



Food and Agriculture
Organization of the
United Nations

FOREST CHANGE IN THE GREATER MEKONG SUBREGION (GMS)

An overview of negative and positive drivers



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The Food and Agriculture Organization of the United Nations (FAO)
Bangkok, 2017

Forest change in the Greater Mekong Subregion (GMS): An overview of negative and positive drivers

ISBN 978-92-5-109911-7

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Citation: **Yasmi, Y., Durst, P., Haq, R.U. & Broadhead, J.** 2017. Forest change in the Greater Mekong Subregion (GMS): An overview of negative and positive drivers. Bangkok, FAO.

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(Left) Forest at Beoung Yak Lom, Ratanakiri Province, Cambodia ©FAO/Yeang Donal

(Middle) Agricultural expansion in Northwest Viet Nam ©FAO/Yurdi Yasmi

(Right) A farmer planting an acacia seedling as part of an afforestation effort in Viet Nam

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Foreword

This report presents forest changes in the Greater Mekong Subregion (GMS) over a period of 25 years between 1990 and 2015. It describes key drivers that have affected these changes. Some drivers influenced forests negatively in that they resulted in deforestation and forest degradation. On the other hand, positive drivers promoted sustainable forest management (SFM), afforestation and reforestation and forest conservation.

Forest changes in each GMS country have not been uniform due to variation in factors such as socio-economic progress, policy and governance, and demographic factors. While these factors are largely outside the forestry sector they have a huge influence on forests. The more direct factors that have influenced forest changes negatively include: agricultural expansion, road and dam infrastructure development, unsustainable and illegal logging, mining and forest fires. In contrast, positive forest changes have been made possible due to increased efforts in afforestation and reforestation, conservation and biodiversity protection and increased demand for green products. In recent years countries have also adopted supportive policy and legislation and people are more aware of the importance of sustainable SFM. The Sustainable Development Goals (SDGs) and the Paris Agreement are expected to further induce positive changes in forestry in the GMS.

The report is important as it provides an overview of what has happened to GMS forests in the last 25 years. In the past, most of our attention was paid mostly to the negative drivers. However, this report also touches upon positive drivers. It is encouraging to see that the GMS countries are taking efforts to improve forest management. Viet Nam is perhaps an interesting case where forest rehabilitation and restoration with the involvement of local communities have resulted in the country's gaining more forest cover. Other countries have also striven to sustainably manage their forests. While progress has been made, challenges remain.

Moving forward, there is an immediate need to tackle negative drivers. Concomitantly, concentrated efforts are required to strengthen the positive drivers. Regional cooperation needs to be improved given the illegal and unsustainable logging in the GMS. Forest law enforcement is needed to ensure that countries target major forest crimes. More localized ownership and control of forest land and more local participation in forest management decisions and land-use planning can improve the sustainability of forest management. Finally, governance needs to be improved through strengthened law enforcement, transparency, monitoring and evaluation, and anticorruption measures. Almost all these actions require a continuous and integrated approach rather than serving as one-off activities.

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Acknowledgements

This report was developed through collaboration with various individuals and institutions. FAO would like to acknowledge the contribution of the USAID Lowering Emissions in Asia's Forests (USAID-LEAF) programme for coordinating the GMS country assessments in Cambodia, Lao PDR, Myanmar, Thailand and Viet Nam. John Costenbader, Theo Varns, Adriana Vidal, Lauren Stanley and Jeremy Broadhead produced a technical report in 2015 based on regional analysis. The current publication benefited from that report. Most of the data in the current report are from the Forest Resource Assessment of 2015 and further research and analysis. It has also benefited from a workshop held in Clark, Philippines during the Third Asia-Pacific Forestry Week (APFW) in February 2016 that FAO held jointly with the Environmental Science for Social Change (ESSC).

The following country authors need special thanks: Chhun Delux (Cambodia), Ian Lloyd Thomas (Lao PDR), Maung Maung Than (Myanmar), Woranuch Emmanoch and Preecha Ongprasert (Thailand) and Do Anh Tuan (Viet Nam). These authors presented their country findings in a regional workshop in Bangkok in January 2015 and in Clark in February 2016.

The authors are especially grateful to the following individuals for their constructive comments and contributions: Brian Bean, David Ganz, Thuy Phuong, Kenneth MacDicken, Kenichi Shono, Yam Malla, Tran Ngoc The, Nguyen Tuong Van, Sok Khim, Chun Laoi, Neil Byron, Rowena Soriaga, Pedro Walpole and Maria Paula Sarigumba. Robin Leslie edited this document.

