect on forestry as resource statistics become available in unprecedented detail and buyers and sellers of environmental services are able to trade with a much greater degree of accuracy and certainty.

SFM in natural production forests will struggle to take hold

Overall, SFM will not be widely practised in terms of management of natural forests for production. Most countries in the subregion will focus on plantations for wood production while, at least nominally, placing many natural forests under full protection. Although exclusion of vested economic interests may result in slow degradation of protected natural forests due to illegal logging and encroachment, the technical, economic and ecological difficulties of sustainably managing natural tropical forests for timber production will mean that such management is only seen in a few model forests.

Managing an efficient transition to forest protection is a primary goal

The main question will be whether a transition from production forestry to forest protection can, with international support, be efficiently managed by Southeast Asian countries. Wood will continue to be in great demand as will land. The best that can be hoped for is a more efficient forest sector producing more and higher quality goods and services from reduced areas. High productivity plantations, secure species-rich protected areas, efficient forest products production and protection forests in the right places, will be goals that will truly be worth achieving.

6 BRINGING ABOUT CHANGE

Consensus over the position of forestry is greatly needed

Without broad agreement over forestry objectives, and implementation of supportive policy and legislation, forestry will remain at the mercy of a wide range of vested interests and business as usual can be expected. While international actors have promoted forests and forestry as a means of sustaining livelihoods, generating income and maintaining environmental and biodiversity values, de facto policies of resource extraction and forest conversion have often been pursued. Low economic returns and lack of financing have been major factors in determining the priority afforded forests within national frameworks. Recent growth in national and international interest in forestry and the environment could, however, provide the necessary stimulus for more widespread transitions in Southeast Asian forestry.

Forestry reforms are gaining wider support

A major factor determining the future of forests and forestry is the extent to which institutions are able to rise to meet this challenge. On the positive side, lower rates of economic growth in comparison with the past decade are likely to reduce pressure on forest resources and provide space to implement natural resource management reforms. Making long-term investments in forests and forestry can potentially provide future supplies of forest products to support manufacturing as economies reinflate; improve watershed protection as the region's climate changes; reduce CO_2 emissions and associated credits; and provide recreation opportunities and a treasure trove of wild plants and animals to add perspective and pleasure to the lives of future generations.

6.1. PRIORITIES

Income generation and protection of biodiversity have become clear goals

In supporting a transition from net forest cover loss to net forest cover gain and from unsustainable to sustainable forest management, priorities need to be set. Within Southeast Asia's overall development framework, prevailing economic and demographic trends and national-level priorities suggest that forestry-related goals should centre on:

- economic production; and
- biodiversity protection.

Trade-offs between these objectives should be carefully monitored and controlled, and as such a third cross-cutting priority is:

» improved governance.

Box 6.1 outlines arguments for focus on these areas in the context of wider socio-economic development and pursuit of forest transitions.

Box 6.1. Priorities during forest transitions

Experience has shown that the transition from traditional forest-based livelihood systems to sustained management of forest for timber production is far less frequent than to agriculture-based systems in which the role of forests is more limited. At the same time, rural-urban migration rates are increasing and low returns on agricultural and forest-related production have reduced the attractiveness of rural livelihoods. Wider changes from subsistence to market orientation, of which these transitions are a part, are, however, increasingly seen as the primary route to poverty alleviation, revenue generation and environmental protection. Thus, there is growing recognition that long-term forestry benefits may be best realized through rapid socio-economic development, poverty alleviation and improved governance – itself supporting the contribution made by the forestry sector (Persson 2003).

In the medium term, a proportion of forests will be converted to alternative uses that, paradoxically, may be unsustainable. It is, however, generally recognized that more affluent societies can better afford non-commodity forest values than those where weak governance, shortages of alternative livelihood options or developing economies place excessive demands on natural capital (e.g., Lanly 2003). Adopting this overall scenario demands greater focus on two distinct long-term goals: generating benefits from forestry that contribute to mainstream development and preserving that which cannot be recovered, i.e., biodiversity and associated ecosystem services. Cutting across these objectives, strengthening forest law enforcement and governance is essential to support efficient functioning of institutional frameworks and to protect vulnerable forest resources.

Source: Adapted from Broadhead (2006).

