Drivers of Forest Change in the Greater Mekong Subregion

Regional Report

USAID Lowering Emissions in Asia's Forests (USAID LEAF)

Drivers of Deforestation in the Greater Mekong Subregion
Regional Report

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1 Introduction

1.1 Regional Context

The Greater Mekong Subregion (GMS), which includes the countries of Cambodia, Laos, Myanmar, Thailand and Vietnam,[1] supports some 70 million people who depend directly on its ecosystems for food, water, and livelihoods.[2] The region is located within the 2.3 million km^2 Indo-Burma biodiversity hotspot.[3] The GMS land use sector is a major source of greenhouse gas (GHG) emissions, contributing a total of 0.108 Giga tons CO_{2eq} in 2010, of which 93% were from forest land. The trend in emissions remained relatively constant between the late 90s and 2012 and in 2010 land use emissions contributed 12% of total GHG emissions in the subregion.[4]

The GMS has witnessed dramatic changes in its forests, particularly in the last half-century. One of the world's most forested regions until the 1970s, the GMS has suffered rapid deforestation and forest degradation in recent decades: GMS countries lost a third of their forest cover between 1973 and 2009, and are forecast to lose another third of their remaining forest cover by 2030.[5] Furthermore, many remaining forest areas are severely degraded.[6] Fast economic growth (with an average GDP growth rate of 8% in the last decade) and conversion for agriculture pose some of the greatest threats to natural forests in the region.[7] Foreign and domestic land-related investments in the GMS countries represent a major immediate driver of forest change. Meanwhile, demand from China, Thailand and Vietnam for natural resources, timber, and agricultural products is also driving forest change in the GMS countries.

Forest change in the GMS also includes positive developments, with the region having increased its overall cover of planted forests through reforestation and afforestation from 4.1 million hectares in 1990 to 8.8 million hectares in 2010.[8] Of this overall area, however, much is in the form of monoculture plantations of non-native species, which do not offer the same ecosystem services as natural forests.[9] GMS country governments have managed to conserve roughly 98 million hectares of natural forest,[10] representing just over half of the region's overall land area.[11]

Each GMS country has implemented numerous programs and initiatives aimed at addressing drivers of forest loss and promoting forest cover expansion. These include both traditional programs such as forest management, protected areas and land use planning, and innovative programs such as direct economic incentives and payments, private sector engagement, decentralization and community forestry, and

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[1] This report focuses only on the five countries listed and excludes Yunnan Province and Guanxi Zhuang autonomous Region in the People's Republic of China, which is also included in the GMS.
[2] Pech, S., & Sunada, K., 2008. Population growth and natural-resources pressures in the Mekong River Basin *in* Ambio, 37(3), 219–224. p. 219.
[3] Critical Ecosystem Partnership Fund, 2012. Ecosystem Profile: Indo-Burma Biodiversity Hotspot: 2011 Update. URL: http://www.cepf.net/Documents/final.indoburma_indochina.ep.pdf.
[4] Land use emissions from FAOSTAT Emissions Database. URL: http://faostat3.fao.org/download/G2/*/E Total emissions from World Bank database accesse3d 18 May 2015: http://data.worldbank.org/indicator/EN.ATM.CO2E.KT/countries
[5] WWF – Greater Mekong, 2013. Ecosystems in the Greater Mekong. Past trends, current status, possible futures. URL: http://awsassets.panda.org/downloads/greater_mekong_ecosystems_report_020513.pdf
[6] FAO, 2011. Investment in Forest Resources. GMS Forest Policy Brief 01. (Noting that countries have reported increasing percentages of forest cover by using a decreasing forest canopy cover limit). URL: http://www.fao.org/fileadmin/templates/rap/files/NRE/policybrief1.pdf.
[7] Xing, L., 2013. "Land-Use Change in the Mekong Region" *in* The Water-Food-Energy Nexus in the Mekong Region: Assessing Development Strategies Considering Cross-Sectoral and Transboundary Impacts. p. 179-189. URL: http://link.springer.com/chapter/10.1007/978-1-4614-6120-3_6
[8] FAO, 2010. Global Forest Resources Assessment. URL: http://foris.fao.org/static/data/fra2010/FRA2010GlobaltablesEnJune29.xls
[9] *Id*.
[10] WWF's 98 million ha estimate is based on remote sensing data. WWF, Greater Mekong, 2013, *supra* note 5. (By comparison, FAO estimates 90 million ha of forest has been conserved by GMS countries based on country-reported data.) FAO, 2011. Forests and Forestry in the Greater Mekong Subregion to 2020: Subregional Report Of the Second Asia-Pacific Forestry Sector Outlook Study. p. 7. URL: http://www.fao.org/docrep/014/i2093e/i2093e00.pdf.
[11] *Id*. at 23.

engagement with international forest legality and certification programs (discussed in detail in Section 5).

Given the high level of biological and cultural diversity in the subregion, and its global economic significance, this study aims to inform forestry related interventions in the GMS, recognizing the subregion's need to balance priorities of biological conservation, sustainable forest management, socio-economic development, and poverty alleviation. GMS countries need to act swiftly to protect natural forests and take concrete efforts to achieve sustainable forest management (SFM), including increasing afforestation and reforestation. This chapter provides an initial perspective on how GMS countries may best respond to this challenge.

1.2 Objective of the report

This regional chapter presents a comparative overview of the GMS countries, drawing on the five country reports as well as other relevant regional information. Section 2 presents trends in the forest and land use sector, changes in overall extent of standing forests and various classes of forest, as well as background conditions regarding land use. Next, Section 3 examines the various "negative" drivers of deforestation and forest degradation, followed by an analysis in Section 4 of so-called "positive" drivers leading to sustainable forest management, forest conservation, afforestation and reforestation in the subregion. In addition to primary drivers of forest change, each analysis includes an assessment of underlying causes and influencing actors related to such change. Section 5 of the chapter compares the programs and initiatives of the five GMS countries that address negative drivers and act as positive drivers of forest change. After comparing the overall design, objectives and scope of each country's most important programs and initiatives, the state of their implementation is analyzed. A typology of factors assisting and impeding the implementation of programs and initiatives is developed and potential solutions to impeding factors are outlined. In a final conclusions section, some lessons gained from the regional analysis are offered, as well as policy recommendations focused on new or revised programs and initiatives related to forest change drivers.

2 Comparative overview of Mekong Region forest and land use sector

2.1 Recent Patterns of Forest Change

GMS forests have witnessed dramatic changes over the past few decades due to many factors. These include rapid economic growth, the conversion of forests to cash crops and plantations, logging, as well as mining and infrastructure development. Although estimates on the extent of forest loss and change vary among studies, the overall picture is one of rapid forest loss across most countries, while some areas have experienced forest regeneration.

The primary source of data on country forest cover comes from the Food and Agriculture Organization's (FAO) Forest Resources Assessments. Total forest cover for continental Southeast Asia in 2015 is estimated at 88.4 million ha, equivalent to 47% of the subregion's land area.[12] Between 1990 and 2015, a total of 4.7 million hectares of forest are reported to have been lost (2.5% of the total land area), with an average annual decrease in forest cover of 0.21% over the period (see Figure 1).

[12] FAO, 2011. Forests and Forestry in the Greater Mekong Subregion to 2020: Subregional Report Of the Second Asia-Pacific Forestry Sector Outlook Study. p. 7. URL: http://www.fao.org/docrep/014/i2093e/i2093e00.pdf.

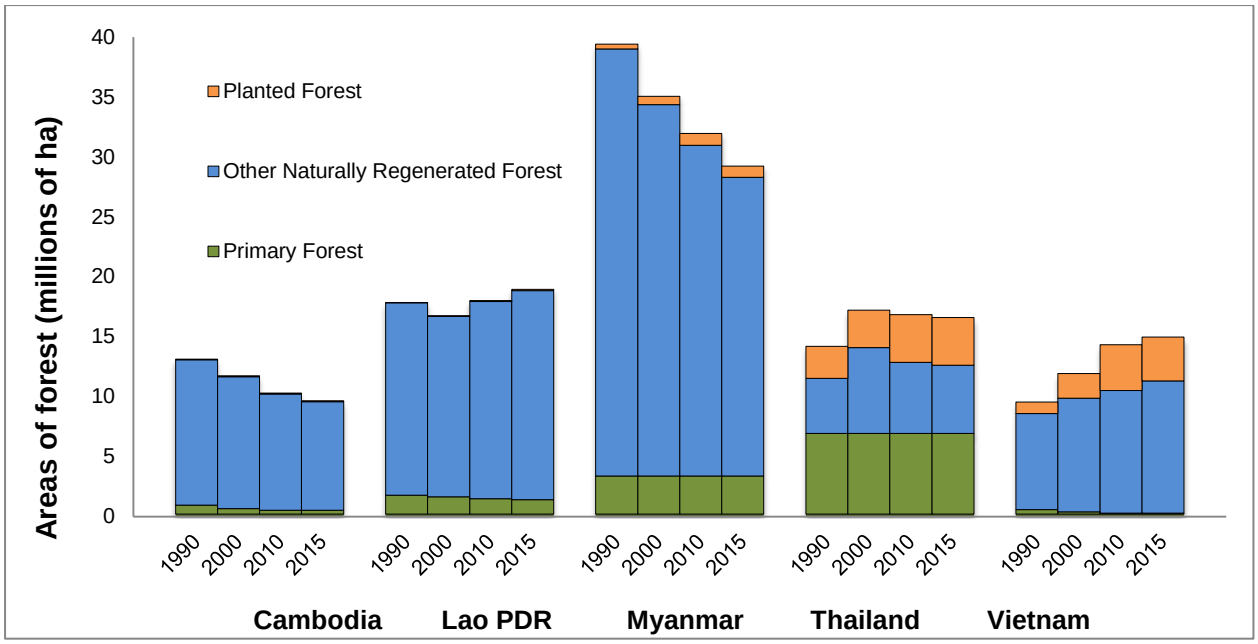

Figure 1. Changes in forest types in the GMS countries since 1990[13]

FAO classifies forests as Primary, Other Naturally Regenerated or Planted. Other Naturally Regenerated forests constitute the largest percentage in the GMS countries. In all countries except Cambodia, the area of Planted Forests increased between 1990 and 2015. Thailand and Vietnam have reported the largest increases, and together account for 85% of all planted forest in the GMS countries. Reported areas of Primary Forest have dropped in Cambodia, Lao PDR and Vietnam, but exhibited little to no change in Myanmar and Thailand since 1990 according to data published by FAO.

Myanmar has the greatest total remaining forest area but has also seen the greatest forest loss among the Mekong countries in recent years. All countries except Cambodia and Myanmar have reported increases in their forest area between 1990 and 2015. Most of the decrease has been in Other Naturally Regenerated Forests), with a much smaller portion of deforestation being reported in Primary Forests.

Table 1. Forest cover changes in the Greater Mekong Subregion countries[14]

Country	Forest area 2015 (ha)	Forest cover 2015	Annual change in forest area (%)			
			1990-2000	2000-2010	2010-2015	1990-2015
Cambodia	9,457,000	54%	-1.1%	-1.3%	-1.3%	-1.2%
Lao PDR	18,761,000	81%	-0.7%	0.8%	1.0%	0.2%
Myanmar	29,041,000	44%	-1.2%	-0.9%	-1.8%	-1.2%
Thailand	16,399,000	32%	2.0%	-0.5%	0.2%	0.6%
Vietnam	14,773,000	48%	2.3%	1.9%	0.9%	1.8%
GMS	88,431,000	47%	-2%	-2%	-2%	-0.2%

Other regional forest cover change assessments show different forest cover trajectories in Lao PDR and Vietnam. The assessment of satellite data provided by Global Forest Watch (GFW) and based on Hansen et al. (2013) show large losses of forest in both countries between 2001 and 2013 rather than the

[13] FAO, 2015. Global Forest Resources Assessment 2015: Desk Reference.
[14] *Id.*

increases between 2000 and 2015 shown by the FAO data (Figure 1). By contrast, forest loss in Myanmar is shown by GFW to be significantly less than reported by FAO. A recent report by the World Wildlife Fund (WWF) analyzing remote sensing data from 1973 to 2009 concluded that net deforestation was occurring in all five of the GMS countries from 2002 to 2009.[15] WWF also estimates that intact core forest areas declined from 70 percent of the total forest area in 1973 to only 20 percent of the total forest area in 2003.[16]

Another recent analysis of satellite imagery and ground measurements measured rates of forest loss for the GMS countries at 210,000 ha per year in the 1990s and 480,000 ha per year in the 2000s (corresponding FAO figures are 470,000 ha per year and 330,000 ha per year, respectively).[17] Areas exhibiting particularly high forest loss include the Annamite mountain range (of Lao PDR, Cambodia, and Vietnam), the border zones of Cambodia (with Thailand and Vietnam), northern Thailand, and northern Myanmar, while parts of Vietnam showed forest gain.[18] Figure 2 illustrates the magnitude of forest gain and loss in the region, showing that areas witnessing rapid deforestation from 1990-2000 have continued to experience deforestation from 2000-2010, often at a faster rate. The relatively few areas that have seen increases in the rates of forest gain since 1990 include southeast Thailand near the Cambodian border and southeastern coastal Vietnam.

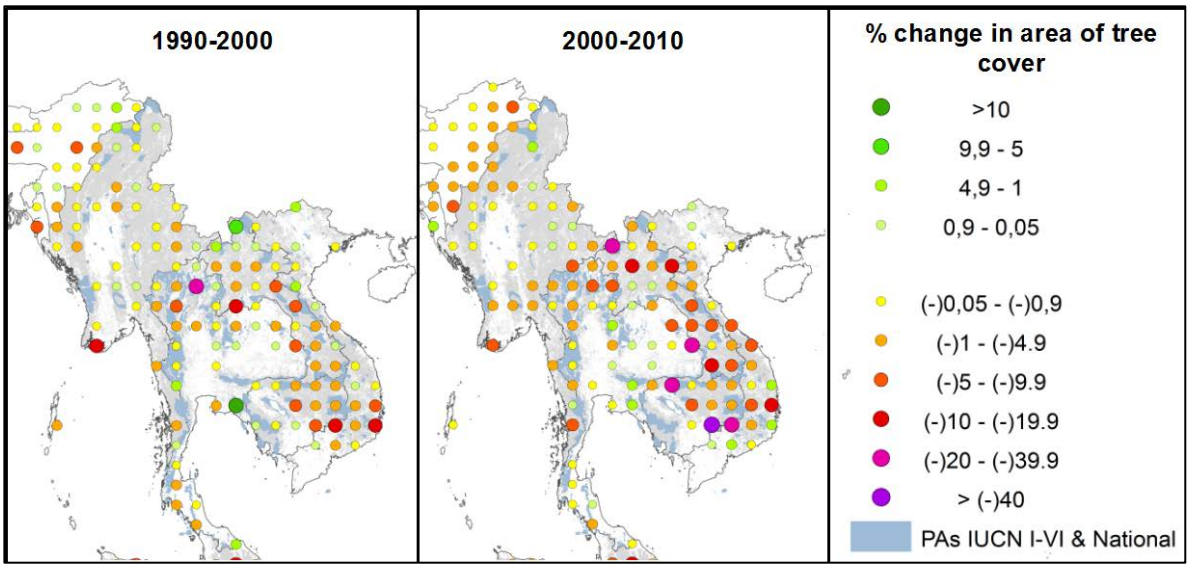

Figure 2. Gains and losses in forest cover since 1990[19]

2.2 Land cover status in selected countries

In parallel with the trend of decreasing forest cover in GMS countries, rapid increases in the total extent of agricultural land have been observed. Most forests lost have been converted to agricultural land, particularly cash crop plantations. However, FAO and World Bank data show only a modest increase in agricultural land areas from 1990 to 2011 (see Figure 4) suggesting that figures underestimate the true scale of forestland conversion. Principal crops driving forest loss include coffee (southern Lao PDR,

[15] WWF – Greater Mekong, 2013. Ecosystems in the Greater Mekong. Past trends, current status, possible futures. p. 24. URL: http://awsassets.panda.org/downloads/greater_mekong_ecosystems_report_020513.pdf
[16] *Id.*, at 20.
[17] Stibig, H.J. et al., 2014. "Change in Tropical Forest Cover of Southeast Asia from 1990 to 2010" *in* Biogeosciences 11(2). p. 247–258.
[18] *Id.*
[19] *Id.*

central highlands of Vietnam), tea (northern Thailand), sugar cane and rubber (northern Lao PDR), and oil palm (southern Myanmar).[20]

Stibig et al. (2014) provide spatial analysis of drivers of forest conversion in GMS countries from 1990-2010. As evident in Figure 3, shifting cultivation plays a large role as a change agent in the mountainous areas of northern Lao PDR and eastern Myanmar. Forest conversion in the subregion results from a diverse mix of factors, primarily including the expansion of annual crops and other agriculture, logging activities, and the establishment of tree plantations. Small areas of forest regrowth are seen in southern Vietnam.

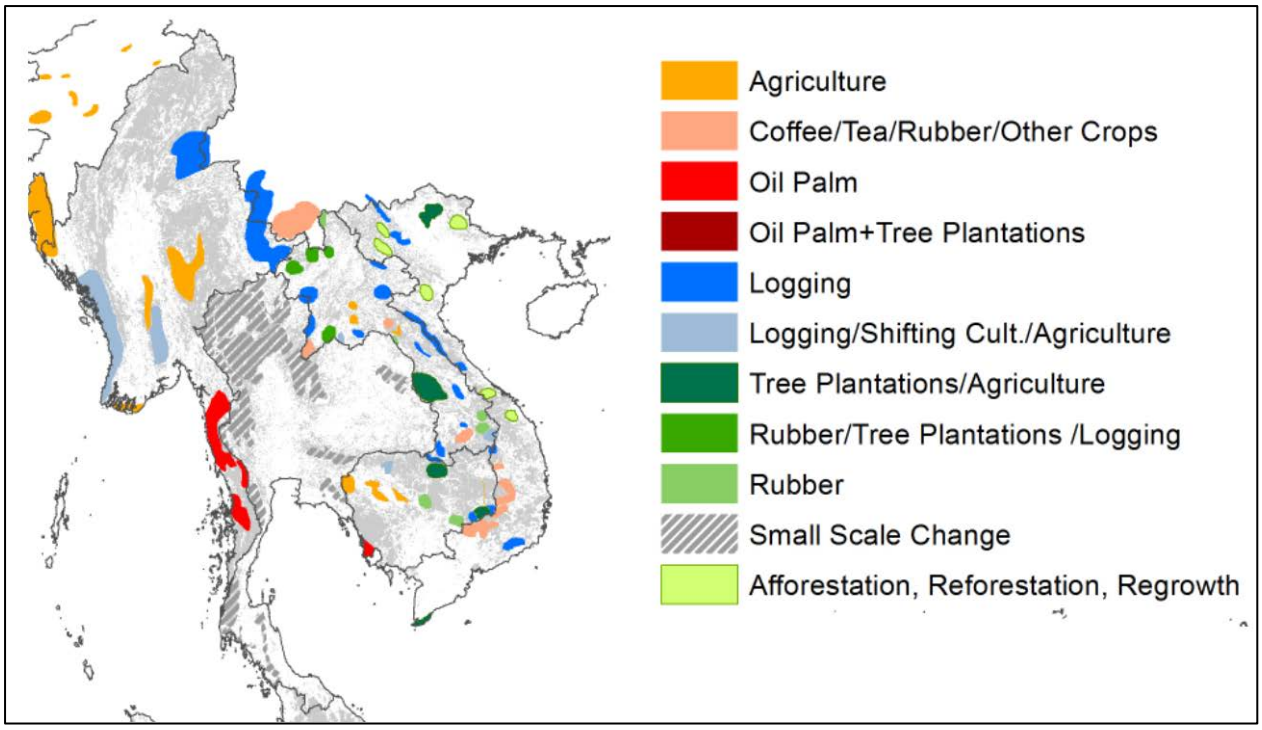

Figure 3. Main areas and causes of forest loss in GMS from 1990 to 2010[21]

3 Comparative overview of negative drivers of forest change

3.1 Direct drivers of deforestation and degradation in the region

A number of common drivers account for the majority of deforestation and forest degradation taking place,[22] although they differ across GMS countries. Principal drivers include agricultural expansion, infrastructure development, illegal and unsustainable logging, and, to a lesser extent, urban expansion and mining.[23] Sometimes these drivers overlap: for example, most of the timber obtained from the Mekong region is "conversion timber," or timber which was harvested from land cleared specifically for agriculture, mining, or infrastructure development. As global and regional demand for land and forest

[20] *Id.*
[21] *Id.*
[22] FAO defines deforestation as the "conversion of forest to other land use or the long-term reduction of the tree canopy cover below the minimum 10 percent threshold." By comparison, FAO defines forest degradation as the "The reduction of the capacity of a forest to provide goods and services." FAO, 2010. Global Forest Resources Assessment 2010. FAO Forestry Paper No. 163. p. 24. URL: http://www.fao.org/docrep/014/am665e/am665e00.pdf.
[23] Sodhi, N.S. et al., 2004. "Southeast Asian biodiversity: an impending disaster" *in* Trends in Ecology and Evolution. 19(12): 654-660.

products has increased, forest loss associated with these and other drivers has accelerated.[24] Table 2 below shows the main historical and on-going drivers of deforestation and forest degradation in GMS countries.

Table 2. Main Causes of Deforestation and Forest Degradation in Mekong Countries

COUNTRY	MAIN CAUSES
CAMBODIA	Conversion for commercial agriculture, mining, economic land concessions, social land concessions, settlement and farmland (legal and illegal), large scale infrastructure and hydropower development; road construction, legal and illegal logging, fuelwood harvesting, forest fire.[25]
LAO PDR	Illegal logging, conversion for agricultural expansion, tree plantations, hydropower, mining and other infrastructure development; unsustainable commercial timber extraction, shifting cultivation.[26]
MYANMAR	Logging for domestic consumption and export, conversion for commercial agriculture, tree plantations, shifting cultivation, infrastructure development; economic growth and increasing consumption.[27]
THAILAND	Illegal logging and forest clearance, government resettlement policies, expansion of commercial agricultural and forestry plantations, forest encroachment, shrimp farming, conversion for economic development and urban expansion, infrastructure, mining, forest fire.[28]
VIETNAM	Logging (legal and illegal), forestland conversion for infrastructure development (including hydropower), commercial plantations and annual crops by locals, forest fire.[29]

3.1.1 Agriculture & Plantation Estates

The expansion of commercial agriculture is considered the primary driver of deforestation in GMS countries.[30] Expansion in production of a few specific cash crops for export has led to the greater part conversion. Thailand serves as a stark example: the country lost 28% of its forestland between 1976 and 1989. Between 1961 and 1989, Thailand's agricultural land increased by 13.12 million ha, while its forest area fell by 13.6 million ha.[31] Agricultural expansion has been aided by government allocations of large concessions to foreign investors. Challenges in establishing plantations have exacerbated conversion of natural forest areas in Myanmar, as explained in Box 1 below.