Acronyms and abbreviations

5MHRP	5 Million Hectare Reforestation Programme
ASEAN	Association of Southeast Asian Nations
CBD	Convention on Biological Diversity
CBE	Community-based Ecotourism
CDM	Clean Development Mechanism
CFD	Community Forestry Division
CFI	Community Forestry International
CFI	Community Forestry Instruction (Myanmar)
CFM	Community Forest Management
CFNWG	Community Forestry National Working Group
CFP	Community Forest Programme (Thailand)
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMDGs	Cambodian Millennium Development Goals
CSO	Civil Society Organization
CSR	Corporate Social Responsibility
CTP	Conversion Timber Project
DoFP	Department of Forest Protection of Viet Nam
DZGD	Dry Zone Greening Department (Myanmar)
EFI	European Forest Institute
EIA	Environmental Impact Assessment
ELC	Economic Land Concession
ESSC	Environmental Science for Social Change
EU-FLEGT	European Union-Forest Law Enforcement, Governance and Trade
EUTR	European Union Timber Regulation
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
FFCD	Forest Fire Control Division (Thailand)
FHS	Fire Hotspots
FIO	Forest Industry Organization (Thailand)
FIPI	Forest Inventory Planning Institute
FLA	Forest Land Allocation
FLEG	Forest Law Enforcement and Governance
FLEGT	Forest Law Enforcement, Governance and Trade
FLR	Forest Landscape Restoration
FMP	Forestry Master Plan (Myanmar)
FOMACOP	Forest Management and Conservation Programme
FRA	Forest Resources Assessment
FREC	Forest Resources and Environmental Centre
FS2020	Forestry Sector Strategy 2020
FSC	Forest Stewardship Council
FSDP	Forest Sector Development Project
G8	Group of 8 Developed Nations



GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographical Information System
GMS	Greater Mekong Subregion
GNI	Gross National Income
GoL	Government of Lao PDR
GW	Global Witness
ICIMOD	International Centre for Integrated Mountain Development
ILO	International Labour Organization
ITTA	International Tropical Timber Agreement
LEAF	Lowering Emissions in Asia's Forests
LFA	Land and Forest Allocation
MAFF	Ministry of Agriculture, Forestry and Fisheries (Cambodia)
MARD	Ministry of Agriculture and Rural Development (Viet Nam)
MODIS	Moderate Resolution Imaging Spectroradiometer
MoE	Ministry of Environment (Cambodia)
MSS	Myanmar Selection System
MTE	Myanmar Timber Enterprise
NESAP	National Environment Strategy and Action Plan (Cambodia)
NESDP	National Economic and Social Development Plan (Thailand)
NFP	National Forest Programme (Cambodia)
NGO	Non-Government Organization
NGPES	National Growth and Poverty Eradication Strategy (Lao PDR)
NWFP	Non-wood Forest Product
ODC	Open Development Cambodia
PEFC	Programme for the Endorsement of Forest Certification
PES	Payments for Ecosystem Services
PFE	Permanent Forest Estate
PSD	Planning and Statistics Department (Myanmar)
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RFD	Royal Forest Department (Thailand)
RGC	Royal Government of Cambodia
SEI	Stockholm Environment Institute
SFE	State Forest Enterprise
SFM	Sustainable Forest Management
SUFORD	Sustainable Forestry and Rural Development Project
TAO	Tambon Administration Organization
TEV	Total Economic Valuation
TLAS	Timber Legality Assurance System
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VGGT	Voluntary Guidelines on Responsible Governance of Tenure of Land, Forests and Fisheries in the Context of Food Security
VIIRS	Visible Infrared Imaging Radiometer Suite
VPA	Voluntary Partnership Agreement

Executive summary

Forests in the Greater Mekong Subregion (GMS) have been undergoing change in the last 25 years due to various factors. Positive and negative changes occur at the same time. There have been many studies on drivers of deforestation and forest degradation. However, there is a dearth of knowledge on the positive drivers, those that promote sustainable forest management (SFM), forest conservation, afforestation, and reforestation. This report looks at both negative and positive drivers that have affected forest change in the GMS between 1990 and 2015 for a better understanding of their influence on forests in the region. It concludes with recommendations to address negative drivers and enhance positives ones. The primary source of the data was FAO's Forest Resources Assessment (FRA) of 2015. In addition, we also used data from individual country reports and secondary data through research.

The GMS is a dynamic and fast-changing region. Rapid population growth is a common characteristic of all the GMS countries. With a population of 180 million in 1990, this figure had risen to 237 million people by 2015. Myanmar, Thailand and Viet Nam host 91 percent of the total population of the GMS with Viet Nam being the largest at 93 million. GMS countries made significant socio-economic progress from 1990 to 2015 but progress has not been uniform across the region. The dependence of economies on various resources and the high level of societal inequality are well reflected in the economic indicators. For example, Gross National Income (GNI) per capita in 2015 ranged from US\$1 070 to US\$1 980 for Cambodia, Myanmar, Lao PDR and Viet Nam compared to over US\$5 620 in Thailand.