Forest transitions will be the defining challenge for forestry to 2020

With the advent of international mechanisms to finance the environmental externalities associated with forestry, and greater national awareness of the importance of forestry, the reality of linking environmental conservation and income generation is drawing closer. Even without international financing, several countries in the subregion are beginning forest transitions and demonstrating approaches that could be more widely implemented. Mustering the political will, human resources, technical know-how and necessary financing to effect widespread forest transitions is likely to become the defining challenge for forestry in Southeast Asia to 2020.

6.2. STRATEGIES

The right strategies will help avert a 'Hard times' scenario

Given that economic growth rates in the coming decade are likely to be below those of the past decade and assuming that international financing will remain available for improved forest management, a range of strategies to improve the performance of forestry are set out below. By implementing related measures a future of *Hard times* may be steered towards *Slow and steady* sustainable development. In various ways, each strategy contributes to the overall priorities of economic production, biodiversity conservation and governance reform and together to a lesser or greater extent a part of moving towards ecological sustainability and green development.

6.2.1. Recapitalize forest resources

Investment in Southeast Asia's forests is required to maintain the flow of goods and services

To maintain ecosystem services, reduce carbon emissions, improve watershed protection and support biodiversity conservation and future economic production, recapitalization of Southeast Asia's forest resources is essential. Across the subregion, falling forest area, low and declining stocking densities in natural forests and poorly performing plantation resources mean that significant investment will be required. Three areas for potential investment are logged-over production forests, heavily degraded forests and planted forests:

- At present the economic viability of management of **logged-over natural forest** for second and third cutting cycles is in question and many commentators doubt that natural forests can be sustainably managed using the silvicultural and harvesting techniques that are commonly in practice. As such, forest protection may be necessary for several years before forests recover to a sufficient extent to be returned to production on a more sustainable footing.
- The productivity of **planted forests** in Southeast Asia is considerably below potential as a result of inadequate extension, low quality planting material and inappropriate institutional measures. In Asia as a whole, the 125 million hectares of planted forests in 2005 had an estimated potential production of about 495 million cubic metres; over twice the total reported production of industrial roundwood (Carle and Holmgren 2008). Improvements in plantation production of timber could have significant effects on demand of timber from natural forests and would also provide green building material with a carbon footprint much smaller than substitute products such as concrete, steel and aluminium.
- The millions of hectares of *Imperata* grassland and **heavily degraded forests** in Southeast Asia may become economically viable sites for plantation development and assisted natural regeneration if newly developed financing mechanisms

prove workable. Methods for reforesting these areas are well known and could be extended to large tracts of land where institutional backing is provided.

Investment in forestry can also increase rural employment

Investing in forest resource recapitalization can also be seen as a means of generating rural employment and will be especially attractive if the economic downturn is protracted and returns from investments in industrial and services sectors fall. Such measures to promote employment have been implemented on different occasions around the world in response to resource depletion and low economic productivity – during economic depressions or following wars for example. Resulting resource bases have powered subsequent economic booms based on manufacturing. Similar long-sighted decisions could provide good prospects for future growth whether or not times of economic hardship are realized. Under low growth conditions it is probable that private sector investment will fall and, where financial markets lack sufficient depth, it is likely that funding will have to be derived from international mechanisms or core government funds.

Supportive investment frameworks are, however, essential

In all cases, recapitalization is only likely to come about or to be supported where investment frameworks are appropriate and include stable and clear tenure rights, supportive financing arrangements and legislation, appropriate scientific and technical inputs and reduced bureaucratic interference. For many years, these issues have resulted in degradation of forest resources and rectification of weaknesses can result in widespread benefits. Experience from countries where such programmes have been undertaken will bring increased clarity in relation to the relative benefits of different approaches and practices.

6.2.2. Conserve forest biodiversity

Forest biodiversity will remain under severe threat

Throughout Southeast Asia maintaining biodiversity will pose an almost insurmountable task and some losses are inevitable. Climate change also threatens forest ecosystem stability and, with increased infrastructure development and expansion of populations, reductions in the health and vitality of forests could result in compound impacts on forest resources and those dependent upon them. As well as deforestation and forest degradation, the porosity of national borders and park boundaries, and huge demands for wildlife and plants for food, medicine and other uses, will mean a constant drain on populations of marketable species. Increased accessibility of previously more isolated areas as roads are constructed will exacerbate rates of depletion where implementation of environmental safeguards is lax.