[24] Lambrechts, C. (ed.) et al., 2009. Vital Forest Graphics. FAO, UNEP, UNFF. p. 69.
[25] Deluxe, C., 2015. Study on Drivers of Change Affecting Mekong Forests: Towards the Formulation of Action Plans for Great Mekong Sub-region Countries: Cambodia. USAID-LEAF and FAO, 2-8.
[26] Thomas, I., 2015. Study on Drivers of Change Affecting Mekong Forests: Towards the Formulation of Action Plans for Great Mekong Sub-region Countries: Cambodia. USAID-LEAF and FAO, 5-9.
[27] Than, M.M., 2015. Study on Drivers of Change Affecting Mekong Forests: Towards the Formulation of Action Plans for Great Mekong Sub-region Countries: Myanmar. USAID-LEAF and FAO, 11-15.
[28] Emmanoch, W. 2015. Study on Drivers of Change Affecting Mekong Forests: Towards the Formulation of Action Plans for Great Mekong Sub-region Countries: Thailand. USAID-LEAF and FAO, 5-7.
[29] Tuan, D.A., 2015. Study on Drivers of Change Affecting Mekong Forests: Towards the Formulation of Action Plans for Great Mekong Sub-region Countries: Vietnam. USAID-LEAF and FAO, 6-7.
[30] Stibig et al *supra* note 17.
[31] Cropper, M., Griffiths, C., & Mani, M., 1999. "Roads, Population Pressures, and Deforestation in Thailand, 1976-1989" *in* Land Economics, 75(1), 58–73.

Box 1: Forest plantation challenges in Myanmar[32]

The Myanmar Selection System was established during the British colonial period and facilitated management of forests on a sustained yield basis. Under the system, scientific management plans were drawn up periodically and approved by both the Forest Department and administrative authorities. Early satellite images in 1974 confirmed healthy forest plantations of 5-10 acres and maximum 50 acres, on 30-year rotations and with no negative impact on the natural environment. In 1974, a loan from ADB and the World Bank to the State Timber Corporation (now Myanmar Timber Enterprise) included a requirement that for every 100 acres of extracted forest, 10% should be replanted as plantation forest. In Myanmar, natural forests were in excellent conditions and high-yielding fuelwood producing forests were therefore clear-felled to establish the required plantations, which subsequently failed. Subsequently insufficient budgets became a major cause of forest plantation failure. Statistics for Dry Zone plantations shows the survival rate to be under 20%, and the overall success rate to be around 30%.Though plantations only account for about 1.4% of the total national land area, they are established only in Myanmar's Reserved Forest Area, which account for around 24% of the total land area. As such, 4% of the Forest Estate has been converted into plantations that have failed. The areas in question are often encroached or requested for conversion to other crops such as rubber.

Rubber plantation establishment has resulted in massive conversion of forestland in all Mekong countries, as described further in Box 2. A significant spike in rubber plantation establishment was observed in Lao PDR due to growing demand for rubber in China.[33] Although rubber plantations are concentrated in Thailand, recent increases in rubber prices and development of clonal material suitable for cooler climates have led to forest conversion in Vietnam, Lao PDR and Myanmar.[34] From 1990-2008, approximately 1.3 million hectares of forests worldwide were converted to rubber plantations; of these, 11% (140,000 ha) were in Thailand and 5% (65,000 ha) in Vietnam.[35]

[32] Than, M.M., 2015. Study on Drivers of Change Affecting Mekong Forests: Towards the Formulation of Action Plans for Great Mekong Sub-region Countries: Myanmar. USAID-LEAF and FAO, 21.
[33] Lao PDR R-PP, 2010. p. 32. URL http://www.forestcarbonpartnership.org/sites/forestcarbonpartnership.org/files/Documents/PDF/Oct2010/Lao_R-PP_Final_draft_revised_11_OCT_2010_Clean.pdf. *See also* Chokkalingam, U. 2010. Design Options for a Forest Carbon Legal Framework for Lao PDR: Drawing Lessons from Across the Globe". CLiPAD. p. 32. *See also* Leinenkugel, P. et al. 2014. A New Land Cover Map for the Mekong: Southeast Asia's Largest Transboundary River Basin *in* Pacific Geographies #41. p. 11.
[34] FAO, 2011, *supra* note 12. p. 96.
[35] Cuypers et al., 2013. The Impact of EU Consumption on Deforestation: Comprehensive Analysis of the Impact of EU Consumption on Deforestation. European Union. Final Report. p 51.

Box 2: Forests, erosion and flooding in the GMS

GMS landscapes are commonly characterized by steep hillsides and highly erodible soils, and the climate alternates between seasons of intense rainfall and periods of dryness. As such, GMS countries are at high risk from landslides, floods and droughts. Recent research has shown that, contrary to common misperceptions, forest cover neither prevents large-scale flooding nor increases downstream water yields. However, forests have been shown to reduce soil erosion, mitigate localized flooding, and improve downstream water quality.[36] Additionally tree cover (particularly deep rooted trees) can also reduce the risk of 'shallow landslides' by strengthening soil layers, but is less likely to prevent deep landslides resulting from long periods of heavy rainfall or earthquakes.[37]

Logging bans in Thailand and several other Southeast Asian countries were put into effect largely due to perceptions that deforestation was causing landslides, flooding and droughts. However, serious erosion can equally occur in large-scale monoculture plantations where leaf litter and vegetation are cleared (e.g., to reduce fire hazard), and from improper land-use practices.[38] Expansion in rubber plantations in Thailand, including significant illegal expansion in primary forest areas, has been linked to especially severe landslides in recent decades.[39] New rubber plantation expansion in mountainous areas across the entire GMS is forecast to quadruple by 2050, and is predicted to lead to "drier conditions at the local level plus surface erosion, loss of soil quality, sedimentation and disruption of streams, and risk of landslides."[40]

Other major cash crops that have been linked to forest conversion include: cashew nuts, coconut, and sugar cane (N. Laos); cacao and coffee (in S. Laos and central highlands of Vietnam); and tea (in N. Thailand).[41] In addition, oil palm expansion has contributed to deforestation in GMS countries (particularly in the southern areas of Thailand and Myanmar), although to a lesser degree than in Indonesia and Malaysia. In Thailand, from 1990-2008, approximately 110,000 ha of forests were cleared for oil palm plantations.[42]

From 1990 to 2008, approximately 4.3 million ha of forest worldwide were converted to rice paddy; one-third of this conversion (1.4 million ha) occurred in Myanmar.[43] In the Myanmar uplands and also in northern Lao PDR and Thailand shifting cultivation has contributed to secondary forest loss.[44] In coastal areas of Myanmar, Thailand, and Vietnam, shrimp farming is a major driver of mangrove forest destruction.[45]

Figure 4 below, based on FAO data from 2011, demonstrates the general increase in reported agricultural areas in Mekong countries in recent decades. Vietnam is the only Mekong country to have paralleled this trend with an increase in overall forest area resulting from large government-supported afforestation and reforestation programs; although against a background of continuing primary forest

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[36] Broadhead, J. Asia-Pacific Forestry Sector Outlook Study II, at 69.
[37] Id., at 68.
[38] CIFOR and FAO, 2005, Forests and floods: Drowning in fiction or thriving on facts?" RAP Publication 2005/03 Forest Perspectives 2, at 5. URL: http://www.cifor.org/publications/pdf_files/Books/BCIFOR0501.pdf
[39] *See, e.g.,* The Rubber Economist, 2011, "Too much rubber expansion may cause disaster in Thailand," (online news article) URL: http://www.therubbereconomist.com/The_Rubber_Economist/News/Entries/2011/7/19_Too_much_rubber_expansion_may_cause_disaster_in_Thailand.html
[40] Fox, J., et al. 2014, "Rubber plantations expand in mountainous Southeast Asia: What are the consequences for the environment?" Honolulu: East-West Center, Asia-Pacific Issues, No. 114. URL: http://www.eastwestcenter.org/system/tdf/private/api114.pdf?file=1&type=node&id=34563
[41] FAO, 2011. *supra* note 12. p. 95. Stibig et al. *Supra* note 12. p. 95
[42] Cuypers et al., *supra* note 35. p. 52.
[43] *Id.*
[44] FAO, 2011, *supra* note 12, p. 96
[45] *See, e.g.,* Ha, T. et al., 2012. "Mangrove Conservation or Shrimp Farmer's Livelihood? The Devolution of Forest Management and Benefit Sharing in the Mekong Delta,Vietnam" *in* Ocean & Coastal Management (69) 185-193.

loss. Most Mekong countries have expanded their total agricultural area, with Thailand showing the largest historical increases, and Vietnam showing rapid increases since the mid 1990s. Lao PDR and Cambodia have increased their agricultural areas at slower rates than the other Mekong countries.

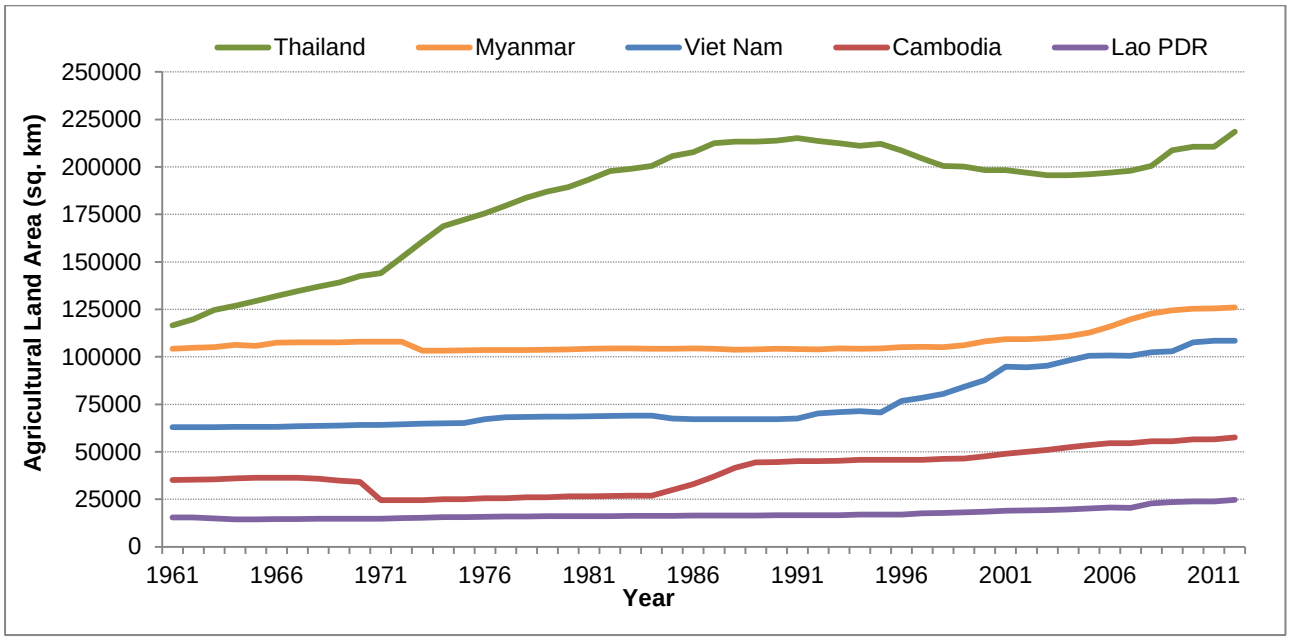

Figure 4: Growth in total agricultural land area, 1960-2011[46]

3.1.2 Infrastructure and Roads

Government promotion of roads and other infrastructure development has resulted in extensive forest loss in the GMS. Future population growth, expansion of road networks, and increased access to agricultural product export markets are all expected to contribute to ongoing forest loss.[47]

Roads act as a driver of deforestation in Thailand and northeastern Laos by opening up new areas to markets and increasing the profitability of deforestation-related activities.[48] However, in many Mekong regions with remote, steep or difficult-to-access areas, no direct correlations can be made between deforestation and distance between forests and roads.[49] Regional transboundary roads include the Phnom Penh-Ho Chi Minh City Highway and the East-West Economic Corridor (both made operational in 2006). These highways have helped connect the entire Mekong region but have come at the expense of major direct and indirect forest impacts throughout the GMS.[50]

In Cambodia, road development and past policies aimed at in-migration (in particular, offering secure land) have increased demand for land and resources. As immigrants arrive rapidly and often occupy land illegally, existing land-use plans are destabilized and land tenure conflicts become more prevalent.[51] Although migration rates have been falling since 2008, new road developments have opened up previously inaccessible forests, increasing deforestation and degradation in these areas. The situation

[46] FAO, 2011, *supra* note 12.
[47] Mekong River Commission for Sustainable Development, 2010. State of the Basin Report. p. 159.
[48] Rowcroft, P., 2008. "Frontiers of change: the Reasons Behind Land-use Change in the Mekong Basin" *in* Ambio 37(3):213-8**.** p. 214.
[49] *Id.* p. 215.
[50] Leinenkugel, P. et al., 2014, *supra* note 33. p. 11.
[51] Cambodia R-PP, 2011. URL: http://forestcarbonpartnership.org/sites/fcp/files/2013/July2013/RPP%202013.pdf.

is exacerbated by lack of state land registration and forest estate demarcation.[52] Protected areas adjacent to development zones are especially threatened by forest encroachment.[53]

3.1.3 Mineral and gas exploitation

New natural gas pipelines have disturbed forests in Myanmar in both the southern lowland rainforests and from western Myanmar to Yunnan province in China where new pipelines are being built to transport gas.[54] New pipelines planned or underway in Thailand and Vietnam may have similar impacts to those observed in Myanmar.[55] In Lao PDR, mining remains an important driver of deforestation, and is projected to lead to 14,100 hectares of deforestation per year from 2010-2010.[56]

3.1.4 Dams and Water Infrastructure

Although the Mekong river basin remains one of the most biologically diverse river systems in the world, the high degree of ecological connectivity between thirteen unique ecosystems on which this biodiversity depends is threatened by growing hydropower development in the region.[57] Mekong countries are currently highly dependent on energy imports. The goal of increasing energy self-sufficiency has led to the initiation of numerous hydropower projects in the region, with more than 100 dams on Mekong tributaries currently operating, under construction, or planned.[58] In particular, Lao PDR, which aims to become the "battery of Southeast Asia"[59], is constructing six large dams and planning at least twelve more.[60] Eleven dams are planned for the main stream of the Mekong River alone, passing through Lao PDR and Cambodia, which has raised major concerns about potential environmental and social impacts.[61] Myanmar has undertaken a major dam construction program since 1988 that has often overlooked proper social and environmental impact assessments.[62] The Government of Thailand's proposal for construction of a National Water Grid (first proposed in 2003 and several times since) would increase irrigated land around the country but could entail significant social and environmental impacts, likely including natural forest loss.[63]

In addition to indirect forest impacts from dams and water infrastructure on biological connectivity and ecosystem function, construction of new hydropower and water infrastructure causes a variety of direct negative impacts on forests and the environment. In GMS countries, dam areas often not cleared prior to inundation, resulting in vastly increased greenhouse gas emissions from decomposing carbon stocks in submerged forests and soils.[64] Additionally, forests are directly impacted by access roads to hydropower dams and water infrastructure projects, often followed at a later date by illegal logging or land sale for establishment of commercial timber or agriculture plantations. [65] Negative livelihood impacts on local populations from GMS hydropower installations further increase forest loss.[66]

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[52] *Id.*
[53] Chan, S. et al., 2001. Land Tenure in Cambodia: A Data Update. Working paper 19. Cambodia Development Resource Institute. p. 5.
[54] Thaung, T.L., 2008. Key trends in forest policies, legislation and institutional arrangements in Myanmar. Draft Country Report.. p. 6.
[55] *See* USAID, 2011. Land Tenure Thailand Profile. p. 13. USAID. 2013. Land Tenure Vietnam Profile. p. 25.
[56] Lestrelin, G., 2012. The Context of REDD+ in LAO PDR: drivers, agents and institutions. CIFOR Occasional Paper No. 92. p. 9.
[57] WWF – Mekong Region. *Supra* note 5. p. 36
[58] Leinenkugel et al., *supra* note 33. p. 11. *See also*, Jian, K., & Qi, G. 2013. "Only One Mekong: Developing Transboundary EIA Procedures of Mekong River Basin" *in* Pace Environmental Law Review 30(3), 950-1004.
[59]Ferrie, J., July 2, 2010. "Laos Turns to Hydropower to Be 'Asia's Battery'" *in* The Christian Science Monitor. URL: http://www.csmonitor.com/World/Asia-Pacific/2010/0702/Laos-turns-to-hydropower-to-be-Asia-s-battery.
[60] FAO, 2011, *supra* note 12. pp. 100-101.
[61] Roberts. D., September 3, 2014. "No More Dams on the Mekong" *in* The New York Times. URL: http://www.nytimes.com/2014/09/04/opinion/no-more-dams-on-the-mekong.html.
[62] Thaung, 2008, *supra* note 54. pp. 7-8.
[63] USAID, 2011, *supra* note 55. p. 13.
[64] Yang, H. and Flower, RJ. 2012. "Potentially Massive Greenhouse-gas Sources in Proposed Tropical Dams" *in* Frontiers in Ecology and the Environment 10 (5) 234 - 235.
[65] *See* Pereira, A., 2007. First the rivers, then the forests: a fragile balance. Oxfam America. URL: http://www.oxfamamerica.org/explore/stories/first-the-rivers-then-the-forests-a-fragile-balance/. *See also*, Pearse-Smith, et al., 2012. "The

3.1.5 Logging

Illegal and unsustainable logging is a major driver of forest degradation throughout the GMS. Though logging does not strictly lead to forest conversion in the region — as clear felling is not practiced — logging is often a first step along a path to deforestation. In large part, demand from China, Vietnam, and Thailand has driven illegal sourcing of wood from GMS countries.[67] Vietnam and Myanmar lead their GMS neighbors in illegal and unsustainable logging, driven by high demand for wood, with $700m and $600m in illegal wood product exports, respectively.[68] Unclear forest sector rules have enabled such practices to continue. Unsustainable and illegal logging are major contributors to forest degradation in Lao PDR (see Table 2).[69] Myanmar is well known for its Myanmar Selection System (MSS), a system for the sustainable management of teak forests based on an annual allowable cut, 30-year rotations, and minimum girth requirements.[70] However, disruptions in the forest management system due to political changes, overharvesting beyond the sustainable cut, as well as the increasing illegal timber trade along the Chinese and Thai borders, threaten to continue the long-term decline of Myanmar's teak forests.[71]

More than half of all timber produced in GMS countries is estimated to come from "conversion forests," or forests cleared for conversion to other land use, particularly commercial agriculture.[72] Though reliable data are not widely available, estimates of the percentage of timber from conversion forests range from 33% in Myanmar, to 73% in Lao PDR, though no reliable data are available for Vietnam and Cambodia. While logs from conversion areas are often legitimized owing to needs for development in rural areas, they can also provide a supply chain through which logs illegally harvested from other areas can pass.

The contribution of logging to deforestation, though indirect, is strongly linked to increasing transboundary trade between the GMS and neighboring countries. For example, while Thailand and Vietnam have reduced logging within their borders, demand from these two countries and others has resulted in displacement of logging to neighboring countries. Rapidly increasing regional and global demand for wood products continues to drive logging in Lao PDR, Myanmar, and Cambodia. China and India purchase approximately 80% of Myanmar's wood product exports, and contribute greatly to demand for wood in the GMS region.[73] Because supply and demand of timber and agricultural products cross boundaries, one country's apparent success in reducing deforestation may be offset by a corresponding increase in deforestation in a neighboring country, particularly if total demand remains high. Border areas can also provide unexpected pockets of forest protection however, as described in Box 3 below.

Impact of Continued Mekong Basin Hydropower Development on Local Livelihoods" *in* Consilience: The Journal of Sustainable Development Vol. 7, Issue 1 (2012), p. 73-86.

[66] Id., Pearse-Smith et al.

[67] *See generally*, Environmental Investigation Agency, 2014. Routes of Extinction: The Corruption and Violence Destroying Siamese Rosewood in the Mekong (documenting illegal Thai Rosewood trade from GMS forests into China via Vietnam). URL: http://eia-international.org/wp-content/uploads/Routes-of-Extinction-FINAL-lo-res.pdf

[68] UNODC, April 2013. Transnational Organized Crime in East Asia and the Pacific: A Threat Assessment. URL: http://www.unodc.org/documents/data-and-analysis/Studies/TOCTA_EAP_web.pdf. p. 96

[69] Lestrelin G., et al. 2013, *supra* note 56.

[70] Htun, K., 2009. Myanmar Forestry Outlook Study. Asia-Pacific Forestry Sector Outlook Study II. Working Paper No. APFSOS II/WP/2009/07. FAO.

[71] Woods, K. and Canby K., 2011. Baseline Study 4, Myanmar: Overview of Forest Law Enforcement, Governance and Trade. Forest Trends.

[72] Lawson, S., 2014. Consumer Goods and Deforestation: An Analysis of the Extent and Nature of Illegality in Forest Conversion for Agriculture and Timber Plantations. Forest Trends Report Series, Forest Trade and Finance.

[73] Woods, K., 2013. Timber Trade Flows and Actors in Myanmar: The Political Economy of Myanmar's Timber Trade. Forest Trends Report Series, Forest Trade and Finance.

Box 3: Unexpected forest protection in GMS border areas

As recent global research has found in border areas in many parts of the world, borders between GMS countries (and areas heavily bombed during previous wars) have accidentally provided some of the best forest conservation in the region.[1] For example, Lao PDR considers forest areas along its national borders as strategically important buffer zones for national security reasons.[1] Along the Lao-Vietnam border, all Lao forests are either in a national biodiversity conservation area or categorized as "Protection Forest."[1,1] Along the border area between Vietnam, Lao PDR and Cambodia (known as "the Lost World"), so much of the area's forests and biodiversity remain intact that an average of two new species have been discovered a day for the past 15 years.[1] Often, remaining shrapnel and leftover undetonated ordnance prevented harvesting of forests and their products. However, with GMS countries rapidly developing and responding to demand for timber and forest products, deforestation and forest degradation threaten these areas unless forest protection measures are sharply increased.