The FRA 2015 estimated 88.4 million hectares (ha) of forest area in the GMS, which is equivalent to 46 percent of the region's land area. Out of this, only 13 percent is primary forest, 10 percent is planted forest and the remaining 77 percent is mostly degraded natural forest. Lao PDR had the highest forest area with 81 percent of the total land area of the country. In terms of actual forest area, Myanmar was highest with 29 million ha in 2015. There have been considerable changes in forest area of the GMS in the past 25 years. Forest area in GMS countries decreased from more than 48 percent in 1990 to less than 46 percent in 2015. However, estimates on the extent of forest loss and change vary among countries. Overall in the study period, the GMS had a 5 percent decline in forest area, mainly due to forest loss of around 1.2 percent annually in Cambodia and Myanmar, but at the same time, Thailand and Viet Nam experienced forest gain due to forest plantation.

Agricultural expansion, infrastructure development, particularly hydropower dams and road construction, illegal and unsustainable logging, mining operations and forest fires are the most dominant drivers of forest loss. Land-based sector development is expanding in all GMS countries, but interestingly, the extent to which it is affecting forests varies from country to country. For instance, agricultural expansion increased by 30 percent in Cambodia during 1990 to 2013 and in this period Cambodia lost 25 percent of its forests. On the

other hand, Viet Nam showed an increase in forest area especially through rehabilitation and afforestation programmes and agricultural area by 55 and 62 percent. Rubber, oil-palm plantation and agricultural development are major drivers of forest change in the region. Agricultural expansion in the GMS has been aided by economic land concessions (ELCs) for local and foreign investors, which in Cambodia leads to widespread deforestation. Infrastructure development, especially the development of hydropower dams, poses a major threat to GMS forests due to lack of proper planning. More than 750 dams have been tracked on the Mekong River.

Unsustainable and illegal logging operations are threatening the existence and viability of forests in the GMS. The mining industry has also affected forests negatively. The share of mining in the Gross Domestic Product (GDP) of GMS countries increased significantly from 2000 to 2010. In Viet Nam the share is around 11 percent of the GDP; similarly, projected deforestation due to mining activities in Lao PDR ranges from 5 100 to 14 100 ha annually. Furthermore, human-induced forest fires are also common in the GMS during the dry period. Typical reasons behind these fires are land clearing, hunting, swidden agriculture, pest removal, promoting grass growth for cattle grazing, burning stubble, honey collection and accidental burning. Among the indirect drivers, population growth, socio-economic progress and weak governance are the main causes of forest loss. Interestingly, GMS countries with higher rates of deforestation were also ranked higher in terms of their corruption indexes, reflecting the role of poor governance in forest loss.



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Photo 1. A villager collect forest product from forest mountain, Son La province, Viet Nam

Long-term forest exploitation in the GMS has directed governments to reconsider their forest management plans, policies and legislations. There have been signs of positive trends in the last decade, including increased efforts towards SFM, forest conservation, and afforestation and reforestation programmes. As a result of SFM policies and initiatives, the forest area under protected areas increased by around 70 percent during 1990 to 2015. Otherwise, an increase of around 64 percent was observed in forest area designated for conservation of biodiversity and similarly, forest area certified under the Forest Stewardship Council (FSC) certification scheme increased significantly. In all countries, new regulations and policies related to logging, timber exports, protected areas, green products and so forth have resulted in an increasing trend towards managing forests sustainably.

GMS countries are gradually involving communities in forest management. This shift is supported by improved understanding that achieving SFM is not possible if governments do not actively engage and work with a wider set of stakeholders. Development of participatory forestry, local forest management initiatives and land allocation have helped to decrease deforestation, forest degradation and in some cases have helped in forest regeneration. Successful examples of participatory forest management can be seen in Cambodia and Viet Nam. In Viet Nam by 2015, about 1.1 million ha of forest (85 percent of which were natural forests) were managed under the community forest management (CFM) system. Secondly, the participation of local communities is a requirement for forest management plans in all GMS countries now. A number of global initiatives like Reducing Emissions from Deforestation and Forest Degradation (REDD+) and payments for ecosystem services (PES) as well as external pressures and certification schemes like European Union-Forest Law Enforcement, Governance and Trade (EU FLEGT) for timber from sustainably managed forests also influence this shift.

Almost all countries in the region have adopted policies that support SFM and balance the social, economic and environmental aspects of forestry. Furthermore, there seems to be an emerging movement from forest resource exploitation towards more sustainable policies. Although policies addressing the drivers of deforestation exist at local, national and international levels, their effectiveness has been rather mixed. Progress has been demonstrated in some areas but at the same time challenges continue to persist.

Based on the analysis of negative and positive drivers, this report suggests focusing on the following measures to mitigate negative drivers and promote positive ones:

1. There is a need to implement comprehensive land-use planning with proper implementation, monitoring, evaluation and harmonization among different policies, objectives, and sectors. This intersectoral coordination at country and regional levels will help in targeting major negative drivers like agricultural expansion, hydropower development, illegal logging and forest fires.
2. Involvement of various sectors will not only help in reconciliation but also help in more involvement of people for the management of forests. Particularly for agriculture, there is a need for more focus on an increase in environmentally friendly and highly productive crops instead of clearing forest land for agriculture.