Improvements in financing, law enforcement and awareness are necessary

Protected areas remain the cornerstone of forest biodiversity and although there are exceptions, deforestation and forest degradation within protected areas are less than in surrounding landscapes. In particular, there is a great need to increase forest law enforcement and awareness-raising efforts and to improve financing for protected areas – particularly in relation to staffing and management planning. Establishment of checkpoints, patrols, border controls and other law enforcement interventions can provide effective support for protected areas, although without high-level political backing time and effort are likely to be wasted. Several international financing mechanisms are likely sources of funding for national parks and should be utilized to the extent possible

More effort is needed to mitigate the impacts of economic development

Improvements in relation to monitoring of development activities are also of key importance. Implementation of environmental safeguards in association with major infrastructure developments – both domestically and donor funded – is an outstanding area in need of attention. Greater efforts should also be made in placing rural roads according to environmental sensitivity and ensuring protection of protected areas around new developments.

6.2.3. Utilize available incentives

Current opportunities must be seized upon

Heightened global interest in forests and forestry constitutes the greatest opportunity in recent times for the forestry sector to deliver on society's priorities. Financial mechanisms aimed at promoting SFM could be converted into new growth in forestry with the involvement of many new participants. Similarly, legality-related regulations aimed at imports of forest products to high-paying markets provide an incentive to promote SFM. Public procurement policies and corporate decisions implemented by international companies and governments will provide parallel motivation. Failing to attain necessary standards would mean that producers and manufacturers will have to find new, possibly lower paying markets where poor forest management remains acceptable.

Marketing of multiple values will bring multiple benefits

Marketing of forests and forestry as producers of valuable timber, carbon sequestration, conservation, watershed protection and rural employment could bring many direct and peripheral benefits that are not being realized through current marketing systems. Forest rangers, tour operators and guides, national forest certification officers, GIS experts, harvesting trainers, forest labourers, wood products manufacturers and community fire officers could all benefit from altered patterns of incentives.

Investment in acquisition of financial resources should be considered

Given the opportunities that now exist, funnelling start-up investment into accessing and acquiring additional financing would seem appropriate. In particular, investment in human resources to seek financing – both from the public and private sectors – administer funding applications, manage programme implementation and promote resulting achievements, is likely to be money well spent.

6.2.4. Involve stakeholders

Inclusiveness is essential

The challenges that face forestry – with respect to climate change and otherwise – and the difficulties of implementing more complex forest policy through a regulatory approach suggest that much greater inclusion of forestry stakeholders at different levels is necessary.

> *Traditional forms of forest governance that focus on hierarchical, top-down policy formulation and implementation by the nation state and the use of regulatory policy instruments are insufficiently flexible to meet the challenges posed by climate change. (Seppälä* et al. *2009)*

Without consultation during formulation, policy may be unworkable

National and international forestry policy has often emerged from processes that fail to assess or accommodate public – i.e., stakeholder – opinion. Differing objectives are supported by governments, powerful interests, environmentalists, economists and international organizations. Policy is, however, often poorly understood or supported by a broader range of stakeholders and this partly accounts for the poor implementation of forestry policy across the subregion. Failure to garner greater participation in the policy process inevitably weakens policy implementation and leads to lack of general enforcement support. Furthermore, and partly as a result of a lack of public engagement, policy processes may become dominated by powerful interests, international concerns and perverse causes.

Public opinion should play a larger role in forestry

As such, public opinion should play a larger role in forestry development so that policies are appropriate, are broadly supported and can be more easily implemented in a rapidly changing subregion. Presently, the question of how important forests are to local livelihoods is rarely put to those directly affected. Likewise, at the national level, the importance of forests to urban dwellers is poorly quantified. Levels of awareness of the roles and importance of forestry are similarly unknown and, as such, the potential of public support remains poorly tapped.

Wider inputs can transform stagnant processes and institutions

Assessment of awareness of, and opinion on, forests and forestry can deliver the perceptions of a broad range of forestry stakeholders to the policy development process. Collated results enable formulation of policy that is well harmonized with current needs and wants and can also be used to inform prospective awareness-raising campaigns. Bringing wider perceptions into policy processes is also likely to help precipitate institutional reform and reinvention.