Fuelwood and charcoal are major sources of energy in GMS countries, and may contribute to forest degradation. Cambodia, Lao PDR, and Vietnam lead the GMS in natural forest loss, and studies estimate 70-90% of households rely on wood for cooking fuel.[74] Most fuel wood is collected at a small scale from trees outside of forests, which is not associated with deforestation. However, commercial collection of charcoal and fuelwood has significant impacts, particularly in mangrove forests.[75] However, total estimated fuelwood consumption in GMS countries has declined from 2000 to 2010 in response to increasing urbanization, rising incomes, increased availability of fuelwood alternatives, and decreasing rural population growth.[76]

Table 3. Available estimates of deforestation due to conversion to commercial agriculture and percentage of conversion timber by country[77]

COUNTRY	% OF 2000-2012 DEFORESTATION OCCURRING DUE TO CONVERSION FOR COMMERCIAL AGRICULTURE	% OF COMMERCIAL AGRICULTURAL CONVERSION THAT IS ILLEGAL	% OF TIMBER SOURCED FROM FOREST AREAS CONVERTED TO COMMERCIAL AGRICULTURE
CAMBODIA	40 – 80%	90%	NOT AVAILABLE
LAO PDR	73%	43.4 - 86.7%	55-75%[78]; 82% (ESTIMATE)[79]
MYANMAR	33%	43.4 - 86.7%	50% (BUT DATA INADEQUATE)
THAILAND	NOT AVAILABLE	NOT AVAILABLE	< 4%
VIETNAM	40-80%	43.4 - 86.7%	NO DATA AVAILABLE

3.1.6 Forest fires

Fire represents another significant driver of forest degradation and to a lesser extent deforestation in GMS countries.[80] Fire is a major driver of forest loss in Cambodia, Laos, and areas of other countries where dry Dipterocarp forests are extensive. Although low-intensity fires are a common tool for forest

[74] *See* Cambodia Climate Change Strategic Plan 2014 – 2023, 2013. URL: http://www.kh.undp.org/content/dam/cambodia/docs/EnvEnergy/CCCAProjects/Cambodia%20climate%20change%20strategic%20plan%202014-2023.pdf. p. 6. Mengersen, K., et al., 2011. "The effect of housing characteristics and occupant activities on the respiratory health of women and children in the Lao PDR" *in* Science of the Total Environment. 409 (8), 1378 - 1384. SNV, 2011. Survey on Cookstove Usage in Nothern Vietnam. URL: http://www.advancedcleancooking.org/uploads/2/4/8/5/24859908/2011_10_snv_ics_survey.pdf. p. 7
[75] Mekong River Commission, 2010, *supra* note 47. p. 163.
[76] *Id.*
[77] Lawson, S., *supra* note 72.
[78] *Id.* at 71.
[79] PROFOR, 2011. Improving Forest Governance in the Mekong Region, Vol. 1. Working Paper. p. 12.
[80] *Id.*

and agricultural management,[81] and are also used for hunting and mushroom and bamboo shoot cultivation, unmanaged fires often burn out of control and inflict extensive damage to forest areas.[82] Moreover, a feedback loop exists whereby forest fragmentation, decreasing forest density and forest drying are expected to compound the risk of catastrophic forest fire in coming years due to climate change-related cycles.[83]

3.2 Indirect drivers

Whereas direct drivers of deforestation and degradation concern human activities that directly alter forest cover and deplete carbon stocks, indirect drivers occur at multiple scales and concern the "complex interactions of social, economic, political, cultural and technological processes that affect [direct] drivers." Indirect drivers include processes such as changing markets, commodity prices, population growth, national policies and governance, and dynamics of subsistence and poverty.[84]

3.2.1 Population and demographics

3.2.1.1 Demographic Indicators

Although demographic indicators vary widely among the GMS countries, all still have a majority rural population. Thailand has the most urbanized population countries as well as the lowest percentage of forest cover, while Cambodia has the least urbanized population. Vietnam has the highest population density, which is more than double that of Thailand, the country with the second highest density. Lao PDR remains the most sparsely populated of the GMS countries, though still with a lower percentage of its people living in rural areas than Cambodia.[85]

Table 4. Population indicators for GMS countries[86]

COUNTRY	POPULATION (2012)	POPULATION DENSITY (PERSONS/SQ KM) (2012)	% RURAL POPULATION (2012)
CAMBODIA	14,864,646	84.2	79.9%
LAO PDR	6,645,827	28.8	64.6%
MYANMAR	52,797,319	80.8	67.5%
THAILAND	66,785,001	130.7	53.3%
VIETNAM	88,772,900	286.3	68.3%

3.2.1.2 Population and demographics as indirect drivers

High population growth and population density in the Mekong region are often cited as key drivers of forest loss.[87] Though this is partly true, recent trends in tropical countries have seen rural populations stabilize, while urban populations continue to grow more rapidly. Increasing affluence leads to dietary shifts towards animal-based foods requiring more land per calorie. Rapid increases in urban populations

[81] Broadhead, J., *supra* note 36, p. 49-50.
[82] Mekong River Commission, *supra* note 47. pp. 162-163.
[83] FAO, *supra* note 12. p. 21, 41.
[84] Kissinger, G., M. Herold, V., De Sy, V., 2012. Drivers of Deforestation and Forest Degradation: A Synthesis Report for REDD+ Policymakers. p. 5.
[85] World Bank, 2014. World DataBank. URL: http://databank.worldbank.org/data/home.aspx.
[86] *Id.*
[87] WWF – Mekong Area, *supra* note 5. p. 54

and shifting diets are the two strongest population-related factors underlying the demand for land that drives deforestation today.[88]

Population in the GMS is increasing quickly and expected to grow by 10 percent between 2010 and 2020 to reach 249 million.[89] However, population rates and demographic indicators differ widely among GMS countries, with population growth rates plateauing in Thailand, Myanmar and Vietnam, while continuing to rise in Cambodia and Lao PDR.[90] While total populations are rising in all GMS countries, rural populations are expected to fall from across the GMS in step with migration to urban areas with labor opportunities.[91] Additionally, rapidly growing Southeast Asian and global populations fuel a range of direct and indirect drivers such as infrastructure development, agricultural conversion, and demand for woodfuel and other non-timber forest products, such as fibers and fruits.

3.2.2 Economics

3.2.2.1 Sectoral profile of national economies[92]

Table 5 shows economic indicators for the GMS countries, including overall GDP, as well as the percentage of the economy in agriculture and forestry, forestry, industry, and services. By far, Thailand has the largest and most industrialized economy, followed by Vietnam, which has a similar sectoral distribution but an economy less than half the size of Thailand's. Cambodia and Myanmar remain the most heavily reliant on agriculture as a total percentage of their economy. The percentage contribution of the services sector to the economy averages around 40% across all GMS countries.

Table 5. Economic indicators for GMS countries[93]

COUNTRY	TOTAL GDP (2012) (USD MILLIONS)	% GDP (2012) AGRICULTURE (INCL FORESTRY)	% GDP FORESTRY (2011)	% GDP INDUSTRY (2012)	% GDP SERVICES (2012)
CAMBODIA	$14,054.4	35.6%	3.2%	24.3%	40.2%
LAO PDR	$9,386.9	28.0%	2.1%	36.2%	35.8%
MYANMAR	$59,430.0	38.0%	0.5%	20.3%	41.7%
THAILAND	$365,965.8	12.3%	0.9%	43.6%	44.2%
VIETNAM	$155,820.0	19.7%	1.7%	38.6%	41.7%

The changing international timber trade also plays a large role in the economies of the GMS countries and has continued to contribute to deforestation in the region. Lao PDR, Cambodia, and Myanmar were major sources of illegal timber in the 1990s and 2000s and this led to significant forest depletion in these countries. Thailand, Vietnam, and China have acted as major importers, consumers, processors, and re-exporters of Southeast Asian timber in recent decades. Thailand and Vietnam assumed this role particularly after most of their forests were degraded, lost or protected prior to or during the 1990s.[94]

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[88] Boucher, D. et al., 2011. The Root of the Problem: What's driving tropical deforestation today?. Union of Concerned Scientists. p. 11-17.
[89] FAO, *supra* note 12. p. 21, 41.
[89] WWF – Mekong Area, *supra* note 5. p. 2.
[90] USAID, 2013. USAID Mekong ARCC Climate Change Impact and Adaptation Study: Main Report. p. 13.
[91] Mekong River Commission, *supra* note 47. p. 4.
[92] World Bank, *supra* note 85; FAO, 2014. State of the World's Forests: Enhancing the Socioeconomic Benefits from Forests.
[93] World Bank, *id.*
[94] Felbab-Brown, V., 2011. Not As Easy as Falling off a Log: The Illegal Logging Trade in the Asia-Pacific Region and Possible Mitigation Strategies. Working Paper No. 5. Foreign Policy at the Brookings Institution. URL: http://www.brookings.edu/~/media/research/files/papers/2011/3/illegal%20logging%20felbabbrown/03_illegal_logging_felbabbrown.

3.2.2.2 Economics as indirect driver

GMS countries have witnessed overall increases in urbanization and foreign and domestic investment in rural areas, resulting in conversion of forest to other uses. Rising commodity prices lead to increased deforestation in the GMS region.[95] The increasingly open nature of the economies of the GMS region and transboundary trade in forest products also contributes to the overall deforestation trends. For example, after Myanmar liberalized its trade policy starting in the late 1980s, foreign investment in its timber sector resulted in widespread deforestation and forest degradation.[96] The value of Myanmar's total annual timber exports have quadrupled from 2000 to 2013, from USD 0.4 billion in 2000 to USD 1.6 billion in 2013.[97]

3.2.3 Governance

GMS countries have developed a broad mix of forest and land use programs and initiatives in attempting to stem forest loss and promote forest regeneration. Where sustainable land use sector policies and programs are already in place however, they are often not fully implemented and enforced. In addition, governance is weak in the region, with all GMS countries having low ratings with respect to control of corruption, the rule of law, and government effectiveness (see Table 6 and for key and definitions). Of the GMS countries, only Thailand and Vietnam have demonstrated relatively consistent middle tier governance scores (shown in yellow) since 1998, although with relatively little improvement in that time. Despite lower overall scores in the same time period, Cambodia improved in all three governance indicators, and Lao PDR and Myanmar improved in Rule of Law and Control of Corruption, respectively.

Table 6. General governance indicators for countries of the Asia-Pacific region[98]

	Governance Score (-2.5 to +2.5)								
	Control of corruption			Rule of law			Government effectiveness		
Country	**1998**	**2012**	**Trend**	**1998**	**2012**	**Trend**	**1998**	**2012**	**Trend**
Cambodia	-1.1	-1.0	+	-1.1	-1.0	+	-1.1	-0.8	+
Lao PDR	-0.4	-1.0	-	-0.9	-0.8	+	-0.6	-0.9	-
Myanmar	-1.2	-1.1	+	-1.4	-1.4	-/+	-1.2	-1.5	-
Thailand	0.0	-0.3	-	0.5	-0.2	-	0.1	0.2	+
Vietnam	-0.4	-0.6	-	-0.4	-0.5	-	-0.4	-0.3	+

Key:

>0.5	**-0.5 to 0.5**	**<-0.5**

[95] FAO, *supra* note 12. p. 92.
[96] Thaung, *supra* note 54, p. 7.
[97] Forest Trends, 2014. Unpublished data.
[98] World Bank Group. World Bank Governance Indicators.URL: http://data.worldbank.org/data-catalog/worldwide-governance-indicators. [Definitions: *Control of corruption* – capturing perceptions of extent to which public power is exercised for private gain, including both petty and grand forms of corruption, and 'capture' of state by elite and private interests. *Rule of law* – capturing perceptions of extent to which agents have confidence in and abide by rules of society, and in particular quality of contract enforcement, property rights, police and courts, and likelihood of crime and violence. *Government effectiveness* – capturing perceptions of quality of public services, quality of civil service and degree of its independence from political pressures, quality of policy formulation and implementation, and credibility of government commitment to policies.]

4 Comparative overview of positive drivers of forest change

Although the GMS region as a whole has witnessed a steady decline in forest cover, some areas and countries have demonstrated increases in forest cover, slowed rates of deforestation and forest degradation, and enhancement of carbon stocks. This section reviews these 'positive drivers,' which include a range of programs and initiatives, such as sustainable forest management, conservation, afforestation, and reforestation.

4.1 Positive trends in forest cover in the GMS region

In GMS countries, areas showing increases in forest cover from 1990 to 2010 include: northern and southeastern (coastal) Vietnam, eastern Thailand, and to a lesser extent, northern Myanmar (see Figure 2 and Figure 3). Most areas in the GMS region experiencing forest growth or regeneration have been due to the establishment of tree plantations that are low in biodiversity compared to natural forest.[99] Other contributing factors include timber market growth, application by sellers of environmentally conscious forest management standards and community forestry initiatives. Vietnam had its lowest level of forest cover around 1990, but growth rates increased from 1990 to 2010 as a result of reforestation and restoration activities.[100] Eastern Thailand has also demonstrated forest increases due to reforestation.[101] Cambodia and Lao PDR have shown recent localized increases in tree canopy cover due to the establishment of rubber and timber plantations, although these are found in areas that were recently covered by natural forests.[102]

4.2 Forest Transitions

Forest transitions occur when countries reverse their deforestation rates and experience reforestation and forest recovery. There are two primary pathways recognized: the 'economic development path,' and the 'forest scarcity path'. The 'economic development path occurs due to increasing employment in industries and services sectors that draws farmers away from rural areas. This transition leads to reduced agricultural activity in less productive areas, abandonment of fields, and natural forest regrowth, while agricultural production concentrates in the most productive areas. The 'forest scarcity path' occurs in areas with stable or growing populations and limited ability to import forest products, which increases the profitability of planting trees relative to crops or pasture.[103] Forest transitions also vary by scale and location. In some cases, localized forest regrowth has occurred in areas with greater affluence and high demand for forest products, while ongoing timber extraction has been observed in areas with weaker environmental policies.[104] In Vietnam, 39% of forest regrowth observed from 1987 to 2006 was effectively lost through displacement of deforestation to neighboring countries to supply logs—half of which were estimated to be illegal—to fuel Vietnam's rapidly growing wood processing industry.[105]

In Vietnam, from the 1950s through the 1980s, growing rural populations contributed to increasing swidden agriculture on sloped lands, which led to rapid losses in forest cover and agricultural productivity, and a food crisis.[106] Since then, the country has undergone a unique pattern of forest

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[99] Pham, T.T., 2012. The Context of REDD+ in Vietnam: drivers, agents and institutions. CIFOR Occasional Paper No. 75, p. 68..Royal Forest Department of Thailand, (n.d.) Forest Management in Thailand. URL: http://www.forest.go.th/foreign/images/stories/FOREST%20MANAGEMENT%20IN%20THAILAND.pdf. p. 7.
[100] Pham, T.T. *id.*, p 1. FAO, 2010. Global Forest Resources Assessment 2010. FAO Forestry Paper No. 163. p. 8, 21.
[101] FAO, *supra* note 12. *See also*, World Bank, *supra* note 85..
[102] Fox, J., and Vogler, J. B., 2005. Land-use and land-cover change in Montane Mainland Southeast Asia *in* Environmental Management, 36(3) 394-403.
[103] Rudel, T. K., et al, 2004. "Forest Transitions: Towards a Global Understanding of Land Use Change" *in* Global Environmental Change, 15, 23–31.
[104] Meyfroidt, P., Rudel, T. K., & Lambin, E. F., 2010. "Forest transitions, trade, and the global displacement of land use" *in* Proceedings of the National Academy of Sciences of the United States of America, 107: 20847–21230.
[105] Meyfroidt P., Lambin E.F., 2009. "Forest transition in Vietnam and displacement of deforestation abroad" *in* Proceedings of the National Academy of Sciences of the United States of America, 106:16139–16144.
[106] Meyfroidt, P., & Lambin, E. F., 2008. The causes of the reforestation in Vietnam *in* Land Use Policy, 25, 182–197.

transition, which was driven by a scarcity of environmental services, such as water and soil stabilization. Many policies and measures credited with Vietnam's growth in forest cover are tied to government responses to forest scarcity and land scarcity in the highlands. These policies have included forest and land allocation to households; liberalization of agricultural markets combined with technical support to farmers to increase yields; and aggressive promotion of tree planting for wood products, all while rural population densities have remained high. By increasing smallholder market integration, intensification, and levels of wood production, while prohibiting swidden on sloped lands, Vietnam succeeded in making lowland, intensive crop cultivation more economically viable than swidden agriculture, leading to forest regrowth. [107] Vietnam's path differs remarkably from the traditional 'economic development' model of forest transition seen in the Europe and the United States driven by reduced dependence on agriculture other direct land use activities, in parallel with increasing urbanization and industrialization.

Other GMS countries have not yet reached a forest transition, although similar efforts are leading to some forest cover increases. In Lao PDR, concerns about the perceived negative effects of swidden agriculture on forest cover, and a desire to reduce rural poverty have led to a mix of land zoning, village resettlement, and land allocation policies to set boundaries between forest and agricultural land, encourage intensification and increase economic value of lands.[108] In many cases this has changed mixed swidden landscapes into more cleanly-delineated single-use landscapes, though with differing effects on resilience and ecosystem services. In Lao PDR, land use planning was not accompanied with sufficient financial and technical support to intensify smallholder agricultural production, leading to decreased fallow periods and decreased yields that negatively affected livelihoods. While increases in forest cover were evident in newly designated and restricted protected areas, the mosaic of secondary farms and forests outside of protected areas showed rapid degradation as a result of this policy.[109]

A forest transition based on economic development also appears to be occurring in Thailand. As agricultural expansion has stopped, relatively unproductive agricultural areas are being abandoned, additional tree plantations are being established, and the country's population is urbanizing.[110] In Myanmar and Cambodia, there does not yet appear to be evidence of a forest transition taking place, and even local increases in forest cover are minimal.

An overall pattern observed in several GMS countries has seen states attempt to restrict swidden agriculture, encourage agricultural intensification, divide and classify the landscape between forest and permanent agricultural areas, resettle rural peoples, and expand markets, roads, and services to rural areas to shift people from swidden to more settled lifestyles.[111] Where restrictions have been supported with significant technical and material support for intensification, as well as secure land-use rights, policies have been successful in increasing forest cover, as in Vietnam, and potentially in Thailand in recent years. Where such policies have not been accompanied by sufficient support and tenure security, or where they have failed to account and permit sufficient diversity of livelihood strategies dependent on forests (such as harvesting of wood and non-timber forest products) restrictions have often led to shortened fallow periods and increased land degradation.

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[107] *Id.*
[108] Castella, J. C., et al, 2013. Effects of Landscape Segregation on Livelihood Vulnerability: Moving From Extensive Shifting Cultivation to Rotational Agriculture and Natural Forests in Northern Laos *in* Human Ecology, 41(1) 63–76.
[109] *Id.*
[110] Leblond, J.P., 2011. Vers une Transition Forestière en Thaïlande? Analyse Causale de L'avancée des Forêts à Partir du Cas de Phetchabun. [Towards a forest transition in Thailand? A causal analysis of forest expansion based on the case of Phetchabun]. Unpublished PhD Thesis. Université de Montréal, Montréal.
[111] Fox, J., et al., 2009. Policies, Political-economy, and Swidden in Southeast Asia *in* Human Ecology, 37(3): 305–322.

4.3 Direct positive drivers

4.3.1 Demand for timber and wood products

Demand for timber and wood products from forests (generally from tree plantations) constitutes a longstanding driver for planting of new forests. The largest areas of forest plantations in GMS region are located in Vietnam and Thailand, with some additional growth in planted forest area in Myanmar.

In Vietnam, small rural households own and operate most tree plantations, following the central government's forestland allocation programs and loans received from the World Bank under the Forest Sector Development Project from 2006-2015.[112] Private sector actors in lowland and coastal areas run additional high productivity tree plantations for pulp production. Between 1993 and 2010, several afforestation and natural regeneration programs and projects contributed to the expansion of 18,156 ha and 3,704 ha of forest cover, respectively.[113] Thailand is the world's largest producer of rubber wood. The country's rubber wood market was restructured in the 1900s after a 1989 ban on logging of natural forest.[114] As a consequence, the pressure on Thailand's primary forest has decreased as more sustainable wood supplies have become available. Factors influencing the development of forest plantations in Vietnam and Thailand include market growth, infrastructure and economic development, increased interaction between farmers and markets, privatization of forestland, globalization, and increased agricultural efficiency.[115]

However, maintaining a tree plantation through to harvest requires large investments, especially since the productivity of plantations established in the Asia-Pacific region to date has been poor.[116] Plantation production is more expensive than native forest exploitation or extraction of timber during transformation of land for agriculture, which economically tends to favor the ongoing logging of native forests.[117] Additionally, tree plantations do not provide a replacement for natural forests. Tree plantations do not have the same value in terms of biodiversity and services provided as primary forests, and plantation species often have a much lower timber value than native forest species. Accordingly, it is necessary to include tree plantations within a more comprehensive system of sustainable landscape management, along with management of natural forests, agricultural land, infrastructure and settlements.[118]

4.3.2 Participatory forestry and local forest management

Development of participatory forestry and local forest management[119] initiatives in the GMS countries has helped decrease deforestation and forest degradation. Villages that manage their own forest have demonstrated greater empowerment to administer their resources, identify forest values and benefits, and redirect development decisions in a way that preserves forest resources in the long-term. However, the success of participatory forest projects is frequently related with country policies on land tenure rights, the amount of power villages have to decide how to manage the forest, and the inclusiveness of marginalized groups, among others.[120]

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[112] Sikor, T. 2012. Tree plantations, politics of possession and the absence of land grabs in Vietnam *in* The Journal of Peasant Studies, 39(3/4): 1077-1101.
[113] Forest Resources and Environmental Center, and Forest Inventory Planning Institute, 2011. Establishment of Forest Status Map in 2011 and Analysis of Forest Changes During the Period 2005 – 2011 in Di Linh and Lam Ha District of Lam Dong Province. p. 29,30.
[114] EU FLEGT Facility, 2011. Baseline Study 5, Thailand: Overview of Forest Law Enforcement, Governance and Trade. p. 10.
[115] Sikor T., 2001. The Allocation of Forest Land in Vietnam - Did it cause expansion of forests in the North-West? *in* Forest Policy and Economics, 2(1): 1-11.
[116] Felbab-Brown, *supra* note 94.
[117] *Id.*
[118] WWF - Great Mekong, *supra* note 5. p. 17
[119] Participatory forestry and local forest management are used interchangeably in this report, and both essentially mean that locals who directly benefit from forests play a key role in their management, with notable variation from country to country on how this is implemented.
[120] RECOFT, 2013. Community Forestry in Asia and the Pacific: Pathway to Inclusive Development.

An example of a successful case of participatory forestry is found in Cambodia, where 13 Management Committees, covering 58 local villages, developed the 60,000-hectare Oddar Meanchey Community Forestry REDD Project.[121] Community Forestry International provides guidance to the villages, while other actors provide technological and financial support.[122] This project was approved by the Forest Administration of the Cambodia government on 2007, and it is expected to sequester 8.7 million tons of CO_2 over 30 years. This project has been certified under the VCS with a triple gold CCB accreditation for emission reductions.[123]

Other examples of local forest management projects within the Mekong region are located in Laos and in Vietnam. While some areas have developed local forest management programs, participatory forest management has not matured in Thailand as an approach to sustainable use of forest resources.[124] In Myanmar, areas placed under local forest management have increased their forest cover by 42,147 ha over a fifteen-year period.[125] However, the extent of participatory forest management still is relatively limited in the region, while state-level forest management remains more influential.