3. Forest law enforcement and legal reform are needed to ensure that countries target major forest crimes together. At the state level, governance needs to be improved by strengthening law enforcement, transparency, monitoring and evaluation, and anticorruption measures.
4. Enabling access to certified forest and agricultural product markets could help to drive positive forest and land-use outcomes in GMS countries. Similarly, PES and REDD+ initiatives have considerable promise for GMS countries to incentivize SFM and forest conservation, and they need to be scaled up in all GMS countries.
5. At the local level, more localized ownership and control of forest land should be implemented and improved through land allocation to local populations and participatory forest management as this should encourage better protection of standing forest and restoration of degraded forest land.
6. There is a need to strengthen civil society organizations (CSOs) and increase awareness about SFM as both set conditions for promoting positive drivers.
7. Forest-related research needs to be supported and enhanced. Data and information should be updated by both ground-level surveys and through satellite monitoring. Statistical databases should be maintained with improved accuracy and reliability. Easy-to-use and widely accessible maps should be generated for public understanding and awareness for which there is a dire need for capacity development at various stakeholder levels.



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Part 1. Introduction

Over the last 25 years, the world's forests have undergone substantial changes in dynamic and diverse ways (FAO, 2015a; MacDicken *et al.*, 2015a). In certain regions and countries, the changes have been more rapid. However, while the net forest loss has been cut by 50 percent and progress on sustainable forest management (SFM) has shown positive results, natural forests continue to decline while plantation forests are on the rise (MacDicken *et al.*, 2015b; Sloan and Sayer 2015). Encouragingly though, larger areas are now being designated for the conservation of biological diversity. Certainly, a number of these changes can be attributed to population growth and the evolving demands of our modern society but the way we manage our forests today is different now and will never be the same again (Agrawal *et al.*, 2008). What drives all these changes in forestry?

This report attempts to address this fundamental question by focusing on drivers impacting the GMS forestry sector in the last 25 years (1990-2015) in Cambodia, Lao PDR, Myanmar, Thailand and Viet Nam. These drivers are key variables that determine the direction of forest and forestry development (FAO, 2010). They influence societal changes and have significant impacts on forests and forestry. There are two types:

1. Direct drivers which are human activities that directly alter forests, for example, conversion of forest land to other uses.
2. Indirect drivers relate to wider processes such as changing policies, markets and population growth (Kissinger *et al.*, 2012).

These drivers have negative and positive impacts on forests. If they generate deforestation and forest degradation they are negative. On the other hand, if they enable SFM, forest conservation, afforestation and reforestation they are positive (Costenbader *et al.*, 2015). Both drivers interact simultaneously in time and space. Forests may be better or worse off depending on which driver has a stronger influence. Policies define how both types of drivers operate and what impacts they have on forests.

FAO has conducted a series of assessments on these drivers in Asia and the Pacific for several years, including in the GMS (FAO, 2010; FAO, 2011). Building on this and using the latest data, the current assessment explores negative and positive drivers of forest change in the GMS.



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Photo 2. Forested landscape in Viet Nam

It is different from a traditional report on drivers of deforestation as the current report includes an in-depth analysis of positive drivers. This report is built on individual country assessments in the GMS, a technical report by Costenbader *et al.*, (2015), various workshops between 2014 and 2016 and secondary research. Certainly, there are challenges in measuring progress in the GMS as some data are not available, incomplete or the accuracy of reported data may be questioned.

The next section provides an overview of forests and forestry in the GMS. It is followed by a description of negative and positive drivers. Key conclusions and recommendations are proposed at the end.



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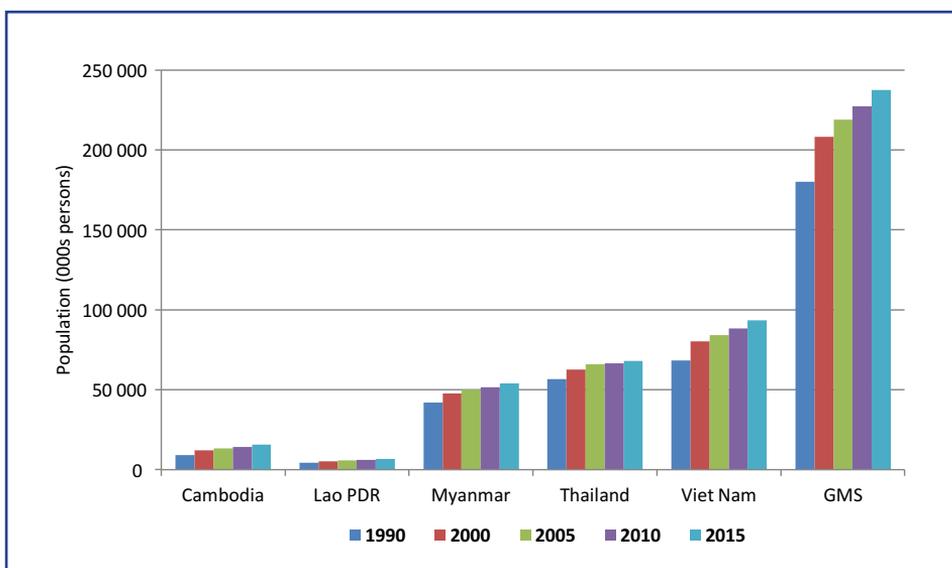
Part 2. Forests in the Greater Mekong Subregion (GMS)