6.2.5. Reinvent forestry institutions

Institutions have often lost focus on practical issues

Over past decades, forest and forestry policies have been formulated to encompass the principles of SFM in almost all countries in the subregion. Implementation has, however, been lacking in all but a few. Despite all the credentials of 'good' forest policy, many examples in the subregion are simply text book models of forest policy, inappropriate for the circumstances into which they were born. This has largely resulted from a logical disjuncture between goals and possibility/capability for achievement of the stated goals. Recognition of this deficiency and refocusing of institutions to play an appropriate role in effectively and efficiently meeting policy goals is essential to move the subregion's forestry sector in parallel with wider developments. To a large extent this will involve refocusing on field-level forestry issues and what can realistically be achieved. Capabilities in terms of human resources, available knowledge, political will and financial support will have to be taken into account much more seriously if widespread adoption of policy aims is to come about.

Greater involvement of stakeholders can precipitate multiple shifts in institutional roles

Gradual shifts towards local participation, greater stakeholder involvement and transparency, and individual and household ownership of forests also mean that many more factors will play deciding roles in the future of forestry by 2020. This will have the effect of promoting institutions to adopt facilitative and regulatory, rather than direct management roles. Facilitating and regulating the many, as opposed to managing the few, will be a very different task for forestry agencies in much of the subregion. Human resource development at the policy level is likely to be a key need for this transition to take place. Movement away from direct management of forests will also mean that high-level integration and intersectoral coordination will be of much greater importance for forestry agencies to retain a raison d'etre. Such transitions are likely to consolidate the roles of forestry agencies, even if the role is considerably altered.

To be successful and remain relevant, institutions need to ensure flexibility, strategic management capabilities, strong "sensory" capacities and an institutional culture that responds to change. (FAO 2008d)

Responsiveness and flexibility are the most important qualities forestry institutions can possess

Global and regional experience demonstrates that points of inflection in forestry trends often occur due to the emergence of tangible economic, political or social 'shocks'. Forecasts and reasoned argument are often insufficient to effect change, especially where governance is weak and other pressing matters are at hand. Environmental degradation is also often an insufficient catalyst unless acute social and economic repercussions are experienced. When shocks do occur, however, the most important qualities institutions can possess in steering an efficient course for society are responsiveness and flexibility. Although decisions must be well informed – both technically and politically – for long-term advantages to be realized, rapid responses to threats and opportunities and ability to redesign and realign objectives confer distinct advantages in maintaining forestry agencies and their contribution to society.

6.2.6. Revitalize field-level forestry

Field-level forestry activities are in danger of being overlooked

Many of the day to day field-level activities that physically determine the future of forests and forestry are often overlooked in national and international discussions: reduced impact logging; forest patrolling; community fire management; forest demarcation; collection of forest statistics; monitoring of forest health and vitality; growing timber; collecting fuelwood and NWFPs; manufacturing products; etc. The present enthusiasm for climate change and forest law enforcement and governance, although inspiring, seemingly denies the importance of these activities. Without focus on practical aspects of forestry, however, it is possible that by the time the international focus generates major implications, a protracted period of institutional strengthening and training will be required for implementation to be realized.

Local-level fire management is of increasing importance

Due to increased opening and drying of the subregion's forests, changing weather patterns and rising risk of anthropogenic ignition, there is a strong need to improve fire management to avoid large losses of forest and ecosystem collapse. Fire management can be improved through information and awareness campaigns, improved legislation and faster fire response. Regional and national communication networks and monitoring schemes may also be necessary, as well as specific management practices at the local level (e.g., controlled burning and sanitary cuts).

Codes of practice provide a practical means of improving forest management

There are also a number of additional initiatives within foresters' control that could be implemented to improve field-level forest management. Amongst these are voluntary codes of practice, which seek to provide benchmark standards to guide forest managers. Codes of practice for forest harvesting address the technical quality of harvesting in natural forests – an area in which positive economic and environmental benefits can be generated. Codes have also been developed for fire management and for planted forests, and the economic and ecological logic of implementing these codes should act as the main incentive in encouraging their uptake and expanding the sphere in which SFM is practised. Criteria and indicators for SFM can similarly serve to convert policy intention into action.

6.2.7. Improve education

Education is necessary to increase awareness and address human resource limitations

The long time scales over which national-level changes occur strongly suggest that education in relation to the values of forests and the opportunities and challenges faced should be a key focus in Southeast Asia. The current lack of human resources in many countries also points to a clear need to improve education in a general sense and also to increase awareness in relation to forests and natural resources.

The next generation will need to be 'environmentally smarter'

The subregion's growing population and the skew towards younger generations place greater emphasis on the need for improved education and awareness. Without an 'environmentally smarter' next generation of consumers and decision-makers, it is likely that resources will be irretrievably eroded through population pressure and environmentally sustainable practices will not take off.