Cambodia also presents an example of how a successful community-based ecotourism (CBE) initiative can foster forest recovery and ecosystem protection while increasing community welfare. The Chi Phat project in the Cardamom Mountains of Cambodia started in 2007, with the idea that ecotourism was an opportunity to preserve vulnerable ecosystems and improve community livelihoods. With the collaboration of Wildlife Alliance, villagers of the Chi Phat community have participated in conservation activities, helping reverse several years of forest depletion and illegal activities. The Chi Phat community dedicates its efforts to increasing commercial opportunities coming from tourism, such as guided tours, homestays, restaurants, and local transportation.[126]

4.3.3 Public awareness campaigns

Strong public opinion on forest policy and governance issues built after an effective awareness or informational campaign could influence policies, private initiatives, and changes in the population perspective.[127] In the case of Myanmar, the government established a set of regulations and policies against illegal exports of timber to China after a broad public awareness campaign resulted from the report "A Choice for China" in October 2005.[128] These governmental measures, influenced by the global economic crisis, caused a decline in the illegal timber trade on the Burma-China border by more than 70% by 2008-09 compared to the logging rate from 2004 to 2005.[129]

4.3.4 Demand for "green" products

Large-scale plantations are a major cause of deforestation in Southeast Asia, with forest removed to supply commodities such as palm oil, rubber, coconut, and timber to global markets.[130] As the main investor in such plantations, the private sector has been the key agent driving deforestation in the region, particularly large international companies that control a significant share of primary production and distribution markets. Some major palm oil producers and traders (e.g. Wilmar International, Golden

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[121] Forest Carbon Portal. Oddar Meanchey REDD Project, Cambodia. URL: http://www.forestcarbonportal.com/project/oddar-meanchey-forest-carbon-project. The numbers of Management Commitees and villages from the previous sources have been corrected based on this publication.
[122] Poffenberger, M., 2009. Cambodia's Forests and Climate Change: Mitigating drivers of deforestation. Natural Resources Forum, 33: 285–296.
[123] Code REDD, 2013. Cambodia Verifies the World's First VCS Triple Gold CCB Avoided Deforestation Project. URL: http://www.coderedd.org/news/cambodia-verifies-the-worlds-first-vcs-triple-gold-ccb-avoided-deforestation-project/.
[124] USAID, *supra* note 55.
[125] Kyaw, T., Springate-Baginski, O., and Ko Ko Gyi, M., 2011. Community Forestry in Myanmar: Progress and Potentials. URL: http://www.burmalibrary.org/docs13/Community+Forestry+in+Myanmar-op75-red.pdf.
[126] Wildlife Alliance, 2014. Community Based Ecotourism *in* Wildlife Alliance's web site. URL: http://bit.ly/17qChRA
[127] Thaung, *supra* note 54, p.p. 4-5, 8
[128] Global Witness, 2009. A Disharmonious Trade: China and the Continued Destruction of Burma's Northern Frontier Forests, p. 25.
[129] Id.
[130] Boucher D., et al, *supra* note 88. p. 25.

Agri-Resources and Cargill), and consumer goods companies (including Hershey's, Unilever and Mars) have adopted zero deforestation policies and/or sustainability standards.[131] Such standards may include environmental criteria associated with protection of high conservation value and/or high carbon stock areas. Consumer goods groups may enter into agreements with local producers in efforts to change practices in a way that reduces forest pressure while incentivizing sustainable management.[132]

However, not all investors have made such commitments to sustainability. For example, out of fifty-seven agricultural and forestry investments in Laos, one investor was certified by a voluntary sustainability standard[133] and just five investors made clear public commitments to environmental sustainability (two with explicit emission reduction goals).[134] Vietnam Rubber Group, the Laos investor certified by the Forest Stewardship Council sustainability standard, is currently under dispute for clearing forests with high conservation value in Laos and Cambodia.[135]

One issue with reliance on private sector initiatives to increase supply chain sustainability in Southeast Asia is the lack of certifications or standards for one of the most dominating crops in the region—rubber (see Figure 5). In recent years, a surge in demand for rubber from countries such as China (see Figure 5) has led to expanded production outside traditional producers (e.g., Thailand and Malaysia) and into new areas such as Cambodia, Myanmar, Vietnam and Laos. The International Rubber Study Group, composed of governments, producer groups and consumers, launched a Sustainable Natural Rubber Initiative (SNR-i) in May 2014 as a voluntary standard to ensure sustainability and transparency in rubber supply chains.[136] As of January 2015 the SNR-i is in its pilot phase.[137]

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[131] UN Climate Summit, 2014. New York Declaration on Forests. Action Statements and Action Plans. Provisional Copy. URL: http://www.un.org/climatechange/summit/wp-content/uploads/sites/2/2014/09/FORESTS-New-York-Declaration-on-Forests.pdf.
[132] Lawson, S. *supra* note 72.
[133] *See* Forest Stewardship Council International, 2014. Global Witness Complaint against the Vietnam Rubber Group (VRG) *in* Forest Stewardship Council International's web site. URL: https://ic.fsc.org/Vietnam-rubber-group-vrg.766.htm.
[134] ZTE corporation web site: http://wwwen.zte.com.cn/en/about/corporate_citizenship/environment/200904/t20090420_353147.html. RTL Group - Backstage's web site: https://backstage.rtlgroup.com/public/EnvironMIND/en/environmind.aspx. *See also* RTL World Trade Company website: http://www.rtlgroup.com/www/htm/environment.aspx. Olam International Ltd's website: http://olamgroup.com/sustainability/aspirations-2014/climate-change-aspirations/. Oji Paper Co. Ltd.'s web site: http://www.ojiholdings.co.jp/english/sustainability/charter/guidelines.html. Honda's web site: http://world.honda.com/conductguideline/.
[135] Forest Stewardship Council International, *supra* note 133.
[136] International Rubber Study Group, 2014. Sustainable Natural Rubber Initiative: Started *in* International Rubber Study Group's web site. URL: http://www.rubberstudy.com/news-article.aspx?id=5068&b=news-archive.aspx
[137] International Rubber Study Group, 2014. Sustainable Natural Rubber Initiative: Pilot Phase and Web-site Launch *in* International Rubber Study Group's web site. URL: http://www.rubberstudy.com/news-article.aspx?id=5080&b=earlier-news.aspx

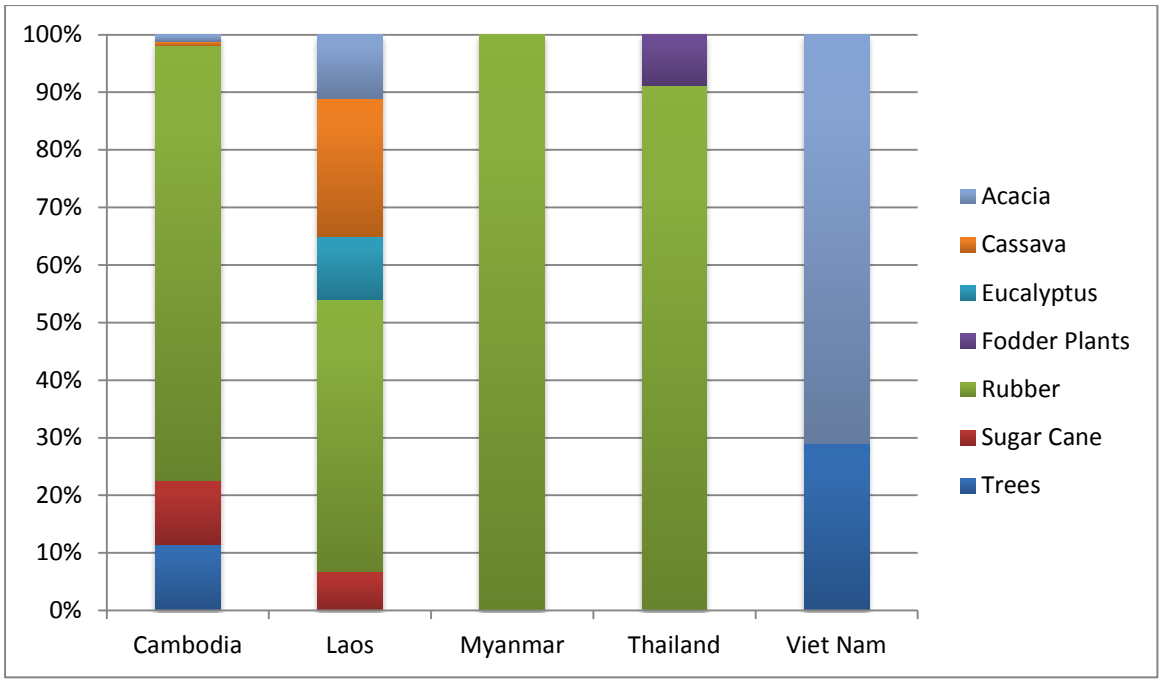

Figure 5. Investments by Main Crop Types (hectares)[138]

The effectiveness of such standards or private policies on forest protection and improvement has not yet been assessed empirically. Nonetheless, company commitments have the potential to improve not only productivity but also social and environmental indicators that advance positive actions in relation to the forests and ecosystems within the plantation area.

4.3.5 Market Demand for Verified Legal Timber

The biggest verified legal timber market was formed initially after Canada, France, Germany, Italy, Japan, UK, United States, and the European Union (G-8 countries) adopted in 1998 an Action Program on Forests to combat illegal logging and associated trade. This Action Program led to subsequent adoption of Regional Forest Law Enforcement and Governance (FLEG) ministerial processes in several regions (including East Asia-Pacific in 2001), which aimed to obtain commitment from both producer and consumer governments to combat illegal logging and associated trade.[139]

The first East Asia-Pacific Ministerial Conference on FLEG resulted in the adoption of the Bali Declaration, where participating countries committed themselves to "intensify national efforts and strengthen bilateral, regional and multilateral collaboration to address forest crime and violations of forest law."[140] In the case of ASEAN country members of the East Asia-Pacific Conference, a FLEG Working Group and a FLEG Work Plan 2008-2015 have been put in place, which provides the basis for deepening cooperation and implementing joint actions, as well as identifying potential partners for collaboration in strengthening FLEG in ASEAN.[141]

Within this context, private companies have started to switch to more responsible production forestry practices, while at the same time buyers have started to implement traceability schemes. In fact, the

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[138] Land Matrix, 2015. The Online Public Database on Land Deals *in* Land Matrix' web site. URL: http://www.landmatrix.org/en/get-the-detail/by-target-country/.
[139] PROFOR, 2011. Improving Forest Governance in the Mekong Region, Vol. 1. Working Paper, p. 5.
[140] The World Bank, August 31, 2013. Regional Forests Law Enforcement and Governance, Brief *in* The World Bank's website. URL: http://www.worldbank.org/en/topic/forests/brief/fleg-regional-forest-law-enforcement-governance.
[141] ASEAN Forest, 2015. ASEAN Regional Knowledge Network on Forest Law Enforcement and Governance (FLEG) *in* ASEAN Forest's web site. URL: http://www.aseanforest-chm.org/asean-regional-knowledge-network-on-forest-law-enforcement-and-governance-fleg/.

FLEG process has led to a growth in sustainable forest management initiatives in GMS countries, especially because G8 countries are the destination for more than 80% of Vietnam's exports and nearly 50% of Thailand's exports of furniture and other wood products.[142] The regional significance of these exports and the FLEG process is underscored by the fact that Lao PDR, Myanmar, and Cambodia export most of their wood products (almost exclusively raw wood materials) to Vietnam and Thailand, who in turn transform them into products exported to G8 countries.

4.4 Indirect positive drivers

4.4.1 Cultural and technological developments in favor of forest protection

Cultural changes are also helping to facilitate changes in forestry and rural development.[143] There has been increasing integration between communities, mass organizations, environmental NGOs, governments, and the private sector.[144] In recent years, global increases in environmental awareness have helped stimulate demand for forest governance reform in the GMS, which has been strengthened by growing civil society efforts in many countries.[145] There are a wide range of developments likely to affect the direction of progress, taking into account sustainability and forest protection.[146] For example, technology could have indirect impacts. In recent years, growing numbers of people have gained access to mobile phones, which can be used to report illegal activities.[147] Cellphones may even be programmed to report chainsaw sounds in uninhabited forest areas, powered only by specially configured solar panels.[148] Satellites increasingly are being used to monitor logging (e.g., the Global Forest Watch of World Resources Institute).[149] All of these factors are indirectly driving forest conservation, rehabilitation and reforestation, although to measure their impacts is challenging.

Box 4: Advanced spatial mapping for multiple benefits[150]

Many GMS countries are affected by a variety of natural and human-made factors that require better understanding of their spatial location and associated vectors. Rather than burdening forest sector budgets with the high costs of satellite and LIDAR mapping of deforestation and forest degradation, countries may be able to pool resources from public budgets for health, military, and other sectors to undertake multipurpose mapping. In so doing, GMS countries could collectively map threats from vector-borne diseases (e.g., malaria), national defence and public safety threats (e.g., unexploded ordnance) with spatially-accurate forest change maps indicating where known threats exist and where people are moving into forest areas. Making such maps available to the public should further assist such programs and increase stakeholders' perceptions of legitimacy.

4.4.2 Growing opportunities for SFM

Multiple types of programs and initiatives are supportive of SFM. These include plantation development, forest certification, protected area establishment and management, and trade measures for sustainable forestry.[151] As we have seen in this section there is a broad array of examples in the GMS

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[142] PROFOR, *supra* note 139**Error! Bookmark not defined.**. p. 6.
[143] FAO, *supra* note 12. p. 81.
[144] *Id.*
[145] *Id.*
[146] *Id.*
[147] IJNet, 2013, "Why Indonesia's Farmers Are Using Cell Phones to Report the News" URL: http://www.icfj.org/news/why-indonesia's-farmers-are-using-cell-phones-report-news.
[148] *See* Ackerman, E.. 2015, "Topher White: Repurposing Cellphones to Defend the Rain Forest," (online article) URL: http://spectrum.ieee.org/geek-life/profiles/topher-white-repurposing-cellphones-to-defend-the-rain-forest.
[149]
[150] See, Thomas, I. *supra* note , at 3, 6, 26-27
[151] Scheyvens, H. 2005. "Sustainable forest management in Asia: Trends and prospects" *in* Sustainable Asia 2005 and Beyond. Institute for Global Environmental Strategies. URL: http://pub.iges.or.jp/modules/envirolib/upload/267/attach/FC-05-013.pdf.

countries of SFM initiatives, basically due to the increasing willingness of governments and of civil society to alter practices in consideration of long-term forest exploitation.[152] Although there hasn't been a progression on the sustainably managed forest area in Asia between years 2005 – 2010,[153] there are current measures in each of the GMS countries to drive a positive result in the coming years.

As attention shifts to rebuilding real assets, creating employment, and pursuing green development, forestry could become a core area for economic renewal investments.[154] In the long term it is likely that forest management for production will only remain economically viable where institutional arrangements are conducive to SFM.[155] Without implementation of improved management, high-paying markets may become unavailable and, perhaps more importantly, the productive functions of forest are unlikely to be maintained.[156]

4.4.3 International and foreign government programs

In recent years, a number of international and foreign government programs have grown, which may lead to some reduction in demand for forest products from GMS countries.

Since initial pledges were announced by developed countries in Copenhagen during the UNFCCC COP-15 of late 2009, climate finance has grown modestly in the form of programs for REDD+, climate adaptation, and other related initiatives. Existing multilateral financial institutions such as the World Bank Group and the Global Environmental Facility (GEF), together with new climate finance institutions such as the Green Climate Fund (GCF), complement a variety of bilateral donors funding climate change and forestry projects and initiatives. Many of these programs aim to address drivers of deforestation and forest degradation, and promote positive drivers of sustainable forest management, enhancement of forest carbon stocks and forest conservation. REDD+ programs in particular are discussed in greater detail within the context of GMS country programs in section 5.2 below.

Additionally, import controls on illegal forest products have been strengthened or instituted, limiting illegal wood and wildlife product trade – significant examples include the 2008 Amendments to the Lacey Act in the U.S. and the 2013 implementation of the 2013 EU Timber Regulation under the Forest, Law Enforcement, Governance and Trade (FLEGT) Action Plan. The Lacey Act 2008 Amendments aimed at banning illegally harvested wood imports to the US,[157] and according to 2014 research has already shown evidence of success.[158] Recent research demonstrates that the EU Timber Regulation has had positive impacts of raising awareness of illegal logging, documentation of wood exports' legality and the creation by EU timber importers of due diligence systems.[159] Similarly, Australia's 2012 Illegal Logging Prohibition Action aims to block imports of illegal timber by requiring proof of due diligence and legal harvesting under the laws of both Australia and the country of export.[160] Additionally, New Zealand and Japan each have passed policies in recent years to promote voluntary purchase of legal timber.[161]

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[152] *Id.*
[153] Blaser, J., et al., 2011. Status of Tropical Forest Management 2011. ITTO Technical Series No 38. p. 31.
[154] *Id.*
[155] *Id.*
[156] *Id.*

[157] Lacey Act amendments in the Food, Conservation, and Energy Act of 2008 (P.L. 110–234, 122 Stat. 923).
[158] Peterson, J. "The impacts of the Lacey Act Amendment of 2008 on U.S. hardwood lumber and hardwood plywood imports," Forest Policy and Economics 50 (2015) 31–44. URL: http://www.srs.fs.usda.gov/pubs/ja/2014/ja_2014_prestemon_002.pdf? (showing evidence that the 2008 Lacey Act Amendment reduced the supply of illegally harvested wood from South America and Asia available for export to the United States.).
[159] Pepke, E. et al. 2013. "European Union Timber Regulation Impacts Global Hardwood Markets," International Scientific Conference on Hardwood Processing (ISCHP 2013), at 28-41. URL: http://www.ischp2013.org/fileadmin/user_upload/keynotes/ISCHP13_Proceedings.pdf
[160] Id., at 30-31.
[161] Id., at 31.

5 Programs and initiatives affecting forests

GMS countries have made important advances in sustainable forestry and land-use policies and measures in recent decades. This section provides an overview of both existing and newly developed programs and initiatives targeting forests that have been implemented within GMS countries. As defined here, such programs and initiatives are typically led and implemented by governments, although the roles and actions taken by other actors, such as civil society or the private sector, are also assessed. This section is divided into an overview of the most important programs and initiatives (see Tables in Section 0) and analysis of their design and implementation. As with the previous section on drivers, the programs and initiatives covered here include both those reducing negative drivers of deforestation and forest degradation, and those promoting positive drivers of sustainable forest management, forest conservation, afforestation and reforestation.

5.1 Forest and Land management

5.1.1 State Forest Management

Unclear institutional roles and responsibilities have contributed to significant forest loss in GMS countries, several of which have attempted to improve state forest management in recent decades (see Table 7). Chiefly, several GMS countries, notably including Cambodia and Vietnam, have revised forestry laws to categorize and clarify ownership of various forest types.[162] In various instances GMS countries have developed scattered and unclear or inconsistent legislation that results in overlapping or competing mandates, as exemplified in Box 6 below. In turn, this leads to conflicts and confusion between institutions and authorities, misinterpretation, inefficient administration and weak enforcement.

Box 5: Forest legislation challenges in Thailand and Vietnam

In Thailand, each piece of forest legislation has its own objective, and the same term (e.g., "forest") may have different meanings and usage.[163] Moreover, within the same legislation, the main purpose is stated generally but with exceptions defined for numerous conditions, leading to an accumulation of problems. This is addressed in day-to-day operations through decisions made by the Council of Ministers and through establishment of specific organs such as "National Boards" or "National Committees" under different laws but with overlapping missions. As a result, different "Boards" consistently make *ad hoc* decisions, essentially negating the original purpose of the laws.[164]

In Vietnam, though the country has a detailed forest classification system, clarity and consistency are nonetheless lacking (especially with regard to "degraded" forest suitable for conversion, which can apply to most natural forest in some areas), and physical demarcation is often inadequate.[165] State programs have increased national forest cover greatly since 1998, but forest degradation has continued or worsened throughout Vietnam.[166] The Government of Vietnam has made efforts in recent years to improve the legal framework for logging, but it is still possible for loggers to exploit loopholes and ambiguities in the system with little risk of legal repercussions.[167]

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[162] In Vietnam, the 2004 Law on Forest Protection and Development categorizes forestland under three categories (special-use, protection and production) and regulates usage of each.
[163] Under the Forest Act, "forest" means land that is not acquired by any person under the Land Code. Under the National Reserves Forest Act, "forest" means land including mountain, rivulet, marsh, canal, swamp, waterway, lagoon, island and seashore that nobody acquired by law.
[164] Id.
[165] Clement, F. and Amezaga, J., "Afforestation and Forestry Land Allocation in Northern Vietnam: Analyzing the gap between policy intentions and outcomes" *in* Land Use Policy 26(2): 458 - 470.
[166] Yasmi, Y. et al., 2010. Forestry Policies, Legislation and Institutions in Asia and the Pacific: trends and Emerging needs for 2020, Asia-Pacific Forestry Sector Outlook Study II. USAID, RAFT, TNC, RECOFT, FAO. p 17. (Worsening degradation is partly due to a lack of clarity and consistency in definitions such as that of degradation, which relates to the government's classification and demarcation of forest as "degraded" and thus suitable for conversion.)
[167] Pescott, M., Durst, P., Leslie, R., 2010. Forest law enforcement and governance: progress in Asia and the Pacific. FAO. p. 201.

Recent policies in several GMS countries generally also guide forest management via targets regarding conservation, production, sustainable certification, or overall forest cover, as in Lao PDR's aim to increase national forest cover to 70% by 2020.[168] In Lao PDR and Thailand, management plans are developed in 5-year cycles, giving targets and guidance to provinces and districts, including plans to increase forestland and improve forest management.[169] Lao PDR's 2007 Forestry Law now only allows logging in Production Forest areas where inventory, surveys, and sustainable management plans are completed.[170] Most GMS countries' forests remain state-owned and management is centralized, but participatory forest management as in Lao PDR could allow for more localized forest ownership and control. Furthermore, a new draft national Land Policy under discussion in Lao PDR since 2013 could ensure non-financial values including those related to natural resources and biodiversity are considered before new concessions are granted.[171]

Despite most countries having relatively comprehensive forest management frameworks in place, various implementation challenges prevent their consistent application. Logging in many countries is considered unsustainable, targets unrealistic and lacking connection to field inventories, institutions deficient, and lower level participation and implementation have been criticized (see 'Implementation Issues' section of Table 7). In Myanmar the country's Selection System, long a regional model for managing teak and other hardwood forests based on scientific forestry principles and sustainable rotations, has not been widely implemented in the country since the 1970's, and extraction has exceeded the annual allowable cut (AAC).[172]

5.1.2 Land Use Planning

Land use planning has played an important role in several GMS countries' land and forest reform efforts as a means to incentivize and improve sustainable land management as well as increase land use profitability (see Table 8). Principally, land use planning in GMS countries needs to address two main factors threatening forests: large-scale economic development and small-scale shifting agriculture.