2.1 The Greater Mekong Subregion (GMS): A dynamic and rapidly changing region

In the last 25 years, 57 million new people have joined the GMS, an average increase of 2.3 million people annually. Rapid population growth is a common characteristic of all the GMS countries as depicted in Figure 1. With a population of 180 million in 1990, the region by 2015 was home to 237 million people. Myanmar, Thailand and Viet Nam have relatively higher populations than Cambodia and Lao PDR. They host 91 percent of the total population of the GMS with Viet Nam being the largest with 93 million inhabitants.

From 1990 to 2015 GMS countries made significant socio-economic progress and now are shifting towards a more diversified market-based economy, but the shift is not uniform in each country. There is also a significant difference in per capita income; Gross National Income (GNI) per capita in 2015 ranged from US\$1 070 to US\$1 980 in Cambodia, Myanmar, Lao PDR and

Figure 1. GMS population change (1990-2015)



Source: World Bank, 2016

Viet Nam compared to over US\$5 620 in Thailand. The dependence of economies on various resources and the high level of inequality is clear from the economic indicators (Table 1).

Economic development in the region since 1990 has been supported by various land-based sectors and exports of commodities, of which quite a few are also driven by the extraction of natural resources (ADB, 2012). The variation in economies among GMS countries poses various degrees of threat to the environment and particularly forests. In some cases, the result has been severe pressure on the resource base causing depletion, environmental

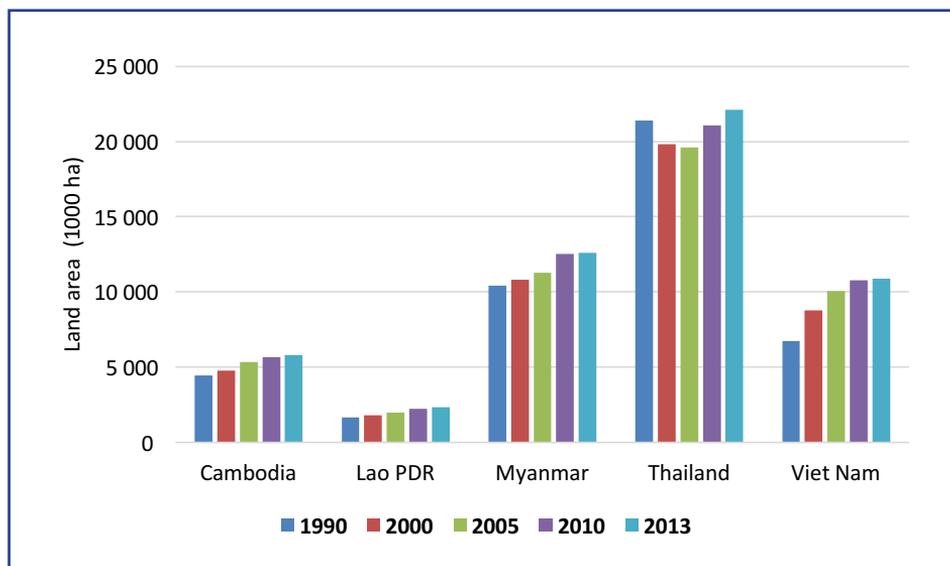
Table 1. Economic profiles of GMS countries

Country/ Territory	Income category	GNI per capita (2015)	Total GDP 2015	Value added (% of GDP) 2014		
		(US\$)	(US\$ Million)	Agriculture	Industry	Services
Cambodia	Lower	1 070	18 050	30	27	43
Lao PDR	Lower middle	1 730	12 328	28	31	41
Myanmar ¹	Lower	1 244	64 866	28	34	38
Thailand	Upper middle	5 620	395 282	11	37	52
Viet Nam	Lower middle	1 980	193 599	18	33	39

Source: World Bank, 2016.

¹ For Myanmar, the values are taken from UN country profile data (available at: <http://data.un.org/CountryProfile.aspx?crName=myanmar>). The value of agriculture, industry and services is the percent of gross value added at producers' prices.