Modern forest management also calls for improved education

More immediately, the current lack of human resource capacity in forestry and increasing complexity of forest management, including linkages with climate change especially, imply that high quality education and training should be made available to those working in forestry and related disciplines at local, provincial and national levels.

Appendix 1. Changes in World Bank governance indicators in Southeast Asia, 1998-2008

Indicator	Governance Score (-2.5 to +2.5)		Percentile Rank (0-100)	Change in rank
	1998	2008	2008	1998-2008
Control of corruption				
Cambodia	-1.0	-1.1	8.6	-3.1
Indonesia	-1.1	-0.6	31.4	22.2
Lao PDR	-0.7	-1.2	5.7	-22.5
Malaysia	0.5	0.1	62.8	-10.0
Myanmar	-1.4	-1.7	0.9	-3.5
Philippines	-0.4	-0.7	26.0	-15.3
Thailand	0.0	-0.4	42.9	-14.9
Viet Nam	-0.7	-0.8	25.1	-3.5
Rule of Law				
Cambodia	-1.0	-1.1	13.3	-1.0
Indonesia	-0.8	-0.7	28.7	4.9
Lao PDR	-0.9	-0.9	20.0	4.8
Malaysia	0.5	0.5	64.5	-0.7
Myanmar	-1.3	-1.5	4.7	-2.4
Philippines	-0.2	-0.5	39.7	-13.2
Thailand	0.4	0.0	54.0	-11.7
Viet Nam	-0.5	-0.4	41.6	3.0
Regulatory quality				
Cambodia	-0.2	-0.5	34.2	-7.8
Indonesia	-0.3	-0.3	45.4	6.4
Lao PDR	-1.0	-1.2	9.6	-5.0
Malaysia	0.6	0.3	60.3	-9.0
Myanmar	-1.5	-2.2	0.9	-6.4
Philippines	0.3	-0.1	51.6	-10.8
Thailand	0.2	0.3	59.9	4.3
Viet Nam	-0.6	-0.5	32.3	7.9
Government effectiveness				
Cambodia	-0.8	-0.8	19.4	-1.5
Indonesia	-0.8	-0.3	47.3	27.9
Lao PDR	-0.6	-0.8	17.5	-7.1
Malaysia	0.6	1.1	83.8	14.6
Myanmar	-1.2	-1.7	1.8	-5.3
Philippines	-0.2	0.0	54.9	7.5
Thailand	0.1	0.1	58.7	-1.0
Viet Nam	-0.6	-0.3	45.4	16.5
Political stability				
Cambodia	-1.2	-0.3	34.4	21.4
Indonesia	-1.4	-1.0	15.7	5.6
Lao PDR	-0.3	0.0	43.5	11.8
Malaysia	0.2	0.1	50.2	-1.2
Myanmar	-1.3	-1.6	9.0	-3.0
Philippines	-0.1	-1.4	10.5	-29.9
Thailand	0.4	-1.2	12.9	-46.7
Viet Nam	0.3	0.3	56.4	-2.3
Voice and accountability				
Cambodia	-0.9	-0.9	22.5	0.9
Indonesia	-1.0	-0.1	44.2	27.9
Lao PDR	-1.0	-1.7	6.2	-11.1
Malaysia	-0.2	-0.6	31.7	-12.1
Myanmar	-1.9	-2.2	0.0	-1.4
Philippines	0.4	-0.2	41.3	-19.3
Thailand	0.4	-0.6	32.2	-28.9
Viet Nam	-1.4	-1.6	6.7	-3.9

Source: http://info.worldbank.org/governance/wgi/

Appendix 2. Wood products production projections for Southeast Asia

Table 6.1. Industrial roundwood production 1990-2020

	IRW production (000 m³)			Projections					
				Baseline scenario			Downturn scenario		
	1990	2000	2005	2010	2015	2020	2010	2015	2020
Cambodia	567	179	113	177	270	419	145	198	273
Indonesia	38 366	33 497	30 720	39 643	48 628	59 051	36 910	42 649	48 966
Lao PDR	455	567	194	498	644	841	457	545	656
Malaysia	41 260	24 380	25 186	25 943	28 034	29 781	25 775	27 317	28 529
Myanmar	3 653	3 612	4 262	5 677	6 748	7 668	5 348	6 024	6 559
Philippines	4 928	3 079	3 129	3 308	3 804	4 624	3 176	3 460	3 903
Thailand	3 093	6 262	8 700	8 849	9 484	10 296	8 508	8 706	8 939
Viet Nam	4 669	4 183	4 754	5 787	7 152	8 217	5 346	6 247	6 921
SE Asia	96 991	75 759	77 057	90 024	104 935	121 110	85 799	95 299	104 927

Source: Jonsson and Whiteman (2009).