At a large scale, many initiatives for promoting forest regeneration and preventing forest loss in the GMS are obstructed by the higher priority given to other sectors in land use planning. In particular, infrastructure and development-related sectors such as transportation, hydropower, and mineral exploitation most often conflict with the objectives of forest conservation and sustainable management in the region. For example, Lao PDR's R-PP has highlighted direct and indirect forest loss from infrastructure as possible emission reductions through REDD+. However, the government has also noted that influencing policy in this area may be difficult, due to the high prioritization of mineral and hydropower-based economic development.[173] Though PES and REDD+ initiatives are increasingly discussed in Cambodia, they have also been criticized for not addressing the overwhelming prioritization of natural resource exploitation for economic development and only targeting areas under low risk of deforestation.[174] Similar to Lao PDR, Cambodia has undergone intensive hydropower and road development in recent years with more developments planned, and is in need of greatly improved land use planning, including identification and protection of forest areas at risk from such construction.[175] At the same time, participatory forestry is often unable to compete in the tender process for the same production forests slated for economic land concessions, resulting in most community

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[168] Government of Lao PDR, 2005. Forestry Strategy to the Year 2020 of the Lao PDR. URL: http://www.forestcarbonasia.org/wp-content/uploads/2011/10/2.-Forestry-Strategy-to-the-Year-2020-of-the-Lao-PDR.pdf.
[169] Yasmi, Y. et al. *supra* note 166, p. 13. Deluxe, C., *supra* note 25, p. 28.
[170] LAO PDR, 2007. Forestry Law. Article 49.
[171] Thomas, I. *supra* note 26, at 18.
[172] Forest Trends, 2012. Forest Certification in Myanmar. Information Brief No. 3. URL: http://www.forest-trends.org/documents/files/doc_3222.pdf.
[173] Lao PDR, *supra* note 33. p 38.
[174] Biddulph, R., 2011. Is the Geographies of Evasion Hypothesis Useful for Explaining and Predicting the Fate of External Interventions? The Case of REDD in Cambodia.
[175] See, Deluxe, C. *supra* note 25, at 8-9.

forests being relegated to degraded lands with low commercial value.[176] In Vietnam, agricultural uses are so strongly favored over forestland that already in 2012 roughly 100,000 ha more "poor and degraded" natural forest (often not actually poor or degraded) has been allowed to be converted to rubber and coffee plantations than the original proposed limit for 2020.[177] Similarly, recent studies of environmental impact assessments in the GMS have found them to be overly focused on immediate, local impacts and not to look far up or down stream from the proposed development site. This localized, short-term focus tends to further favor other sectors' goals over those of sustainable forestry.[178]

At a smaller scale, participatory and decentralized approaches have played a prominent role in recent land use planning efforts in Cambodia, Lao PDR, Myanmar and Vietnam, with Cambodia developing special procedures for land planning among indigenous communities, beginning a process of titling land for dozens of communities.[179] Most GMS countries historically have focused their land use planning efforts on reducing the incidence of swidden (or shifting) agriculture in past decades. This focus continues in particular in Lao PDR and Thailand, which link swidden practices with deforestation.[180] However, the damage of shifting cultivation upon forests may be overstated due to the tendency to study swidden cultivation in areas where it is most damaging.[181] Furthermore, targeting swidden agriculture generally has the result of discriminating against ethnic minorities whose customs inherently include such practices, and who are unable to easily switch to sedentary practices.[182]

In Myanmar, a draft National Land Use Policy has been developed under the guidance of a steering committee made up of representatives of 25 government agencies, which could provide comprehensive land use planning for decision-making across all sectors and all levels of government.[183] Despite this important step forward for Myanmar, the draft Land Use Policy also has received criticism for lacking recognition of smallholder land rights and communal land uses, and for insufficient time to allow for meaningful civil society participation.[184]

Despite countries' development of land use planning laws and policies, formalization of planning procedures to enable regular implementation is still lacking in Cambodia, Thailand and Vietnam. Conflicts between sectors and their responsible institutions, as exemplified in Box 7 below, continues to pose a hurdle to effective land use planning in many GMS countries.

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[176] Blomley, T., et al., 2010. Review of Community Forestry and Community Fisheries in Cambodia. Report prepared for the Natural Resource Management and Livelihoods Programme.
[177] Tuan, D.A. *supra* note 29, at 10.
[178] WWF – Mekong Area, *supra* note 5, p. 36 (Such disturbances affect sections both far upstream and downstream, yet environmental impact assessments, when they are performed, have focused on discrete project sites without considering the cumulative impacts on connectivity at the sub-basin to basin levels (Dugan et al., 2010; ICEM, 2010; Sindorf and Wickel, 2011).
[179] *Id.*
[180] *See generally*, Fox, J, et al., *supra* note 111.
[181] Robichaud, W., et al., 2009. Stable Forest Cover under Increasing Populations of Swidden Cultivators in Central Laos: the Roles of Intrinsic Culture and Extrinsic Wildlife Trade *in* Ecology and Society 14(1): 33.
[182] *See generally*, Fox, J, et al., *supra* note 111.
[183] Than, M.M. *supra* note 27, at 19-20.
[184] *See* Oberndorf, 2014. Burma Draft National Land Use Policy Open for Public Consultations *in* USAID Land Tenure and Property Rights portal. URL: http://usaidlandtenure.net/commentary/2014/11/burma-draft-national-land-use-policy-public-consultations.

Box 6: Institutional conflict in Thailand's forest sector administration

The **Royal Forest Department** (RFD) is responsible for reserved forests outside protected areas and for production across the forest sector. Since the logging ban of 1989, the RFD has shifted its focus to the conservation of natural forests and the development of forest plantations. The **Department of National Park, Wildlife and Plant Conservation** (DNP) is responsible for the conservation and protection of forests within protected areas (duties it took from the RFD when established in 2002), and for the REDD+ Technical Task Force.[185] As of 2010, 19% of the total land area of Thailand was classified as protected area and 7.6% of all forests were on protected land.

Forest governance at the central level has been criticized for inefficiency due to overlaps in administrative functions (the process of establishing protected areas involves five departments namely the RFD, DNP, ONEP, ALRO and LD), contradictory responsibilities and inconsistent government policies. Research has found that tension between the RFD, DNP and local people hamper effectiveness of on the ground policy implementation. RFD is said to have strong resistance towards community-based forest management, claiming that villagers are incapable of sustainably managing forest resources, and vice versa, villagers are reported to show a general mistrust towards RDF officials.[186] According to reports, the Government and the RFD have a history of using laws to evict local people from areas declared protected or prosecuting them for encroachment, which leads to further mistrust towards central authorities.[187] Furthermore, the RFD, in the context of its significant role and long history in forest exploitation and management, has been criticized over the years for a lack of public consultation, a "*top-down bureaucratic structure,*"[188] and a lack of monitoring and evaluation of policy implementation.[189]

5.1.3 Protected Areas

GMS countries largely established their protected area (PA) systems in the early 1990s (with Thailand and Vietnam beginning their systems in the 1960s), and PAs serve as the cornerstones of forest conservation in the region.[190] Since then, GMS countries have continued to expand forest protection via combinations of increased allocation of and/or improved management of forest PAs. In particular, Thailand and Vietnam have roughly doubled the area of forest PAs in recent decades, and Myanmar plans to increase its PAs to 10% of its national area (see Table 9). Most recently, in 2014 Thailand announced its plan to increase forest PAs by 27% over the next decade.[191] GMS countries also can learn

[185] Thailand REDD+ Readiness Preparation Proposal (R-PP), 2013. URL: http://www.forestcarbonpartnership.org/sites/fcp/files/2013/RRevised%20R-PP%20version%2024%20Feb%202013.pdf
[186] Nalampoon, A. National Forest Policy Review, Thailand. URL: ftp://ftp.fao.org/docrep/fao/005/AC921E/AC921E11.pdf.
[187] Phromlah, W. and Martin, P. "Reforming Governance for Sustainable Forest Management in Thailand", Society of Interdisciplinary Business Research (SIBR), June 22, 2011.
[188] Lakanavichian, S., 2005. "Trends in forest ownership, forest resources tenure and institutional arrangements: are they contributing to better forest management and poverty reduction?, Case study from Thailand" FAO (2005), URL: ftp://ftp.fao.org/docrep/fao/009/j8167e/j8167e12.pdf.
[189] Nalampoon, A., (n.d.) National Forest Policy Review, Thailand, URL: ftp://ftp.fao.org/docrep/fao/005/AC921E/AC921E11.pdf.
[190] *See generally*, Critical Ecosystem Partnership Fund (CEPF), (n.d.) Indo-Burma: Legislation and Protected Area Networks *in* CEPF's web site. URL: http://www.cepf.net/where_we_work/regions/asia_pacific/indo_burma/ecosystem_profile/Pages/legislation_and_protected_area_networks.aspx.
[191] FAO, 2009. Thailand Forestry Outlook Study. Asia-Pacific Forestry Sector Outlook Study II. Working Paper No. APFSOS II/WP/2009/22. pp. 18-19.

from the example of Cambodia, which in 1993 extended its forest PA systems to target protection of forest with high biodiversity significance (as can also be done for carbon and other natural resources).[192]

Despite these positive steps, GMS countries face challenges in managing forest PAs due to conflicts with local populations. Such conflicts have been particularly evident in Cambodia and Thailand, where unclear forestland tenure and boundaries sometimes result in locals' evictions from their homes. Indeed, most if not all GMS countries are in need of improved land tenure arrangements. However, in 2008 Cambodia passed a new Protected Areas Law to manage both Protected Areas and Community Protected Areas.[193] Participatory approaches to PA management as seen in Lao PDR could offer lessons for the region,[194] as could increase institutional authority where inadequate (as has been found in Vietnam).[195]

Additionally, implementation of forest PAMs is often hindered by lack of human and financial resources. In particular, protected areas are often created on paper but lack an adequate allocation of resources for their management. For example, Myanmar has created a new protected area system and established new protected areas, but only 22 were found to have park wardens and staff as of 2008.[196] In Lao PDR, lack of resources and insufficient human resource capacities are often cited as key underlying factors preventing effective implementation of forest PAs.[197]

5.1.4 Law Enforcement and Logging Bans

Several GMS countries have taken measures to improve forest law enforcement, largely focused on reducing high levels of illegal logging and trans-boundary timber trade in the region (see Table 10). Generally, weak enforcement of forest laws, regulations and concession agreements by local authorities (often due to limited capacity) exacerbates problems such as inadequate demarcation of boundaries, inappropriate or deficient implementation of land-use planning, and abuse of power by authorities, and enables drivers such as agricultural expansion to operate without restraint.[198] Although improved forestry sector law enforcement generally is a positive and much-needed step in improving forest governance, enforcement initiatives can backfire if implemented in an overly severe manner. Some types of logging bans and enforcement actions that have the effect of removing landholders from forest areas are two primary examples of such approaches having unintended outcomes in GMS countries.

All five GMS countries have enacted partial or complete bans in recent decades on logging-related activities to protect their forest areas from illegal logging. Whereas Thailand and Cambodia have moved away from logging or timber export bans, Lao PDR, Myanmar, and Vietnam have limited their bans to raw log exports. Despite some successes, in several cases the GMS logging/log export bans also have led to perverse outcomes, in particular by putting increased pressure on law enforcement and displacing sustainable logging activities. In Lao PDR, logging companies reportedly circumvent logging bans regularly without repercussion and pay or otherwise influence forest populations, law enforcement

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[192] Kingdom of Cambodia, 1993. Royal Decree on the Protection of Natural Areas (1993). URL: http://www.skpcambodia.com/Laws%20&%20Regulations%20of%20the%20Kingdom%20of%20Cambodia/Property%20&%20Land%20Law/RKT-93-%20Protected%20Areas-E.pdf.

[193] Kingdom of Cambodia, 2008. Protected Area Law. URL: http://theredddesk.org/sites/default/files/protected_area_law_2008_1.pdf.

[194] Clarke. J.E., 2000. Biodiversity and Protected Areas: Lao PDR. Regional Environmental Technical Assistance 5771. Poverty Reduction & Environmental Management in Remote Greater Mekong Subregion (GMS) Watersheds Project (Phase I). URL: http://www.mekonginfo.org/assets/midocs/0002547-environment-biodiversity-and-protected-areas-lao-p-d-r.pdf.

[195] *See* Brunner, J. 2012. Protected Area Management: Vietnam vs. India *in* IUCN web site. URL: http://www.iucn.org/vi/vietnam/congviec/rung/rung_ uc/?11096/1/Protected-area-management-Vietnam-vs-India.

[196] Thaung, *supra* note 54, p. 5

[197] *See, e.g.*, Rasul, G. and Thapa, G.B., 2003. "Shifting Cultivation in the Mountains of South and Southeast Asia: Regional Patterns and Factors Influencing the Change" *in* Land Degradation & Development 14:495-508. p. 84. Fujita, Y. and Phengsopha, K., 2008. "The Gap Between Policy and Practice in Lao PDR" *in* Lessons from Forest Decentralization: Money, Justice and the Quest for Good Governance in Asia-Pacific. Earthscan/CIFOR, London. p. 116. Lao PDR, *supra* note 168. p. 4. *See also, e.g.*, Department of Forestry, Lao PDR, 2011. Annual Review of REDD+ Activities in Lao PDR 2011. p. 23, 30 (noting numerous parks lacking sufficient resources to be managed properly).

[198] Lao PDR, *supra* note 33. p. 32 R-PP.

agencies and even prosecutors to actively or passively assist them.[199] Additionally, logging bans in GMS countries, such as those implemented in Thailand and Vietnam, can result in a significantly increased illegal timber sector and leakage of deforestation and degradation across GMS country borders.[200] Such bans often promote a boom in secondary value-added domestic wood industries, which can further drive up regional demand for timber and increase illegal timber trafficking from neighbors with weak forest enforcement such as Cambodia, Laos and Myanmar.[201]

Simple enhancement of forest law enforcement also can have the perverse outcome of protecting elite, sophisticated actors and targeting rural poor lacking political connections. Consequently, increased enforcement of existing forest law not only often inflicts overly harsh penalties on forest dwellers, but it can result in illegal timber practices becoming more covert and sophisticated, although equally or more destructive.[202] This is especially true in GMS countries where government officials, law enforcement agencies and possibly even the judiciary are involved either directly or passively in illegal logging.[203] However, recent research suggests an emphasis on improved yet balanced law enforcement and border controls (such as between Myanmar and neighboring India, China and Thailand),[204] in conjunction with managed logging, participatory forestry, and timber certification, can promote sustainable forestry in the GMS region.[205]

5.1.5 Participatory Forestry

All GMS countries have been developing laws and policies promoting participatory forestry over the past two decades (as shown in Table 11). The SUFORD project in Lao PDR offers a prime example of such an approach, whereby participatory forestry management is supported in 41 Production Forest Areas totaling 2.3 million ha.[206] Notwithstanding GMS participatory forestry programs, critics point out that no country has actually given full rights and responsibilities to communities over forest areas in their vicinities. Instead, critics note that GMS countries only have devolved communities partial rights to forests, restricted certain aspects of forest usage and generally retained forest tenure to the state.[207] According to a July 2014 global study on community forest rights, significantly lower deforestation rates are found in forest areas in which local groups' forest rights are legally recognized.[208] However, others note that in many cases in GMS, governments may withhold rights for fear of local populations simply selling forestland for development or conversion to other uses. Generally, GMS countries have been moving more towards allocating land to families and individuals in recent years and away from participatory forestry (see section 5.3 below).

As in many areas of forest governance, participatory forestry policy intentions are frequently not translated into binding legislation, nor implemented in secondary legislation or regulations. In Myanmar, a target of one million hectares of community plantations exists in the Forestry Master Plan 2001-31 to promote Community Forestry, but the country has only established roughly 8,100 hectares by 2015.[209] A Community Forest Instruction (CFI) exists that might be implemented without a lengthy

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[199] Thomas, I. *supra* note 26 at 23.
[200] *See, e.g.,* Daniel, R. (Ed.), 2005. After the Logging Ban: Politics of Forest Management in Thailand. Foundation for Ecological Recovery (PER). *See also,* Waggener, T., 2004. Logging Bans in Asia and the Pacific: An Overview. FAO. *See also,* Felbab-Brown, *supra* note 94, pp. 40-41.
[201] Felbab-Brown, *supra* note 94. pp. 40-41. *See also,* Than, M.M. *supra* note 27 at 5.
[202] Felbab-Brown, *supra* note 94, p. 39.
[203] Colchester, M. et al., 2006. Justice in the Forest: Rural Livelihoods and Forest Law Enforcement. Forest Perspectives 3, CIFOR. URL: http://www.cifor.org/publications/pdf_files/Books/BColchester0601.pdf. p. 63.
[204] *See*: Forest Legality Alliance's web site. URL: http://risk.forestlegality.org/countries/652/laws
[205] Felbab-Brown, *supra* note 94. p. 41-48.
[206] Thomas, I. *supra* note at 20.
[207] *See, e.g.,* Beang, L.C. and Sethaphal. L., (n.d.) Community forestry in Cambodia. FAO. URL: http://www.fao.org/docrep/007/ad511e/ad511e0a.htm. *See also,* USAID, *supra* note 90.
[208] *See* Stevens, C. et al., 2014. Securing Rights, Combating Climate Change: How Strengthening Community Forest Rights Mitigates Climate Change. URL: http://www.wri.org/sites/default/files/securingrights-full-report-english.pdf. p. 4.
[209] Than, M.M. *supra* note 32, at 12. *See also,* Woods, K., *supra* note 71. pp. 9-10.

Cabinet approval process, but some argue the CFI lacks sufficient legal strength to help over the long-term. Towards this end, a legal basis for participatory forestry could be provided via relevant provisions in the 1992 Forest Law, followed by passage of a Community Forestry Law that would consolidate and strengthen the existing CFI provisions.[210] In Cambodia, 199 Community Protected Areas currently exist, covering 167,728 ha of forest in the protected areas system.[211] Meanwhile, the Cambodian National Forest Program (2010-2029) sets a target of allocating 2 million hectares of forestland (or roughly 1,000 community forests) to groups with official community forest status by 2030.[212]

In Thailand, a controversial 2007 Community Forest Bill first drafted in 1992 and not yet in force could go the furthest within any GMS country to empower communities to manage forests. The Bill would give those living in forest PAs prior to 1993 the right to enter into agreements with the Forest Department to preserve and manage forests with Department supervision. However, given political turmoil in Thailand at the time of writing, the Bill's passage is uncertain and less likely than in previous years. As forest protection in GMS countries such as Thailand often comes at the expense of poor forest dwellers being evicted,[213] a balance needs to be found between consideration for local population and forest protection needs. Moreover, all environmental policies and plans in Thailand must be approved by the National Economic and Social Development Board (NESDB), which has main responsibility for national economic and social development. As a strongly centralized governmental organization, the NESDB has been criticized for not allowing public participation in the policy development process.[214]

5.2 Incentives

Various incentive-based programs have been instituted in GMS countries in recent years in an attempt to encourage more sustainable forestry practices. The most noteworthy of these programs are related to Payments for Ecosystem Services (PES) and forestland allocation programs. Incentive programs can provide needed stimulus to protect existing forests and promote regeneration and rehabilitation of forest, but they must be calibrated to drivers of forest and land use change and to the needs of the target population in order to achieve their goals. Provision of inadequate incentives could risk inducing landholders to refrain from positive behaviors they might have otherwise pursued voluntarily.[215] For example, payments under Vietnam's Payment for Forest Environmental Services (PFES) program (discussed in 5.2.1 below) have been set unilaterally by the state and have been found to be too low relative to opportunity costs.[216] New or existing incentives can also promote practices resulting in forest loss (so-called 'perverse incentives'). Such incentives would need to be removed for sustainable forest programs to achieve their goals.

5.2.1 Payments for Ecosystem Services (PES)

Payments for Ecosystem Services (PES) pilot systems are underway in forests in Cambodia, Lao PDR and Vietnam (see Table 12). The largest example of a working PES system in the GMS is Vietnam's national-level PFES program, operating at pilot level in two provinces since 2008. In addition,

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[210] Tint, K., et al., 2011. Community Forestry in Myanmar: Progress and Potentials. URL: http://www.burmalibrary.org/docs13/Community+Forestry+in+Myanmar-op75-red.pdf. p. 19.
[211] Deluxe, C. *supra* note 25, at 14.
[212] Kingdom of Cambodia, 2010. Cambodia National Forest Programme 2010-2029. URL: http://www.cdc-crdb.gov.kh/cdc/documents/Sector_Strategy/6_Forestry_Reform/National_Forest_Programme_2010_2029_Eng.pdf. *See also*, RECOFTC, 2014. Community Forestry in Cambodia. URL: http://www.recoftc.org/basic-page/community-forestry-cambodia.
[213] Cambodia National Forest Programme, 2010-2029, at 26. URL: http://www.cdc-crdb.gov.kh/cdc/documents/Sector_Strategy/6_Forestry_Reform/National_Forest_Programme_2010_2029_Eng.pdf *See, e.g*, Areerat, K., 2014. Junta's attempt to 'return forest' hurts the poor *in* Prachatai's web page. URL: http://www.prachatai.com/english/node/4441. *See also*, Svasti, P., 2014. A matter of land and rights *in* Bangkok Post. URL: http://www.bangkokpost.com/print/425623/.
[214] Emmanoch, W. *supra* note 28 at 12.
[215] *See* Kerr, J. et al., 2012. Prosocial behavior and incentives: Evidence from field experiments in rural Mexico and Tanzania. Ecological Economics 73 (2012) 220–227.
[216] Pham TT, et al., 2013. Payments for Forest Environmental Services in Vietnam: From Policy to Practice. Brief No. 22. CIFOR. URL: http://www.gms-eoc.org/uploads/resources/539/attachment/PFES%20in%20Vietnam.pdf.

Cambodia and Lao PDR have been developing pilot PES (or PES-like arrangements, in the case of Lao PDR) projects and initiatives since 2002 and 2008, respectively.[217] Cambodia's pilot PES projects (conducted with the Wildlife Conservation Society) include a variety of incentive structures for biodiversity protection, which have increased local participation and buy-in, thereby preventing encroachment and increasing income and local capacity.[218]

Legislative provisions enabling PES system development exist in Myanmar and Thailand, though both are lagging behind their GMS neighbors in implementation of PES systems and projects.[219] Weak institutional arrangements and capacity, land and forest tenure rights and overly restrictive access and use rights are the most common issues preventing or delaying successful implementation of PES programs in GMS countries. Also, leakage (or displacement of forest loss) results where programs are only established at the subnational level as in Lao PDR, a threat to both PES and REDD+.[220]

5.2.2 REDD+

REDD+ can serve as a potential long-term financing mechanism for mobilizing the forest sector to strengthen forest governance and address both positive and negative drivers of forest change. Most GMS countries are preparing or implementing national and subnational REDD+ programs, as shown in

Table **13**. Cambodia, Lao PDR, Myanmar and Vietnam all have received or are beginning to receive REDD Readiness funding under UN-REDD Readiness.[221] Additionally, Thailand, Cambodia, Lao PDR and Vietnam are currently in the Readiness phase of Forest Carbon Partnership Facility (FCPF) funding.[222] Numerous national level REDD+ meetings and projects have been implemented in GMS countries, with REDD+ Task Forces established in Cambodia,[223] Lao PDR,[224] Thailand[225] and Vietnam,[226] and a REDD+ Task Force proposed in Myanmar.[227]

The number and scale of REDD+ component activities varies across GMS countries. REDD+ progress in GMS countries includes accomplishments such as completion of biomass inventories in Cambodia,[228]

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[217] *See* Wildlife Conservation Society, (n.d.) Bundling and Stacking Carbon for Conservation: Payments for Ecosystem Services. p. 6,7 (describing payments for watershed services in Bolikhamxay, Laos and multiples markets for biodiversity in Northern Plains, Cambodia). URL: http://www.ecosystemmarketplace.com/documents/acrobat/k17/Tom%20Clements%20PES%20bundling&stacking%20Overview%20KTG.pdf

[218] Clements, T. A. et al. 2010. "Payments for Biodiversity Conservation in the Context of Weak Institutions: Comparison of Three Programs from Cambodia" *in* Ecological Economics 69(6): 1283–91. URL: http://linkinghub.elsevier.com/retrieve/pii/S0921800909004595. *See supra* note 217.

[219] *See* Aung, M. and Aung, N., (n.d.) National Workshop on Reviewing the PFES Program: Enabling Conditions for Payment for Environmental Services in Myanmar. URL: http://www.gms-eoc.org/uploads/resources/538/attachment/6-Myanmar-PFES.pdf. *See also*, IUCN, 2012. Assessing payments for ecosystem services (PES) in Doi Mae Salong, Northern Thailand. URL: http://www.iucn.org/news_homepage/news_by_date/2012/?10165/Assessing-payments-for-ecosystem-services-PES-in-Doi-Mae-Salong-northern-Thailand.