Figure 2. Change in agricultural land area in the GMS (1990-2013)



Source: FAO (2016a).

degradation and ecosystem fragmentation. This demographic and economic unevenness has also inevitably brought spatial and income inequalities along with adverse effects on environmental and socio-cultural dimensions. Figure 2 shows the change in agricultural land area from 1990 to 2013; with the exception of Thailand, all countries experienced an increase in agricultural area. This trend, unfortunately, had an impact on forests as well.

The national environmental performance assessment reports show that GMS-wide environmental indicators are experiencing downward trends, although government responses are improving to some extent. Continued unsustainable resource extraction practices could seriously undermine the future economic development of the subregion.

The GMS has divergent cultural, social and historical values. There are huge diversities in terms of local ethnicities. According to ADB (2012), the numbers of various tribes and ethnic minorities exceeded 80 million. Their intimate knowledge of traditional systems related to the use and management of resources inherited from their ancestors makes these ethnic groups an important asset in the region. Many of their practices are considered to be environmentally friendly and they are often referred to as the 'guardians of nature' (ADB, 2012). Furthermore, for many indigenous people, forests have spiritual values or cultural significance. Often forests are used as traditional 'space' for burials, religious activities and so forth (FAO, 1990).

2.2 Forests in the Greater Mekong Subregion (GMS)

Before the 1970s, the GMS was a highly forested region. Wet evergreen forests covered the Cardamom and Elephant mountains of Cambodia and the Annamites in Viet Nam,

Box 1. Classification of forests according to FAO

Primary forests: Naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.

Other naturally regenerated forests: Naturally regenerated forest where there are clearly visible indications of human activities.

Planted forests: Forest predominantly composed of trees established through planting and/or deliberate seeding.

Source: FAO (2015b).

while evergreen, semi-evergreen and dry dipterocarp forests dominated the landscapes of northern and central Thailand, Lao PDR and Cambodia (MRC, 2003).

GMS countries lost a third of their natural forest area in less than 40 years between 1973 and 2009, and are forecast to lose another third of their remaining forest cover by 2030 (WWF, 2013). Furthermore, many remaining forest areas are either diminishing, severely fragmented or degraded (FAO, 2011; Chaudhury, 2009; Stibig *et al.*, 2007). Economic growth supported by excessive extraction of resources and conversion of forest area for agriculture, plantation estates, infrastructure, and mining pose some of the greatest threats to natural forests in the region (Xing, 2013). Foreign and domestic land-related investments in GMS countries represent a major immediate driver of forest change. Meanwhile, demand from China, Thailand and Viet Nam for natural resources, timber and agricultural products is also driving forest change in GMS countries.

The FRA 2015 estimated 88.4 million ha of total forest cover in the GMS, which is equivalent to 46 percent of the subregion's land area. Although estimates on the extent of forest loss and change vary among studies, the overall picture for the GMS is one of rapid forest decline, mainly due to forest loss in Cambodia and Myanmar; but at the same time Lao PDR, Thailand and Viet Nam have experienced forest gain primarily due to the increase in area of other naturally regenerated forests or secondary forests and in the case of Lao PDR there has been a reclassification of forest area (Figure 3).

Between 1990 and 2015, a total of 4.7 million ha of forest is reported to have been lost (a 5 percent decline), with an average annual decrease of 0.2 percent over the period. Forest cover is still declining in Cambodia but the decline is less severe than before; forest area in Lao PDR has shown some increase. In the last FRA report, Lao PDR had reclassified forest area, which may explain this change. Whether actual forest cover has increased is debatable. Myanmar was the only country where the decline became severe during 2010 to 2015. The annual increase in forest area was highest for Viet Nam among the GMS countries.



Table 2. Changes in forest cover in the GMS countries

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

Source: FAO (2015a).