Table 6.2. Sawnwood production 1990-2020

	Sawnwood production (000 m³)			Projections					
				Baseline scenario			Downturn scenario		
	1990	2000	2005	2010	2015	2020	2010	2015	2020
Cambodia	71	20	4	34	56	92	26	38	56
Indonesia	9 145	6 500	1 472	5 386	5 840	6 171	5 241	5 539	5 749
Lao PDR	100	200	130	222	313	440	198	256	329
Malaysia	8 849	5 590	5 173	5 563	5 320	5 069	5 583	5 362	5 131
Myanmar	296	545	1 530	1 538	1 599	1 633	1 502	1 529	1 534
Philippines	846	151	288	231	188	145	243	208	172
Thailand	1 170	220	288	308	379	501	298	349	432
Viet Nam	896	2 950	3 232	3 419	4 136	4 728	3 225	3 734	4 143
SE Asia	21 518	16 257	12 193	16 770	17 916	18 883	16 382	17 092	17 636

Source: Jonsson and Whiteman (2009).

Table 6.3. Wood-based panel production 1990-2020

	Panel production (000 m³)			Projections					
				Baseline scenario			Downturn scenario		
	1990	2000	2005	2010	2015	2020	2010	2015	2020
Cambodia	2	44	7	9	13	20	8	11	14
Indonesia	8 617	8 896	6 098	7 020	7 505	7 965	6 883	7 218	7 493
Lao PDR	10	25	24	22	25	28	22	23	25
Malaysia	1 953	5 788	7 672	8 885	11 114	13 257	8 739	10 537	12 195
Myanmar	15	56	113	135	146	159	131	140	149
Philippines	505	510	453	819	1 059	1 449	771	935	1 186
Thailand	449	1 158	1 365	1 580	1 927	2 451	1 503	1 753	2 105
Viet Nam	39	40	441	319	434	548	286	355	420
SE Asia	12 008	16 872	16 528	19 187	22 660	26 370	18 730	21 387	24 040

Source: Jonsson and Whiteman (2009).

Table 6.4. Paper and paper board production 1990-2020

	Production			Projections					
	(000 tonnes)			Baseline scenario			Downturn scenario		
	1990	2000	2005	2010	2015	2020	2010	2015	2020
Cambodia	0	0	0	0	0	0	0	0	0
Indonesia	1 438	6 977	7 223	10 557	13 936	18 658	9 717	12 055	15 093
Lao PDR	0	0	0	0	0	0	0	0	0
Malaysia	275	791	954	1 561	2 435	3 714	1 425	2 019	2 811
Myanmar	11	39	45	65	94	144	58	75	104
Philippines	245	1 107	1 097	1 472	2 006	2 936	1 359	1 711	2 270
Thailand	877	2 312	3 431	4 113	5 100	6 710	3 940	4 634	5 699
Viet Nam	57	384	888	1 106	1 427	1 734	1 001	1 199	1 385
SE Asia	2 983	11 697	13 725	19 016	25 161	34 095	17 635	21 843	27 535

Source: Jonsson and Whiteman (2009).

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In the 12 years since the first Asia-Pacific Forestry Sector Outlook Study was completed in 1998, the region has experienced tremendous changes in nearly every aspect. These changes have been particularly profound in the forestry sector, where society has dramatically increased its demands and expanded its expectations of forests and forestry. This subregional report for Southeast Asia summarizes the key findings and results collated under the second Asia-Pacific Forestry Sector Outlook Study – a comprehensive effort spanning nearly four years and involving all member countries of Asia-Pacific Forestry Commission. The current report synthesizes observations and findings from eight Southeast Asian country reports, numerous thematic reports and a wide ranging review of current and past publications in providing analyses of the status and trends of forests and forestry in Southeast Asia. The publication analyses key factors driving changes in forestry in the region and sets out four scenarios for 2020: *Hard times*, *Slow and steady*, *Overburn* and *Living on the edge*. The report also outlines priorities and strategies to move the subregion's forestry sector onto a more sustainable footing and to provide continued benefits to future generations.

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