[220] Thomas, I. *supra* note 26 at 24.

[221] UN-REDD Programme, 2015. UN-REDD Programme in Asia-Pacific web site. URL: http://www.un-redd.org/RegionalActivities_AsiaPacific_New/tabid/104258/Default.aspx.

[222] Forest Carbon Partnership Facility, 2015. REDD+ Countries' web site. URL: https://www.forestcarbonpartnership.org/redd-countries-1.

[223] UN-REDD Programme, 2013. Cambodian National REDD+ Taskforce Established. Newsletter Issue 37, April 2013. URL: http://www.un-redd.org/Newsletter37/Cambodian_REDD_Taskforce/tabid/106149/Default.aspx.

[224] The REDD Desk, 2012. "REDD Task Force Lao PDR" *in* The REDD Desk website. URL: http://theredddesk.org/countries/actors/redd-task-force-lao-pdr.

[225] Phromlah, W. Potential Conflict Arising in the Context of REDD+ Implementation in Thailand *in* IUCN Academy of Environmental Law e-Journal 2012(1). URL: http://www.iucnael.org/fr/component/content/article/86-issue/239-issue-20121.html.

[226] REDD Vietnam, 2012. "REDD+ and International Requirements for REDD+ Development and Implementation". Provincial workshop presentation *in* REDD Vietnam web site. URL: http://Vietnam-redd.org/Web/Default.aspx?tab=newsdetail&zoneid=107&subzone=157&itemid=488&lang=en-US.

[227] Myanmar REDD+ Programme, (n.d.) "The REDD+ Taskforce" *in* Myanmar REDD+ Programme web site. URL: http://reddmyanmar.blogspot.com/p/the-redd-taskforce.html.

[228] The REDD Desk, 2015. "Cambodia Siem Reap Community Forestry REDD+ Project Initiative summary" *in* The REDD Desk web site. URL: http://theredddesk.org/countries/initiatives/siem-reap-community-forestry-redd-project.

capacity building and training for government officials and local communities in Lao PDR,[229] and efforts to establish provincial REDD+ action plans in Vietnam.[230] However, a lack of clear legal frameworks for land tenure and carbon accounting, a lack of capacity to enforce forestry laws supportive of REDD+, a lack of MRV systems and insufficient education and awareness of REDD+ goals are common implementation issues faced by GMS countries.[231]

5.3 Allocation of forest land to local levels

Given local populations' frequent lack of forest access and use rights, programs aimed at allocating forest land to villagers in exchange for their management and re-planting of forests has special significance in many of the GMS countries examined (see Table 14). Vietnam is a leader in this area, implementing some of the most ambitious and comprehensive forest and land use allocation policies in the region, having allocated since 1983 a total of 3.7 million ha to households and individuals, or 30% of the total forest land.[232] In Vietnam, the Five Million Hectare Reforestation Program (5MHRP), Degraded Forest Land Allocation (FLA) and National Mangrove Restoration and Development Plan for 2008-2015 programs have all allocated considerable forestland to local households and communities, which has been returned to fallow, or reforested.[233] In addition to forestland allocation, the 5MHRP provided local people with payments, tax incentives and favorable loans for forest protection.[234] Despite these programs however, recent research shows that state-owned organizations own roughly 50% of all Vietnamese forests - generally the most valuable and productive forest areas - while individual households mainly receive poor and degraded areas.[235] Similar inequities have been found between richer, more powerful groups and poorer, less powerful groups in Vietnam, which have been connected with conflicts between forest users.[236]

Recently, Lao PDR also has developed experience in this area via both its Land and Forest Allocation (LFA) policy and Sustainable Forestry for Rural Development (SUFORD) project. Other GMS countries all have similar allocation programs underway, which generally focus on allocating land to poor and landless farmers and afforesting deforested and degraded forest lands (with the exception of Thailand, which focuses on agricultural lands and does not allocate forestlands for management). Implementation challenges in GMS countries include slow and inconsistent application of land allocation and land use planning, especially between forestry and agricultural sectors, and the inadequate terms over which forestland access and use rights are granted.

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[229] The REDD Desk, 2015. "Avoidance of deforestation and forest degradation in the border area of Southern Laos and Central Vietnam for the long-term preservation of carbon sinks and biodiversity" *in* The REDD Desk web site. URL: http://theredddesk.org/countries/initiatives/avoidance-deforestation-and-forest-degradation-border-area-southern-laos-and.

[230] *See* Trung, L.V., 2013. Provincial REDD+ Action Plan in Lam Dong Province – Vietnam. Department of Agriculture and Rural Development. URL: http://www.asialeds.org/sites/default/files/resource/file/5.-Vietnam_Le-Van-Trung.pdf.

[231] Bradley, A., 2011. Review of REDD Readiness: Progress and Challenges. Forest Conservation Project, Ocasional Paper No. 4. Institute for Global Environmental Strategies. URL: http://redd-database.iges.or.jp/redd/download/link?id=4. *See also* Ouekham, K., 2012. Status of REDD+ in Lao PDR: Institutions, Frameworks and Pilot Activities. Department of Forestry, Lao PDR. *See also* Evans, K., 2014. Amid Deforestation in Myanmar, Growing Discussions of REDD+ and Rights. CIFOR Blog. URL: http://blog.cifor.org/25915/amid-deforestation-in-myanmar-growing-discussions-of-redd-and-rights#.VLbXOCvF9qU. *See also supra* note 225.

[232] Jong, W. de, Sam, D. D., & Hung, T. Van., 2006. Forest Rehabilitation in Vietnam: Histories, Realities, and Future. Review of Forest Rehabilitation, Lessons from the Past. CIFOR. p. 26. (noting this corresponds to 46.2% of the land area in the country designated for production forest, and is equal to 23.2% of the total forest area that Vietnam plans to achieve by 2020).

[233] Clement, F. et al., 2007. The Impact of Government Policies on Land Use in Northern Vietnam: An Institutional Approach for Understanding Farmer Decisions. International Water Management Institute, Research Report No.112. URL: http://www.iwmi.cgiar.org/Publications/IWMI_Research_Reports/PDF/PUB112/RR112.pdf, p. 11

[234] Nguyen, N.B., 2003. The National Policy to Rehabilitate and Develop 5 Million Hectares of Forests and other Issues on Wetlands. WorldFish Center. URL: http://www.worldfishcenter.org/Pubs/wetlands/pdf/Chapter07.pdf. p. 55-57.

[235] Tuan, D.A. *supra* note 29 at 17.

[236] Id.

5.4 Private sector encouragement

In one of the most important initiatives driving positive, long-term forest change (i.e. conservation, sustainable forest management, afforestation and reforestation) in concert with sustainable economic development, GMS countries have made promising efforts at boosting private sector growth in the forestry sector (as seen in Table 15). With the exception of Lao PDR, all GMS countries' framework forest laws and policies outline private sector participation, and Cambodia and Myanmar respectively have an implementing law and decree in place.[237] Whereas Myanmar, Thailand and Vietnam merely encourage private sector participation, Cambodia and Lao PDR establish quantitative targets (of private sector investment and forest management certification, respectively). In recent years in Myanmar, the government has promoted reforestation of commercial teak plantations in deforested areas with the involvement of several private companies. Additionally, several bilaterally and multilaterally-funded projects have focused on private sector initiatives such as training logging crews in reduced impact logging,[238] sustainable forest management certification.[239]

5.5 Forest Project Funding

All GMS countries have established (or appear to have established in Myanmar's case) one or more funding mechanisms devoted wholly or in part to financing forest sector initiatives (see Table 16). Vietnam leads the region in sheer number of forest-related funds established and operating in country, though countries show a range of experiences and funding mechanisms. Whereas funds in Cambodia, Lao PDR and Vietnam all channel income from fees related to timber and forest areas, Thailand sources revenue from fees on fuel. Insufficient information on most GMS country funds was available at the time of writing to fully evaluate implementation. Despite Vietnam's leading role in forest funds, state forest finance is limited with payments currently at just 2.5-5 USD/ha/year. As lands allocated to households are generally poor and degraded, little incentivizes natural forest management in Vietnam.[240]

5.6 Regional Initiatives

GMS countries have joined forces in just one major regional initiative on forestry to date and several agreements and projects of lesser importance (see Table 17). The Forest Law Enforcement and Governance (FLEG) ministerial conference in Bali, Indonesia in 2001 constituted a major multinational ministerial-level attempt to cooperate in reducing forest loss in the world, with a particular focus on Southeast Asia. This conference resulted in the Bali Declaration, in which countries committed to "intensify national efforts and strengthen bilateral, regional and multilateral collaboration to address forest crime and violations of forest law."[241] In addition, Vietnam and Lao PDR signed a Memorandum of Understanding to cooperate from 2012 to 2017 in Forest Fire Prevention & Wood Trade Governance, in connection with each country's commitments to climate change, forest law enforcement, governance and trade (FLEGT), forest protection and biodiversity conservation.[242] Additional regional initiatives have been made under the framework of regional projects such as the UNEP/GEF project 'Reversing Environmental Degradation Trends in the South China Sea and the Gulf of Thailand," in which

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[237] Myanmar 1992 Forest Law N. 8/92. Kingdom of Cambodia, 2008. Cambodia Forestry Law and Policy Statement and Sub-Decree 26 "Roles for Granting User Rights to Cultivate Tree Plantation within State Forest Land". *See* Table 15 in Annex 1 for more information.
[238] *See, e.g.*, Dickinson, C., 2009. Forest Restoration and Management: SUFORD Project and Challenges in the GMS Subregion. p. 5 (noting RIL training in Lao PDR).
[239] Litz, V., 2000. Certification and local forest management: The FOMACOP experience in the Lao PDR *in* Asia-Pacific Community Forestry Newsletter. URL: http://www.mekonginfo.org/assets/midocs/0003077-environment-certification-and-local-forest-management-the-fomacop-experience-in-the-lao-p-d-r.pdf.
[240] Tuan, D.A. *supra* note 29, at 18.
[241] World Bank, 2013. Regional Forest Law Enforcement and Governance (FLEG) Initiatives. Brief. URL: http://www.worldbank.org/en/topic/forests/brief/fleg-regional-forest-law-enforcement-governance.
[242] Memorandum of Understanding 2012-2017 between Vietnam and LAO PDR on the Cooperation in the Field of Forest Protection, Forest Law Enforcement, Controlling and Preventing Illegal Trading and Transporting of Timber, Forest Products and Wildlife. (July 12 2012). URL: http://tongcuclamnghiep.gov.vn/Media/AuflaNews/Attachment/MoU_between_Lao_and_Vietnam_2012-2017.pdf.

Cambodia, Thailand and Vietnam participated and aimed to increase mangroves in seven participant countries to 90% of 1998 levels.[243]

5.7 GMS Policy Recommendations

Based on the above summary of programs and initiatives addressing drivers of forest change in the GMS region, this report suggests focusing on the following steps in national and regional action plans:

i. Mitigating negative drivers.

a. **Strengthen forest law enforcement.** Forest law enforcement and penal code reform is needed to ensure countries target major forest crimes and ringleaders (rather than low-level and petty violations), in particular including less visible 'white collar' illegal logging. The EU-FLEGT process could provide a framework for improving implementation and enforcement of existing forest laws, as well as identifying gaps in existing law.

b. **Revisit logging bans.** In most GMS countries, logging moratoria and timber export bans have had limited impacts on regional forest degradation, as they often result in increased timber demand and degradation in adjacent countries. Efforts are also needed to maintain sustainable timber production following bans on logging in natural forests.

c. **Enhance forest protected area allocation and management.** Better targeting forest PAs to areas of high conservation value (e.g., prioritizing carbon content and biodiversity value, as has been done in Cambodia) can result in overall more efficient use of limited resources and effective sustainable forest outcomes. The highest priority areas could be established as permanent national forest estate and given strict protection by state forest agencies (e.g., as recommended in Vietnam), while other PAs may be managed together with communities. In some countries (e.g., Vietnam), increased legislative authority is required to enable forestry departments to effectively implement and enforce PA management regimes.

ii. Tackling indirect drivers.

a. **Strengthen civil society and increase awareness around sustainable forestry and the goals of REDD+.** Environmental awareness and strengthening of civil society is an enabling condition for several of the positive drivers identified in Section 4 above (sustainable supply chains and sustainable forest certification in particular). Much of this awareness raising and civil society advocacy has been global in nature, resulting in increased global demand for sustainable forestry and agricultural commodities (especially in Europe and North America). However, several positive drivers have been assisted by GMS country environmental awareness and civil society as well (e.g., community forestry, land use planning).

b. **Empowering local populations.** More localized ownership and control of forestland, and more local participation in forest management decisions and land use planning, have been proven in many cases to improve sustainability of forest management, including the following in particular:

i. **Land allocation to local populations** (in exchange for their ongoing sustainable management, conservation and re-planting of forests) can act as both an incentive mechanism and a forest management regime towards more sustainable forest development outcomes. However, allocated land needs to be of suitable quality, distributed equitably, and with clearly demarcated boundaries and property rights to avoid creating conflicts and

[243] *See* UNEP, 2009. Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand. Terminal Evaluation. http://www.unep.org/eou/Portals/52/Reports/South%20China%20Sea%20Report.pdf.

disadvantages for local populations. Additionally, in some cases the process of allocating land use rights needs to be expedited.

ii. **Improve participatory forest management.** Community forestry initiatives hold considerable promise in most GMS countries, and with more complete granting of access rights (albeit potentially with restrictions on deforestation and degradation) and better quality land to manage, could encourage better protection of standing forest and restoration of degraded forestland. By empowering locals to help manage forests rather than evicting them, management may be improved and conflicts with local populations avoided.

iii. Promoting positive drivers.

a. Scale up incentive initiatives in concert with other efforts. Payments for Ecosystem Services (PES) and Reduced Emissions from Deforestation and Forest Degradation (REDD+) initiatives hold out considerable promise for GMS countries to incentivize forest protection, and regeneration of deforested and degraded areas, and should be scaled up in GMS countries. In order to enable such programs however, legal frameworks will need to be clarified, capacity enhanced, and implementation and enforcement of existing forest laws improved (e.g., Myanmar and Thailand).

b. Align incentives with livelihood considerations: in many GMS country incentive programs, insufficient payments or poor quality allocated forestland prevents sustainable forestry activities from actually being incentivized. By targeting incentives to priority high value conservation areas and increasing payments in line with income needs, incentive programs may have greater impacts.

c. Enabling access to certified forest and agricultural product markets: Demand for sustainably certified forest and agriculture products could help drive positive forest and land use outcomes in GMS countries. However, some GMS countries require regulatory frameworks to enable landholders to access markets for their sustainable products (e.g., Vietnam).

iv. Enhancing governance.

a. Land use planning: Many countries' land use planning procedures need to be formalized into regulations (e.g., Cambodia). Above all, this includes securing forest property and use rights, developing mechanisms to ensure equity in forestland allocation, and clarifying boundaries and overlapping property rights (e.g., Vietnam). Additionally, regulations should guarantee sustainable forest management and forest conservation goals (primary forests in particular) are given higher priority in relation to demand from competing sectors such as infrastructure, economic development and agriculture (see also Recommendation (4)(d) below).

b. Forest management decentralization: In conjunction with empowering local populations (via increasing allocation of forest land to local groups for ownership and management described in Recommendation (ii)-(b) above), increasing decentralization of decision-making to local governments has been shown to greatly improve overall forest governance outcomes. Besides delegating and/or devolving relevant responsibilities to lower levels however, human and financial capacity generally also need to be guaranteed to enable their execution. Also, regulatory safeguards may need to be implemented (e.g., to prevent local elites from dominating decisions and to ensure national sustainable development goals are not dominated by localized, short-term interests). Several GMS countries already have devolved and decentralized certain government decisions, but often such processes have been pursued in cyclical fashion (e.g., Myanmar) and/or legislation has not been implemented (e.g., Thailand).

c. Sectoral coordination: In many countries, institutional functions need to be better defined and forestry agencies empowered with legislative mandates and authorities necessary to complete their tasks. Equally, several GMS countries could benefit by clarifying regulatory duties of their forestry agencies and institutions (e.g., between MARD and MONRE in Vietnam).

v. **Enhancing research and capacity building.**

a. **Improved spatial mapping, monitoring and drivers research:** To date, various organizations and entities have pursued studies at different levels using different measurement protocols. Often this has resulted in different estimates of the relative force of various drivers and the interactions of drivers occurring in and among GMS countries, and consequently different views on necessary government responses. Equally, drivers research needs to be better informed in an ongoing basis by both ground level and satellite monitoring, recorded in statistical databases and maps easy to use by the public (hard copies can be provided to communities without internet access). Capacity building is also needed to enable forestry agencies to use mapping, monitoring and drivers research tools, and technological responses to address threats such as illegal logging.

b. **Enhanced forest economic valuation:** Natural forests often are viewed narrowly in terms of their timber value, while other values such as ecosystem services and NTFPs are ignored. This leads to misclassifying forests as low value and converting them to agricultural plantations or other use (e.g., Vietnam). Total Economic Valuation (TEV) of natural forests is still a new concept in some GMS countries, especially for local forestry authorities. If capacity is developed this tool could enable other values of natural forests to enter decision-making and conserve such forest.

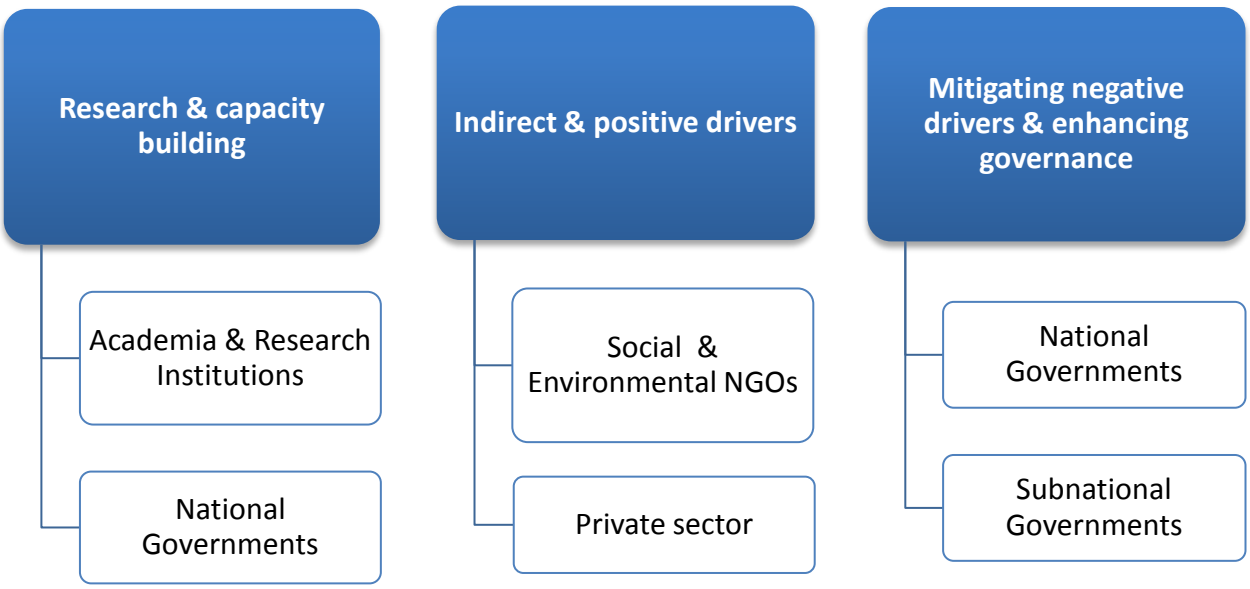
vi. **Fostering GMS regional cooperation.** Given that much demand for illegal and unsustainable logging comes from neighboring GMS countries, collaboration on enhancement of border controls and joint programs tackling illegal logging are necessary to addressing these problems at their roots. Although a few GMS countries have made initial forays into joint agreements to improve forest governance, all GMS countries need to address the most critical issues in the region together in order to have a lasting impact.

6 Greater Mekong Subregion Action Plan

Based on the collective needs of the five GMS country identified in this publication's national reports, together with feedback from participants at the regional workshop held in Bangkok on 20 January 2015, the following actions are identified as necessary next steps.

6.1 Regional Policy Advisory Group & National Policy Advisory Groups

This action would mandate an existing group to function as an ongoing advisory body on PAMs for addressing drivers in GMS countries.[244] The advisory group would include a variety of experts with experience across the region and covering content related to PAMs addressing or enhancing forest change drivers. In order to ensure a cross-section of perspectives so as to maximize buy-in from GMS countries, experts should be drawn from academia, the private sector, government and social and environmental NGOs, as outlined in the figure below.

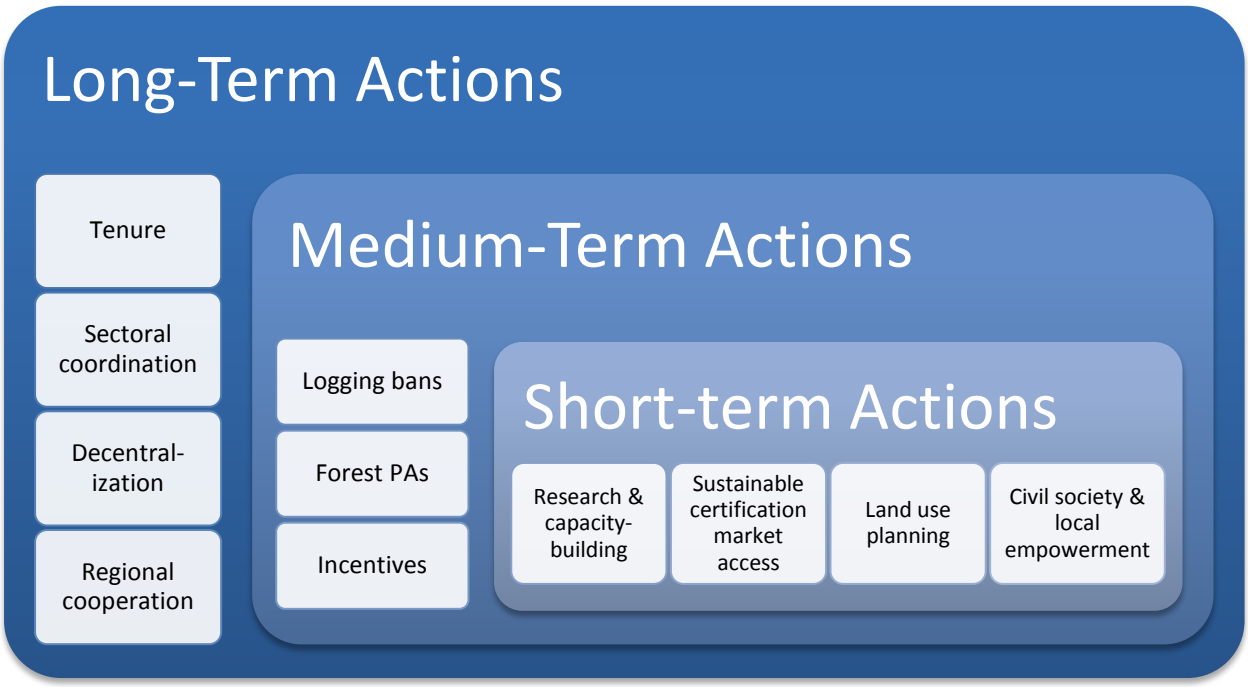


Three sub-groups would be formed within countries as indicated with findings presented to a larger regional group for further discussion and feedback. Though the groups could have representatives from the other constituents, the sub-groups would likely work best if led by the main actors relevant in addressing each subset of questions. That is, national and subnational governments would lead work on mitigating negative drivers and enhancing governance; civil society, local populations and private sector would lead work on tackling indirect drivers and promoting positive drivers, and government and academia/research institutions would lead work on enhancing research and capacity-building, and fostering GMS regional cooperation. Though variation on this configuration would be possible depending on country circumstances, the main advantage would be to efficiently fit each group's expertise to relevant issues.