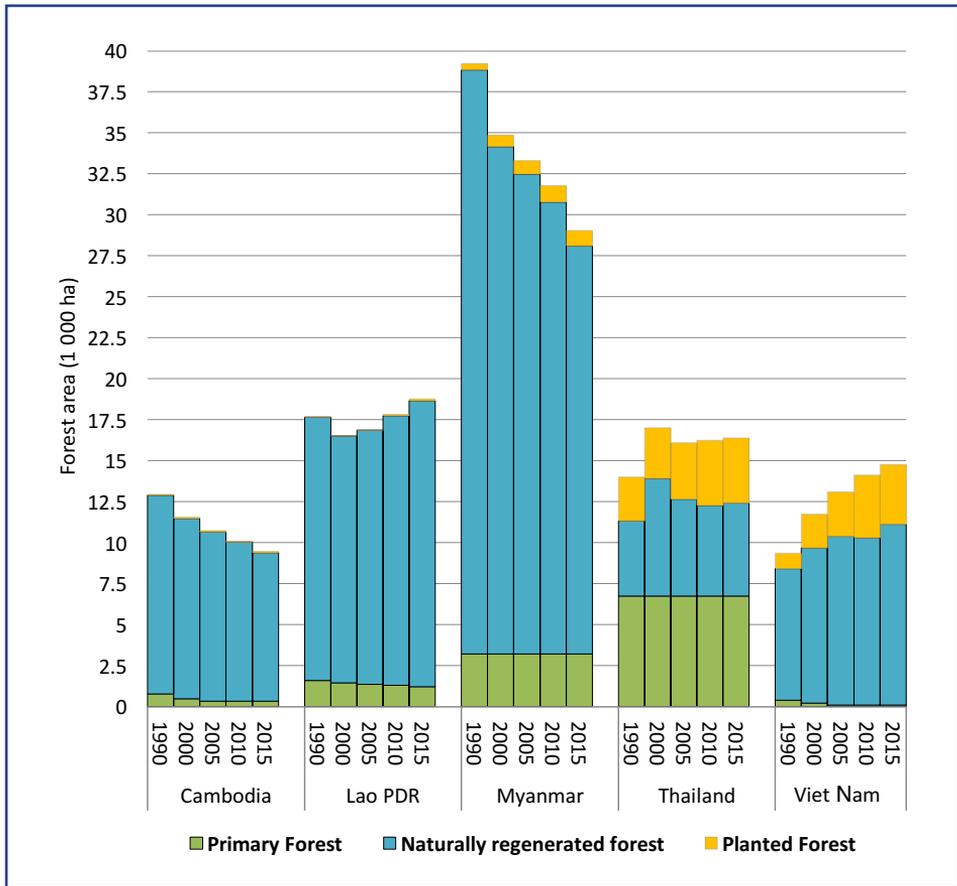
The FRA 2015 showed that out of total forest cover of 88.4 million ha in 2015, only 13 percent was primary forest, about 10 percent was tree plantations and the remaining 77 percent was mostly degraded natural forest or secondary forests. Primary forest has virtually disappeared in Viet Nam except in protected areas or well-conserved forests while in Cambodia it is extremely low and in Lao PDR it is rapidly decreasing. While FRA data suggest that the primary forest area is constant in Myanmar and Thailand, it is important to note that Thailand assumes that all forests inside national parks are primary. Myanmar does not have adequate data to assess primary forest cover, so the country has used the same figure since 1990 (Figure 3).



©Kenichi Strano

Photo 3. Agricultural expansion in Mae Hong Son, Thailand

Figure 3. Changes in forest types in the GMS (1990-2015)



Except for Cambodia and Myanmar, in all other GMS countries, the area of planted forests increased between 1990 and 2015. Thailand and Viet Nam have reported the largest increases and together account for 85 percent of all planted forest in GMS countries. For Myanmar, planted forest, which showed an increase from 1990 to 2010, declined during 2010 to 2015, while for Cambodia it remained constant, although due to the relatively very small area it is hard to see in Figure 3.

Reported areas of primary forest have dropped in Cambodia, Lao PDR, and Viet Nam, but have exhibited little to no change in Myanmar and Thailand since 1990. Again, it is important to note how Thailand and Myanmar define their primary forests as explained above. Myanmar has the greatest total remaining forest area but has also seen the greatest forest loss among the Mekong countries. Most of the decrease has been in the other naturally regenerated forests, with a much smaller portion of deforestation being reported in the remaining primary forests.

2.3 Country profiles

2.3.1 Cambodia

The total area of Cambodia is around 18.1 million ha. The total population in 2015 was 15.6 million – it increased by approximately 73 percent during 1990 to 2015, with a 62 percent increase in rural population and a 130 percent increase in urban population. Most people (close to 80 percent) are still living in rural areas (World Bank, 2016).

The total forest area of Cambodia is 9.46 million ha. The FRA 2015 revealed a continuing trend in forest cover loss in the last two decades, particularly primary forest. During 2005-2010, Cambodia is reported to have had the highest rate of deforestation in the GMS. From 1990 to 2015, total forest area declined from 74.7 percent to 53.9 percent (12.94 million ha to 9.46 million ha), which represents approximately a 27 percent decline in overall forest cover. Severe decline (58 percent) was observed in the primary forest area. Naturally regenerated forest showed a 25 percent decline, while only planted forests showed an increase of around 3 percent (see Table 3). Data from other sources show that the decline is even worse and forest cover is now less than 50 percent (ODC, 2016).

Table 3. Changes in forest cover in Cambodia (1990-2015)

Cambodia	1990	2000	2005	2010	2015	Change from 1990 to 2015
	million (ha)					(%)
Primary forest	0.77	0.46	0.32	0.32	0.32	-58
Planted forest	0.07	0.08	0.07	0.07	0.07	3
Naturally regenerated forest	12.11	11.01	10.34	9.70	9.07	-25
Total	12.94	11.55	10.73	10.09	9.46	-27

Source: FAO (2015a).