[244] One example of an existing group that could be given a new mandate to advise on GMS actions to address drivers of forest change is the Asia-Pacific Forest Policy Think Tank. The Asia-Pacific Forest Policy Think Tank is an intersessional activity of the Asia-Pacific Forestry Commission (APFC), which mandates it to "support sustainable forest management in the region by strengthening the policy process at various levels." This includes activities such as forest policy short courses and policy briefs. For more information, see: http://www.fao.org/forestry/33587/en/.

The national sub-groups would prioritize needs identified within the policy recommendations above (and any other recommendations of their own), and develop timelines for action. The three national sub-action plans would be shared at the national level to feed into national action plans for each country, which would in turn be shared at the regional level to cross-fertilize and identify actions that could be addressed jointly within a regional action plan.

Based on the current report's findings, an initial categorization of actions could follow the outline below. However, such actions will understandably need to be tailored to different country needs and challenges.



6.2 Regional Guidance

A regional publication will provide tailored information and advice responding to the general recommendations outlined in Section 5.7 and any recommendations of the regional and national advisory groups outlined in Section 6.1. The publication will synthesize existing information on PAM successes and failures in each country in the region to inform development of new PAMs and reform of existing PAMs. In particular, the guidance will assist each country and the GMS region as a whole to prioritize actions to be taken and in what order, thus informing action plans. The publication will synthesize this overview in order to categorize PAMs and analyze PAMs that have worked and draw lessons from those that have not worked. Finally, the publication will evaluate advantages and disadvantages of GMS country policies and programmatic initiatives.

6.3 Regional Mapping

This action will map in a single cohesive online mapping tool an overview of the most recent spatial data available necessary for assessing drivers of forest change in GMS countries. This will include the following:

a. **Hotspots of forest change**: The mapping tool will identify areas of high forest change (both forest growth and forest loss, as identified by satellite imagery) and identify categories of land use change. The online tool will allow multiple levels of overlapping forest data to be selected in order to analyze forest change simultaneously with information on positive and negative drivers, and potentially select information on forest-related programs and initiatives in GMS countries.

b. **Update existing mapping data:** The regional mapping will update existing forest drivers mapping data. In particular, the tool will build on the 1990-2010 regional forest drivers mapping analysis of Stibig et al.,[245] and provide increased regional specificity to global data of the UMD web-based mapping tool of NASA Land-Use/Land-Use Change Program.[246]
c. **Build on LEAF Atlas**: The action will build on the USAID-LEAF program's "South and Southeast Asia REDD+ Atlas." The LEAF Atlas provided an initial foray into integrating mapping data on forest cover, forest biomass carbon stocks, and carbon emissions from deforestation for the Southeast Asian region as whole, the region as a whole, and in detail for each USAID-LEAF country (Cambodia, Laos, Malaysia, Papua New Guinea, Thailand, and Vietnam).[247]

[245] Stibig et al., *supra* note 17.
[246] *See* NASA – Land-Cover / Land-Use Change Program. Global Map of Hotspots of Land Cover and Land Use Change. URL: http://lcluc.umd.edu/hotspots/
[247] *See* LEAF, (n.d.) LEAF South and Southeast Asia REDD+ Atlas *in* LEAF website. URL: http://leafasia.org/tools/leaf-south-and-southeast-asia-redd-atlas.

Annex I: Tables of Programs and Initiatives Addressing Drivers

Table 7. State Forest Management Programs

	Cambodia	Lao PDR	Myanmar	Thailand	Vietnam
Main PAM(s)	• 2001 Land Law; 2003 Forestry Law; 2007 partnership with National Forest Programme Facility. • National Forest Programme 2010-2029[248]	• 2007 Forestry Law • SUFORD sustainable management plans; • FSC Certification in production forest. Forestry Strategy 2020 released in 2005.	• State-run Myanmar Selection System (MSS) • 1992 Forest Law, last major changes made in 2005.	• 5-year National Economic and Social Development Plans (improved forest management). 20 laws relevant to national forestry management.	• 2004 Law on Forest Protection and Development
Highlights	• National forest law delineates permanent forest estate (PFE) and production forests; mandates management plans, socioeconomic assessments, and timber marking.[249]	• 5-year plans to guide subnational management; (participation & implementation criticized). • FS 2020 aims to increase national forest cover to 70% by 2020.[250] • SUFORD forest management model put much production forest under participatory management.	• Nearly all forests owned by state. • MSS has been a model sustainable management system since early 20th century based on annual allowable cuts, girdling, and selective rotation system. • Government has cracked down on illegal logging in recent years.	• Forest management is largely top-down and centralized, has undergone three major revisions to respond to decreasing national forest cover.[251] National development plans have included forest conservation targets.[252]	• 2004 Law categorizes forest: 1. special-use 2. protection 3. production • Includes reforestation policies, forest management plans, increased legal production, and rates of certification, and sources more legal timber for industry.[253]
Implementation Issues	• Law does not specifically define forests. Extent of illegal logging remains unknown. Logging in PFE is not considered sustainable.[254] Slow re-introduction of controlled commercial forestry, not yet economically significant.[255]	• Forestry targets not considered realistic or supported by data. • Lack of accountability by regional authorities to national forest laws, moratorium on land concessions not enforced.[256]	• No tenure data on forestland available. • Financial and political pressures block MSS implementation.[257] • Harvesting only high-value species, likely to cause long-term degradation. • Illegal cross-border timber trade common.	• Still lack of coherence in forest policies, no coherent support for communities and private sector, and deficient institutional management. • Lack of national-level forest inventories.[258]	• Policies decreased deforestation, but also disrupted livelihoods and shortened fallow periods, continuing degradation.[259] • Mitigation measures often neglected during EIAs (for development projects - e.g., hydropower.).[260]

[248] Kingdom of Cambodia, *supra* note 212.
[249] ITTO, *supra* note 153. p. 151.
[250] Government of Lao PDR, *supra* note 168.
[251] Masawat, J. and Roongtawanreongsri, S., 2012. "Policy on Forest Management in Thailand: A Case Study of Kho Hong Hill in South Thailand" *in* International Proceedings of Economics Development and Research, 52: 91–95.
[252] ITTO, *supra* note 153. p. 245.
[253] Tuan, D.A., *supra* note 29, p. 37.
[254] ITTO, *supra* note 153. p. 156.
[255] *Id.*
[256] Thomas, I., *supra* note 26, p. 35. *See also*, LAO PDR, 2010. Strategy for Agricultural Development 2011 to 2020. p. 17.
[257] Woods, K., *supra* note 73.
[258] ITTO 2011, *supra* note 153. p. at 46.
[259] Thomas, I., *supra* note 26, p. 36.
[260] *Id.* p. 38.

Table 8. Land Use Planning

	Cambodia	Lao PDR	Myanmar	Thailand	Vietnam
Main PAM(s)	• Land Law (2001); • Sub-Decree on Economic Land Concessions (2005); • Sub-Decree No. 83 on Procedures of Land of Indigenous Communities (2009)	• 2010 MAF Ministerial Instruction to Prepare for the Complete Eradication of Slash and Burn Cultivation • 2009 Participatory LUP (PLUP-LA) Manual; • 2014 MNRE Land Surveys;	• 2014 Draft National Land Use Policy (based on 2012 National Dialogue on Land Tenure and Land Use Rights)[261] • National Spatial Planning System proposed under National Spatial Development Planning Act[262]	• National Land Policy 1987 • Land code 1954 • Agricultural Land Reform Act (1975)	• Land Law of 2003; • 1998-2010 Five Million Hectare Reforestation Program (5MHRP); Forest Land Allocation (FLA)
Highlights	• Land Law defines land classification, including forest reserves, concessions, and common property. • 2009 Indigenous Procedures system processed land titles for communities; • Commune Land Use Plans integrated into decentralized planning[263]	• In 1990s Govt. began national 'Land Use Planning/Land Allocation' (LUP-LA), wide rural area coverage. • Since 2009, participatory planning (PLUP-LA) for stabilizing land settlement (swidden to sedentary farming) via participatory planning.[264]	• Extensive participatory national dialogue used in developing draft land use policy, currently open for public comment;[265] • Land use administration mapping underway in 2014 with civil society;[266]	• Land-use planning started in 1980s with watershed management and opium reduction; later expanded to mountains.[267]	• Land use master plans begun for districts and provinces in national development planning. • Participatory approaches begun 1990s for local watershed and community forest management.
Implementation Issues	• Limited implementation of systematic land-use planning; does not always correspond to improved forest rights for communities.	• Swidden harm may be overstated due to monitoring where most damaging.[268] • Land and forest allocation policies restrict access to land, shortening fallows, and increasing degradation.	• Criticisms that not enough time to comment on draft policy. • Improvements needed in smallholder land recognition, title procedures, respect of existing communal land uses.[269]	• Never become an institutionalized and regulatory procedure.[270]	• Local LUPs widely conducted in forest and mountain areas, but master plans do not integrate this.[271]

[261] *See* Government of the Republic of the Union of Myanmar, 2014. National Land Use Policy (Draft). URL: http://www.burmalibrary.org/docs19/National_Land_Use_Policy-en.pdf.
[262] *See* Japan, Ministry of Land, Infrastructure, Transport, and Tourism, 2013. Myanmar Country Profile. URL: http://www.mlit.go.jp/kokudokeikaku/international/spw/general/myanmar/index_e.html.
[263] *See* GIZ GmbH Division Agriculture, Fisheries and Food, Sector Project Land Policy and Land Management, 2011. Land Use Planning: Concept, Tools, and Applications. URL: http://www2.gtz.de/dokumente/bib-2011/giz2011-0041en-land-use-planning.pdf. p. 41.
[264] *Id.*
[265] *See* Burma Land Use Allocation and Scrutinizing Committee, 2014. Consultation Meeting on Draft National Land Use Policy. URL: http://www.burmalibrary.org/docs19/Draft_National_Land_Use_Policy_Pre-Consulation_18_Oct-Minutes-en.pdf. *See also* Oberndorf *supra* note 184.
[266] *See* WWF, 2014. Highlighting natural capital, ecosystem services, and land use planning in Myanmar *in* WWF website. URL: http://wwf.panda.org/what_we_do/where_we_work/greatermekong/news/mekongmessenger.cfm?227990/Highlighting-natural-capital-ecosystem-services-and-land-use-planning-in-Myanmar-training-partners-in-InVEST.
[267] *See* GIZ *supra* note 263. p. 41.
[268] Robichaud, W., *supra* note 181.
[269] *See* Oberndorf, *supra* note 184.
[270] *See* GIZ *supra* note 263. p. 41.
[271] *See* GIZ *supra* note 263. p. 41,42.

Table 9. Protected Areas Systems

	Cambodia	Lao PDR	Myanmar	Thailand	Vietnam
Main PAM(s)	• Royal Decree on Protected Areas (1993) Protected Areas Law (2008): includes Community PAs	• 1989 Decree on Wildlife, Aquatic Life Conservation & Hunting/Fishing Control (118/PMC) • 1993 National Biodiversity Conservation Areas (Decree 164)[272]	• Protection of wildlife and wild plant and conservation of natural areas law (1994) • Protected Area System (PAS)	• Wildlife Protection Act 1992 • National Park Act 1961 • National Forest Reserve Act 1964	• 1986 Decision of Minister of Forestry (categorizing forests); • 2001 Decision on management of special use forests (est. 3 sub-zones)
Highlights	• 27 protected areas; 10 protected forests. • (23 new PAs designated by biodiversity significance, 1993) • 21% of Cambodia's carbon stocks estimated within protected areas, and 11% in PA forests[273]	• 13 National Protected Areas (NPAs) covering 21% of country's land area.[274] • PA system noted for using participatory management approaches with local communities.[275]	• Permanent forest estate (PFE) includes Reserved forests; Protected public forests (together 19.13% of the country, planned to increase to 30%); • & Protected Areas System (34 PAs, 2.26% of country in 2012, planned to increase to 10%).[276]	• In 1999, PAs covered 17% of national territory, Thai Govt. long-term goal of 25% of forest in PAs.[277] • In 2014 mandate to increase forest PAs from 32% to 40% in next 10 years.[278]	• Special Use Forests (SUFs) cover 6.7% of land area, include national parks and other natural reserves; • 1999 MARD doubled PA size from 10K – 20K km
Implementation Issues	• PAs cross human settlements and areas with unclear tenure rights. • PA boundaries established with poor information, prioritization of conservation value; many key areas excluded.[279]	• Continuing risk of illegal cross-border trade in wildlife and forest produces.[280] • Enforcement of PA rules has trade-offs: in north, weak enforcement led to higher wildlife trade but less swidden pressure on forest.[281]	• Enforcement to prevent cross-border trade in wildlife remains major difficulty, and limited funding constrains management success of protected areas.[282]	• Fragmented system; • Few communal property rights; • Roughly 600K people live in PAs; conflicts as may not harvest forest products or cultivate crops; • Govt.to demarcate forest boundaries)[283]	• Central protected area management authority with adequate institutional mandate needed; • Currently no national PA system[284]

[272] Clarke. J.E., *supra* note 194.
[273] Kapos, V., et al., 2010. Carbon, Biodiversity and Ecosystem Services: Exploring Co-benefits. Cambodia. UNEP-WCMC.
[274] Yen, H.M., et al., 2013. A Review of Conservation Area Governance in Cambodia, Laos and Vietnam.
[275] Clarke, J.E., *supra* note 194.
[276] Government of Myanmar. Ministry of Environmental Conservation and Forestry, 2012. Myanmar's Initial National Communication under the United Nations Framework Convention on Climate Change (UNFCCC). URL: http://unfccc.int/resource/docs/natc/mmrnc1.pdf. p. 10 (noting reserved forests and protected public forests cover 19.13% of the country (129,445 sq km), while the protected areas system covers 2.26% of the country (15,276 sq km)).
[277] FAO, *supra* note 191. p. 18-19. *See also*, Than, M.M. *supra* note 32 at 13.
[278] Gershkovich, E., 2014. Thailand's Deforestation Solution *in* World Policy Blog website. URL: http://www.worldpolicy.org/blog/2014/10/16/thailands-deforestation-solution.
[279] Clements, T., et al. *supra* note 218.
[280] Singh, S., 2008. "Contesting moralities: the politics of wildlife trade in Laos" in Journal of Political Ecology Vol 15 (2008). p. 7, 8, 12. *See also*, Clarke, J.E., *supra* note 194.
[281] Robichaud, W., *supra* note 181.
[282] Than, M. M., 2015. Myanmar country report. Presentation in Workshop on Drivers of Change Affecting Mekong Forests: Towards formulation of GMS action plans. Unpublished source.
[283] RECOFT, 2011. "Benefits and drawbacks to protected areas in Thailand" *in* RECOFT website. URL: https://recoftc.wordpress.com/2011/09/19/benefits-and-drawbacks-to-protected-areas-in-thailand/
[284] *See* Brunner, J., *supra* note 195.

Table 10. Logging Bans & Enforcement

	Cambodia	Lao PDR	Myanmar	Thailand	Vietnam
Main PAM(s)	• 1997 Log Export ban; • 2002 Logging Ban (large-scale logging);	• Log Export Ban • 2007 Forestry Law	• 2005-09 Kachin State Logging Ban • April 2014 Raw Timber Export Ban[285]	• 1989 Commercial Logging Ban;	• 1995 Partial logging ban
Highlights	• 2002 ban designed to ensure sustainable forestry	• Dept. of Forest Inspection operationalized in 2008	• April 2014 ban on teak & roundwood exports • Kachin State ban on logging and timber transportation (together with ban in China) reduced illegal logging 70% in Burma[286]	• Small-scale illegal logging of rosewood and teak in national parks and timber plantations[287]	• Ban on use/export of domestic timber • GoV active in FLEGT with EU
Implementation Issues	• 1997 ban encouraged illegal logging; 2002 ban came late & many natural forests depleted; conflict between foresters and locals[288] • Forest Department found to target small-scale illegal forestry activities while ignoring major illegal operations with political connections.[289]	• Vietnam companies control timber extraction & processing, with negative impacts on local populations[290] • Difficult to tell if much logging legal or illegal due to loopholes, though often unsustainable	• Most logging close to borders with China & Thailand; • Chinese companies have controlled timber extraction & processing, with negative impacts on local populations[291] • Illegal logging continues despite ban in other parts of country[292]	• Net importer and processer of illegal and unsustainable timber from other GMS countries, for re-export[293] • Harsh enforcement tactics vs. swidden agriculture reported against upland minorities (relocation, coercion, et al. abuses)[294]	• Net importer and processer of illegal and unsustainable timber from other GMS countries, for re-export[295] • Import bans on Cambodian and Lao timber largely sidestepped[296] • Forest owners seen to lack access to enforcement of land rights against encroachers and illegal loggers.[297]

[285] Stecker, T., 2013. "Facing daunting challenges, Myanmar seeks to protect its forests" *in* Environment & Energy Publishing. URL: http://www.eenews.net/stories/1059979923/print.
[286] Global Witness, *supra* note 128, pp. 5-7. 9.
[287] Currey, D., and Ruwindrijarto A. Timber Trafficking: Illegal Logging in Indonesia, South East Asia, and International Consumption of Illegally Sourced Timber. EIA and Telepak, 2001. URL: http://www.eia-international.org/files/reports26-1.pdf. p. 10.
[288] *See e.g.*, McKenny B. and Tola, P., 2002. Natural Resources and Rural Livelihoods in Cambodia: A Baseline Assessment. Working Paper #23, Cambodia Development Resource Institute.
[289] Colchester, M. et al., *supra* note 203. p. 63.
[290] Yasmi, Y., *supra* note 166.
[291] *See generally*, Kahrl, F., Weyerhaeuser, H., and Yufang, S., 2004. Navigating the Border: An Analysis of the China- Myanmar Timber Trade. Forest Trends. URL: http://www.forest-trends.org/documents/files/doc_120.pdf.
[292] Global Witness, *supra* note 128, pp. 5-7. 9.
[293] Felbab-Brown, *supra* note 94, p. 31.
[294] *Id*. p. 31.
[295] *Id*. p. 30.
[296] *Id.*
[297] Brunner, J., correspondence with author. 20 February 2011.

Table 11. Participatory Forestry

	Cambodia	Lao PDR	Myanmar	Thailand	Vietnam
Main PAM(s)	• Commune Administration Law (2001); • 2003 Sub-decree on Community Forest Management;[298] (Guidelines) • 2006 Community Forestry *Prakas* (Guidelines)	• Land and Forest Allocation (LFA) Policy; • 1995 Forest • Management and Conservation Programme (FOMACOP); • 2004-11 Sustainable Forestry and Rural Development Project (SUFORD)	1992 Forest Law; • 1995 Forest Policy; • 1995 Community Forest Instruction (CFI) • 2001-31 Forestry Master Plan (FMP)	• 2007 Community Forest Bill (drafted 1992; status unclear) • 1994 Tambon Administration Organization (TAO) Act • 1986 CF Division in RFD; • 1998 Decentralization Act[299]	• Law on Forest Protection and Development (LFPD) 2004
Highlights	• Prakas guide CF establishment, management council elections, and 15-year renewable timber leases; require formation of community management council [300]	LFA began as recognition of rural land rights, but motivated by preventing swidden, demarcating forest and agriculture. SUFORD has promoted production forest co-management government and villages.	• CFI enables communities to co-manage forests for firewood, small agriculture, and reforest degraded forestlands; [301] • CF targets in 2001-31 FMP for 919,000 ha community-managed forest (1.36% of total land area).[302]	• RFD's CF Division begun to develop participatory programs.[303] • TAO supports local governments in forest use, planning and decision-making.[304] • Bill could empower communities by giving those in PAs pre-1993 right to preserve, manage with Dept. supervision.[305]	• LFPD 2004 provides for assignment of forests to village communities closely associated with forests.[306]
Implementation Issues	• Incomplete devolution of rights to communities under CF policy; short leases restrict timber potential. • Unclear benefit sharing, co-management, and guidelines. • CF lacks govt. incentives, esp. for rehabilitation/refore station activities.[307]	• LFA re-designated most village lands as other types; largely restricted forest use, allowed NTFP collection. • Enforcement of illegal logging remains weak.[308]	• Still insufficient pro-poor emphasis and realization of benefits; • Forest Department not supportive or informed of customary forest uses other than timber.	• CF Bill is still highly disputed.[309] • Participatory forests limited to fuel wood, NTFP rights.[310] • CF Bill requires locals to prove settlement in forest pre-1993, which may be impossible for many people.[311]	• Community forest tenure remains with state, "village population communities" (VPCs) lack lease or transfer rights.[312] • Implementation of LFPD assignment of forests to VPCs blocked by legislation problems.

[298] In Cambodia, community forestry policies issued within the mandates of the RGC's 1993 Constitution and the RGC Forestry Law of (2002). *See* Deluxe, *supra* note 25, p. 17.
[299] *See* Asia Forest Network, (n.d.) "Community Forest Management in Thailand" *in* Asia Forest Network website.URL: http://www.asiaforestnetwork.org/tha.htm.
[300] Oberndorf, R.B., 2006. Legal Analysis of Forest and Land Laws in Cambodia. Community Forestry International.
[301] *See supra* note 70. p. 27. *See also*, Forest Trends, *supra* note 71. p. 9-10, 18-19.
[302] *See supra* note 210. p. 19
[303] Lakanavichian, S., 2006. Case Studies in South and East Asia: Forest Ownership, Forest Resource Tenure and Sustainable Forest Management: Thailand FAO URL: http://www.fao.org/forestry/10809-09f8870885bd8d85106e0a87cd906b784.pdf. p. 19 et seq.
[304] Asia Forest Network, *supra* note 299.
[305] *Id.*
[306] Vietnam, 2004. Law on Forest Protection and Development LFPD. Article 29.
[307] Beang, *supra* note 207.
[308] Fisher, R., 2014. Lessons Learned From Community Forestry in Asia and Their Relevance For REDD+. USAID-supported Forest Carbon, Markets and Communities (FCMC) Program.

Table 12. Payments for Ecosystem Services (PES)

	Cambodia	Lao PDR	Myanmar	Thailand	Vietnam
Main PAM(s)	• Biodiversity-related PES projects (2002)[313]	• Payments for Watershed Ecosystem Services (2008) • Climate Protection through Avoided Deforestation (CliPAD)[314]	• National Environmental Conservation Law (2012)	• Numerous PES-like projects in effect[315]	• Degraded Forest Land Allocation policy; • 2004 National Forest PES (PFES) policy;[316] • 2008 Pilot PFES projects (Lam Dong & Son La provinces) • 2010 national PFES program; Decree 99
Highlights	• Payments for bird nest protection, agro-environmental payments to farmers and community-based ecotourism payments; creation of local committees for ecotourism and agricultural co-ops.[317]	• ES contracts for increasing soil fertility to support REDD+ objectives, increasing crop production in areas of shifting cultivation, applying a landscape level approach and linking agricultural and conservation methods .[318]	• National law encourages green initiatives such as PES and REDD+.[319] • Discussions underway regarding Myanmar's enabling conditions for the development of a PES system.[320]	• Studies have been conducted on the feasibility of implementing a PES system in certain provinces in Thailand, recognizing watershed and other ecosystem services.[321]	• Links ecosystem service users with ecosystem service providers; ecosystem service payments made for soil protection, water sources, forest carbon, natural landscape protection, and spawning grounds.[322]
Implementation Issues	• Weak institutional arrangements; • Weak ownership rights (in bird nest sites)	• Uncertainty in development of REDD+ mechanism;	• No framework law or policy directly addressing PES to date	• Top-down approach, tenure issues and public mistrust restrict development;[323] • Relevant laws need relaxing.[324] • Framework PES law or policy needed.	• Lack of capacity at provincial levels for MRV; watershed services the only modality with established service users and providers and fully developed PES system[325]

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[309] Emamanoch, *supra* note 28.
[310] RECOFTC, 2014. Current Status of Social Forestry in Climate Change Mitigation and Adaptation in the ASEAN Region: Situational Analysis.
[311] Phromlah, W., and Martin, P.V., 2011. Reforming Governance for Sustainable Forest Management in Thailand. Society of Interdisciplinary Business Research (SIBR) 2011 Conference on Interdisciplinary Business Research.
[312] Tuan, *supra* note 29.
[313] *See* Wildlife Conservation Society, *supra* note 217, p. 7.
[314] *Id.*
[315] Nabangchang, O., 2014. Legal and policy Framework for Payment of Ecosystem Services (PES). Presentation in Regional Workshop on PES. URL: http://www.slideshare.net/raddalarpnun/pes-in-thailand-cifor-orapanradda-presentationnov2014.
[316] Vietnam, 2008. Decision No. 380/QD-TTg on the Pilot Policy for Payment for Forest Environmental Services.
[317] *See* Clements, *supra* note 218. *See also* Wildlife Conservation Society, *supra* note 217.
[318] Kissinger, G. et al. (2013) Payments for ecosystem services schemes: project-level insights on benefits for ecosystems and the rural poor. World Agroforestry Centre. URL: http://www.worldagroforestry.org/downloads/publications/PDFs/WP13001.PDF.
[319] Aung, *supra* note 219.
[320] *Id.*
[321] IUCN, *supra* note 219.
[322] Vietnam, 2010. Decree No. 99/2010/ND-CP on the Policy for Payment of Forest Environment Services art. 4.2.
[323] Neef, A., 2013. Payments for Environmental Services in Thailand: A Review of Discourses and Practices. Presentation in Mekong Environmental Symposium, 5-7 March 2013. URL: http://docs.mekong-environmental-symposium-2013.org/data/Session%20131%20-%20Topic%2003.%20Mekong%20Basin%20forest%20dynamics%20and%20REDD+/131-6-Payments%20for%20environmental%20services%20in%20Thailand_Neef.pdf.
[324] Nabangchang, *supra* note 315.
[325] Pham, *supra* note 216. p. 9.

Table 13. REDD+

	Cambodia	Lao PDR	Myanmar	Thailand	Vietnam
Main PAM(s)	• Cambodia REDD+ Roadmap[326] • Oddar Meanchey Community Forestry REDD Project (2007)[327] • Siem Reap Community Forestry REDD+ Project (2011) and GHG Inventory Training (2012)[328] • Prey Long REDD+ Carbon Project • Northern Plains REDD+ Project • Southern Cardamom REDD+ Project • Readiness (FCPF) • National Program (UN-REDD)	• Avoidance of Deforestation and Forest Degradation in the Border Area of Southern Laos and Central Vietnam for the Long-term Preservation of Carbon Sinks and Biodiversity (2011)[329] • REDD+ Pilot project at Xe Pian NPA (2013)[330] • REDD Demonstration Activity in the Nam Et Phou Louey NPA in Luang Prabang, Houaphan and Xieng Khuang provinces[331] • Preparation Grant for Investment Plan (FIP) • Scaling-up Participatory Sustainable Forest Management (FIP) • Smallholders Forestry Project (FIP) • Readiness (FCPF) • National Program (UN-REDD)	• Readiness Roadmap (UN-REDD)[332]	• Mapping Carbon Content in Forests, Monitoring and REDD+ Capacity Building (Germany's International Climate Initiative) • Tracking Reductions in Carbon Emissions through Enhanced Monitoring and Project Support (2013)[333] • REDD+ Taskforce (2011) • Readiness (FCPF)	• Vietnam's Forests and Deltas Programme (2012)[334] • Building Grassroots Capacity for REDD+[335] • Dien Bien REDD+ Pilot Project (2012)[336] • Preventing Deforestation, Forest Degradation and Leakage to Preserve Carbon Sinks and Biological Diversity (Germany's International Climate Initiative) • Avoidance of Deforestation and Forest Degradation in the Border Area of Southern Laos and Central Vietnam for the Long-term Preservation of Carbon Sinks and Biodiversity (2011)[337] • Readiness (FCPF) • National Program (UN-REDD)

[326] *See* Kingdom of Cambodia, 2010. REDD+ Roadmap in Cambodia. URL: http://theredddesk.org/sites/default/files/8_redd_roadmap_cambodia_v4_0_official_222_5.pdf.
[327] Forest Carbon Portal, *supra* note 121.
[328] *See* The REDD Desk, *supra* note 228.
[329] *See* The REDD Desk, *supra* note 229.
[330] *See* The REDD Desk, (n.d.) "REDD+ Pilot Project at Xe Pian NPA" Initiative Summary *in* The REDD Desk website. URL: http://theredddesk.org/countries/initiatives/redd-pilot-project-xe-pian-npa-0.
[331] *See* The REDD Desk, "REDD Demonstration Activity in the Nam Et Phou Louey NPA in Luang Prabang, Houaphan and Xieng Khuang provinces" Initiative Summary *in* The REDD Desk website. URL: http://theredddesk.org/countries/initiatives/redd-demonstration-activity-nam-et-phou-louey-npa-luang-prabang-houaphan-and.
[332] *See* UN-REDD Programme. "Myanmar's country description" *in* UN-REDD Programe website. URL: http://www.un-redd.org/AsiaPacific_Myanmar/tabid/104264/Default.aspx.
[333] Phromlah, *supra* note 311.
[334] *See* The REDD Desk, (n.d.) "Vietnam's Forests and Deltas Programme" Initiative Summary in The REDD Desk website. URL: http://theredddesk.org/countries/initiatives/Vietnams-forests-and-deltas-programme.
[335] *See* The REDD Desk, (n.d.) "Vietnam: Building Grassroots Capacity for REDD+" Initiative Summary in The REDD Desk website. URL: http://theredddesk.org/countries/initiatives/Vietnam-building-grassroots-capacity-redd.
[336] *See* The REDD Desk, (n.d.) "Dien Bien REDD+ Pilot Project" Initiative Summary in The REDD Desk website. URL: http://theredddesk.org/countries/initiatives/dien-bien-redd-pilot-project.
[337] *See* The REDD Desk, *supra* note 229.

Highlights	• REDD+ Roadmap was the base for establishment of UN-REDD and FCPF policies[338] • Oddar Meanchey project expected to sequester 8.7 million tons of CO_2 over 30 years;[339] certified under the VCS with a triple gold CCB accreditation for emission reductions[340] • Siem Reap project completed biomass inventory plots, household surveys, participatory rural appraisals and training[341]	• Avoidance of Deforestation and Forest Degradation: covers an area of more than 200,000 hectares; training and capacity building to provincial government; development of alternative livelihoods[342] • REDD+ Pilot in Xe Pian aims to increase knowledge of REDD+[343] • Implementing JNR with the Lao Government[344]	• Roadmap includes: management of REDD+ readiness; stakeholder consultation and participation; development and selection of REDD+ strategies; implementation framework and safeguards; national forest reference emission level and/or forest reference level (REL/RL); and national forest monitoring system[345]	• Tracking Reductions in Carbon Emissions program aims to establish the first forest carbon basemap and monitoring system[346]	• Thanh Hoa and Nghe An selected as pilots for moving strategies and policy into practice through innovative land-use planning to reduce GHG emissions through improved forest management, afforestation and investment in promoting climate resilient livelihoods[347] • Building Grassroots Capacity for REDD+ aims to train and build capacity of forest sector grassroots stakeholders for REDD+[348] • Dien Bien pilot project builds technical and institutional capacity for REDD+ implementation in Dien Bien province[349]
Implementation Issues	• Lack of: clear legal framework; demarcation of forest land; secure forest tenure and rights to carbon; forest permanence; REDD financing; capacity to enforce forest laws and control drivers of deforestation[350]	• MRV issues (no system in place) due to lack of forest definitions and forest type data; capacity building needs.[351]	• Country is undergoing rapid political change and economic growth[352] • Lack of legal frameworks to address drivers; insufficient education/awareness; unclear tenure rights[353]	• Unclear and contested tenure; access and use restrictions; inequitable benefit sharing; insufficient involvement of forest communities and indigenous peoples; cross-border conflicts[354]	• Insufficient training on REDD+[355] • A comprehensive REDD+ strategy to generate and sustain emission reductions at the local level must be developed, along with capacity for MRV[356]

[338] *See* The REDD Desk, (n.d.) "Cambodia REDD+ Roadmap" Plan Summary *in* The REDD Desk website. URL: http://theredddesk.org/countries/plans/cambodia-redd-roadmap
[339] Poffenberger, *supra* note 122.
[340] *See* Code REDD, *supra* note 123.
[341] *See* The REDD Desk, *supra* note 228.
[342] *See* The REDD Desk, *supra* note 229.
[343] *See* The REDD Desk, *supra* note 330.
[344] *See* The REDD Desk, *supra* note 331.
[345] UN-REDD, 2013. Myanmar REDD+ Readiness Roadmap.
[346] Phromlah, *supra* note 311.
[347] *See* The REDD Desk, *supra* note 334.
[348] *See* The REDD Desk, *supra* note 335.
[349] *See* The REDD Desk, *supra* note 336.
[350] Bradley, *supra* note 231. p. 7-9.
[351] Ouekham, *supra* note 231.
[352] UN-REDD, *supra* note 332.
[353] Evans, *supra* note 231.
[354] Phromlah, *supra* note 311. p. 262.
[355] *See* The REDD Desk, *supra* note 335.
[356] IUCN, 2010. "REDD in Vietnam: issues, opportunities and linkages" *in* IUCN website. URL: http://www.iucn.org/about/work/programmes/forest/?6434/REDD-In-Vietnam-Issues-Opportunities-and-Linkages.

Table 14. Allocation of Forest Land to Locals

	Cambodia	Lao PDR	Myanmar	Thailand	Vietnam
Main PAM(s)	• 2001 Land Law • New Law on Forestry (2002) • Social Land Concessions (2003)	• Land and Forest Allocation (LFA) • Sustainable Forest and Rural Development (SUFORD) project	• Myanmar Forest Policy (1995) • Community Forestry Instruction (CFI) (1995)	• Environment Fund • Agricultural Land Reform Act of 1975 (ALRA)	• Degraded Forest Land Allocation policy (FLA) • National PFES Policy • Five Million Hectare Reforestation Program 1998-2010 (5MHRP) • National Mangrove Restoration and Development Plan 2008-2015 (NMRDP)
Highlights	• Recognizes rights of indigenous communities to collective ownership of their land and the right to assert and enforce interests against third parties; includes residential and agricultural land;[357] • Grants state private land to poor landless families for residential and farming purposes[358]	• Recognized rights of villages to manage forest and of individuals to use degraded forest (LFA);[359] • Development of sustainable management plans (SUFORD)[360]	• Forest Policy allocates 30% of total land area to reserved forest areas and 5% to PAs; encourages participatory forestry; increases farm incomes via community and agroforestry systems[361] • Afforestation in areas insufficient in fuel wood, planting, extraction, utilization of forest products for food, consumer products and income[362]	• Primary mechanism for government to allocate agricultural land to landless farmers (ALRA)[363]	• FLA allocated forest land since late 90s to households and communities for long-term use to lessen role of State Forest Enterprises;[364] • 5MHRP sought to increase timber supply by allocating forestland to locals for timber plantations;[365] • NMRDP aims to increase mangrove forests by 50% via allocation to households and communities for restoration.[366]
Implementation Issues	• Limited consistent implementation of land-use planning or land allocation, causes unclear land tenure in practice.[367]	• SUFORD sustainable management plans are rarely implemented outside SUFORD project areas[368]	• Policy inconsistency between forestry sector and other sectors (agriculture, livestock breeding and mining); overexploitation; illegal logging; conflict of interests between forest sustainability and forest income[369]	• ALRA focuses only on agricultural land and there is currently no mechanism in place for allocating forestland to local households and communities[370]	• FLA has been slow; one year contracts do not provide long-term guarantee of access to forests, illustrating lack of confidence by government; locals allocated poor quality forests; legal status of land recipients unclear; no support provided after FLA[371]

[357] USAID, *supra* note 90, p. 6.
[358] *Id.*
[359] Fujita, Y., *supra* note 197.
[360] Thomas, *supra* note 26. p. 34.
[361] FAO, 1997. Country Report Union of Myanmar. Working Paper No: APFSOS/WP/08. URL: http://www.fao.org/docrep/003/w5693e/W5693E12.htm.
[362] *Id.*
[363] USAID, *supra* note 55.
[364] Tu, T.N. and Burgers, P., 2012. Decentralized Forest Governance in Central Vietnam. ETFRN News 53. URL: www.etfrn.org/file.php/89/6.4.t.n.tu-p.burgers.pdf
[365] Clement, F, et al., *supra* note 233, p. 11.
[366] Katoomba Group, 2010. REDD and Mangrove Forests in Vietnam: Legal Issues. URL: http://live.katoombagroup.org/wp-content/uploads/2010/08/VN-Mangrove-Legal-Summary.pdf. p. 4.
[367] Beang, *supra* note 207.
[368] Information obtained during visit to Vientiane, September 2011.
[369] Htun, *supra* note 70.
[370] USAID, *supra* note 55.
[371] Phuc, T. et al., 2013. Forest Land Allocation in Vietnam: Implementation Processes and Results. Info brief. Tropenbos International Vietnam.

Table 15. Private Sector Encouragement

	Cambodia	Lao PDR	Myanmar	Thailand	Vietnam
Main PAM(s)	• Forestry Law and Policy Statement; • Sub-Decree 26 "Roles for Granting User Rights to Cultivate Tree Plantation within State Forest Land" (25 March 2008)	• Promote NWFPs and green forest products	• 1992 Forest Law N. 8/92; • Foreign Investment Law, No 21/12 (2012); • 30 year Forestry Master Plan	• National Forest Policy; • Potential PEFC Membership	• Forestry Development Strategy (1995); • Forest Sector Development Project (FSDP)
Highlights	• Commits to convincing private sector investment in forest rehabilitation to reach 60% forest cover of national territory[372] • From 2003-2010, planted forests grew by roughly 18,000 ha with private sector contributions.[373]	• 14% of Production Forest Areas are currently under FSC certification with plans to expand to 3.1 million ha in the coming years	• Forest Law encourages private sector participation in forest management; Investment Law allows foreign & domestic companies to invest in timber sector; Commercial teak plantations encouraged;[374] Foreign investment encouraged[375]	• Encourages the private sector to become involved in tree planting projects for both domestic and export[376] • Thailand aims to join PEFC as a national member by December 2016[377]	• Restructured forestry from state management to multi-sector economic management involving the private sector, individuals and communities;[378] • FSDP encourages sustainable management of plantation forests and conservation of biodiversity in special use forests by private sector[379]
Implementation Issues			• Teak remains state-owned; No financial incentives for teak planting; • Inconsistent state support of private investment in tree plantations and tenure insecurity may deter investment.[380]	• Policy is weak in terms of coordination and clarity[381]	

[372] FAO, 2010. Cambodia Forestry Outlook Study. Working Paper No. APFSOS II/ WP/ 2010/ 32. URL: http://www.fao.org/docrep/014/am627e/am627e00.pdf. p.16.
[373] *Id.*
[374] Thaung, *supra* note 54. *See also*, Agence France Presse, 2005. Terra Daily, 2005. "Myanmar Plans Vast New Plantations, Especially for Teak" *in* Terra Daily website. URL: http://www.terradaily.com/2005/050424111133.0j4v1jls.html.
[375] *See* Rungfapaisarn, K., 2013. "Myanmar to Investors: More Reform Ahead" in The Nation website. URL: http://www.nationmultimedia.com/business/Myanmar-to-investors-more-reform-ahead-30214894.html.
[376] Hammond, D., 1997. Commentary on Forest Policy in the Asia-Pacific Region. FAO. URL: http://www.fao.org/docrep/w7730e/w7730e0c.htm.
[377] PEFC, 2014. "Thailand Shows Strong Interest for PEFC" *in* PEFC website. URL: http://www.pefc.org/news-a-media/general-sfm-news/1762-thailand-shows-strong-interest-for-pefc.
[378] Forest Science Institute of Vietnam, 2009. Vietnam Forestry Outlook Study. FAO. URL: http://www.fao.org/docrep/014/am254e/am254e00.pdf. p. 6.
[379] The World Bank, (n.d.) "Forest Sector Development Project" *in* The World Bank wesite. URL: http://www.worldbank.org/projects/P066051/forest-sector-development-project?lang=en.
[380] Kahrl, F., *supra* note 291. p. 10
[381] *Id.*

Table 16. Forest Funding

	Cambodia	Lao PDR	Myanmar	Thailand	Vietnam
• **Main PAM(s)**	• Ministry of Economy and Finance and MAFF established Forest Revenue Management System (2002)	• State Budget Law (2006) established the Forestry and Forest Resource Development Fund (FFRDF) • Environmental Protection Fund (EPF) (2005)	• Rural Development Fund	• Environment Fund	• Forest Regeneration Fund (FRF) 2004 Trust Fund for Forests (TFF) • 2005 Vietnam Conservation Fund (VCF) • 2008 Forest Protection and Development Fund (VNFF)
Highlights	• Revenue generated from forest concessions, logging coupe for domestic use through bidding, NTFP, fines for forest offenses, concession lands and road construction in forest areas, and planted forests[382]	• Revenue sources for FFRDF include fees from the collection of timber and NTFP harvests;[383] • EPF revenue sources include taxes, levies, development project and private sector contributions, and interest from EPF capital[384]	• The Convention on Biological Diversity lists Rural Development Fund as Myanmar's Environmental Fund; however, no information publicly available on current investments in the forestry sector[385]	• Revenue sourced by government endowment (USD 192 M) from Revolving Fund (USD 19.2 M) and Fuel Oil Fund (USD 173 million).[386] • Fund supports environmental and natural resource activities via low-interest loans and grants[387]	• FRF fund from harvest fees to reforestation, restoration, SFM[388] • VNFF funding via provincial windows to PFES programs; • TFF ended in 2012 • REDD+ Fund under development
Implementation Issues		• Five funding windows exist for EPF but most funding to date provided to policy implementation, capacity enhancement (PICE), biodiversity and community investment (BCI)[389]			

[382] San, V., 2003. "Chapter 1: Cambodia Background Paper" *in* Proceedings of the International Workshop: Reforming Forest Fiscal Systems to Promote Poverty Reduction, and Sustainable Forest Management. URL: http://www.profor.info/Documents/pdf/FFSProceedingsEnglish.pdf.
[383] Muziol, C. et al., (n.d.) Supporting REDD Implementation in Laos Through the Design of a REDD-Compliant Benefit Distribution System. URL: http://cmsdata.iucn.org/downloads/iucn_sensa_report_redd_bds_laos.pdf. p. 24.
[384] UNDP, (n.d.) Case Study Report: Environmental Protection Fund in Lao PDR. URL: http://www.asia-pacific.undp.org/content/dam/rbap/docs/Research%20&%20Publications/environment_energy/ncf/APRC-EE-2012-NCF-CaseStudy-Lao.pdf.
[385] Convention on Biological Diversity, (n.d.) Biodiversity Environmental Funds: Myanmar *in* Convention on Biological Diversity website. URL: http://www.cbd.int/financial/environmentfunds/. *See also* Myanmar Times, 2013. "Shan Govt. struggling to stop illegal timber trade" *in* Myanmar Times website. URL: http://www.mmtimes.com/index.php/national-news/7871-shan-govt-struggling-to-stop-illegal-timber-trade.html.
[386] Moye, M., 2002. Innovative Mechanisms to Manage Environmental Expenditures in Africa, Asia and Latin America and the Caribbean (LAC). Draft Background Paper for Discussion at Session III.2 of the OECD Global Forum on Sustainable Development: Conference on Financing the Environmental Dimension of Sustainable Development**.** URL: http://www.oecd.org/sweden/2083726.pdf. p. 9.
[387] Choeypun, K., (n.d.) "Thailand Environmental Fund" *in* Profiles of the NEFS: Thailand. URL: https://www.cbd.int/financial/trustfunds/Thailand-ef.pdf. p. 2.
[388] Rosenbaum, K., and Lindsay, J., 2011. An Overview of National Forest Funds: Current Approaches and Future Opportunities. FAO. URL: http://www.fao.org/docrep/003/x6821e/X6821E01.htm.
[389] Muziol, *supra* note 383.

Table 17. Regional Initiatives

Main PAM(s)	FLEG Bali Declaration on Forest Law Enforcement and Governance (2001)	Joint Forest Fire Prevention & Wood Trade Governance Memorandum of Understanding
Countries	• Cambodia • Lao PDR • Myanmar • Thailand • Vietnam	• Lao PDR • Vietnam
Highlights	Declared to: • take immediate action to intensify national efforts to address violations of forest law and forest crime; • eliminate export and import of illegally harvested timber; • involve stakeholders, including local communities, in forestry sector decision-making; • undertake demarcation, accurate and timely mapping and precise allocation of forest areas; • created regional taskforce[390]	• Promotes cooperation between Lao and Vietnam in the field of forest protection, forest law enforcement, controlling and preventing illegal trading and transportation of timber, forest products and wildlife contributing to the implementation of regional and international commitments and conventions in the fields of climate change, forest law enforcement, governance and trade (FLEGT), forest protection and biodiversity conservation[391]
Implementation Issues	• Countries struggle with limited human and financial resources; • absence of political will; • pervasive governance problems; • corruption; • increased demand for industrial crops[392]	

[390] Forest Law Enforcement and Governance East Asia Ministerial Conference, 2011. Ministerial Declaration. URL: http://siteresources.worldbank.org/INTFORESTS/Resources/Bali_ministerial_declaration.pdf.
[391] Memorandum of Understanding 2012-2017, *supra* note 242.
[392] Canby, K., 2011. Forest Governance in Asia: 10 Years after the Bali Declaration. EU FLEGT Facility, Forest Governance in Asia. p. 31,32.

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