As in most tropical nations the economic welfare of rural people, particularly forest dwellers, depends primarily on agriculture, and forest and non-wood forest products (NWFPs). Escalating demand for, and pressures on land and natural resources from increasing population growth, rapidly rising unemployment, internal migration and developments in infrastructure and other economic sectors, combined with weak legislation/law enforcement, have exposed the forests to deforestation and led to conflicts over rights of access and use (Kingdom of Cambodia, 2010).

Forest management in Cambodia is under the jurisdiction of two ministries: The Ministry of Agriculture, Forestry and Fisheries (MAFF) and the Ministry of Environment (MoE). The Ministry of Environment and Natural Resources was created in early 2016 to focus on conservation. In addition, there are policies and legislative framework for the development of the forestry sector, key statutes being the Forest Law (2002), Law on Protected Area (2008) and Guidelines on Community Forestry (2006). The National Forest Programme (NFP), for the

period 2010-2029, provides strategic directions that place governance at the heart of SFM and increasing forest contributions to national development objectives.

Equally relevant frameworks are:

- Cambodian Millennium Development Goals (CMDGs);
- The National Strategy Development Plan;
- The Rectangular Strategy for Growth, Employment, Equity and Efficiency;
- The Governance Action Plan;
- The Strategic Framework for Development Cooperation;
- The National Poverty Reduction Strategy;
- The Environment Protection Action Plan; and
- The National Sustainable Development Programme.

With the development of the country's environmental code, the framework and foundation for improved land-use management systems, tackling environmental degradation and so forth will also be addressed. The National Environment Strategy and Action Plan (NESAP) is also being updated. Cambodia is committed to following international conventions and standards such as the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), the Ramsar Convention on Wetlands of International Importance, the Convention for the Protection of the World's Cultural and Natural Heritage, the International Labour Organization's (ILO) Convention No. 169, the International Tropical Timber Agreement (ITTA) and the Voluntary Guidelines on Responsible Governance of Tenure of Land, Forest and Fisheries (VGGT) among others.

2.3.2 Lao PDR

Lao PDR has an area of 23.7 million ha. The total population in 2015 was 6.8 million, increasing by around 60 percent during 1990 to 2015; a rapid increase of around 313 percent was observed in the urban population while a 20 percent increase was seen in the rural population. Most of the population (63 percent) still lives in rural areas (World Bank, 2016).

Lao PDR has the highest national forest cover percentages in the GMS (81 percent) with a total forest area of 18.76 million ha. The FRA 2015 showed an increasing trend in forest cover of around 6 percent during 1990 to 2015. During 2000 to 2015 there was a 13.5 percent increase. Over this period there was an expansion of naturally regenerated and planted forests, while primary forests declined by around 25 percent (see Table 4). There is still some ambiguity in the definition and classification of forests in Lao PDR, which may also explain the reported number of forest area in the recent FRA. Lao PDR has used a 20 percent canopy threshold as a definition of forest in its land/forest cover mapping.

In order to estimate the extent of forest area that meets FAO's forest definition, an assumption that 60 percent of temporarily unstocked forest lands has a canopy cover of at least 10 percent (or is expected to reach that threshold) was used. In other words, 60 percent of forest

lands classified as temporarily unstocked area was added to the forest class to adjust the national data to FRA reporting.

The spatial distribution of deforestation shows that expansion of agriculture into more accessible forest areas continues to be a leading cause of deforestation throughout Lao PDR. At the same time, large forest areas in more inaccessible and mountainous areas still remain relatively intact. Illegal logging continues to be a serious issue adding to already extensive natural forest losses caused by large-scale conversions to agriculture, industrial tree plantations, mining, hydropower dams and other infrastructure projects (Costenbader *et al.*, 2015).

In Lao PDR, regulations and policies related to timber logging and exports aim to conserve existing natural forests and steer the country towards SFM but, to date, the country’s forest management and related governance strategies have been weak and there is considerable scope for improvement.

Table 4. Changes in forest cover in Lao PDR (1990-2015)

Lao PDR	1990	2000	2005	2010	2015	Change from 1990 to 2015
	million (ha)					(%)
Primary forest	1.59	1.44	1.36	1.28	1.19	-25
Planted forest	0.00	0.02	0.03	0.07	0.11	N/A
Naturally regenerated forest	16.05	15.07	15.48	16.47	17.45	9
Total	17.64	16.53	16.87	17.82	18.76	6

Source: FAO (2015a).

The 2003 Lao Constitution (Article 19) stipulated that all organizations and citizens must protect natural and environmental resources in Lao PDR – land surfaces, underground resources, forests, animals, water reserves and the atmosphere. The main law related to forestry in Lao PDR is the 2007 Forestry Law, which sets measures as well as regulations for sustainable management, conservation, development, inspection and use of forest land and resources. The Environmental Protection Law, No. 02-99/NA specifies required measures and principles and regulations for managing, monitoring, restoring and protecting the environment. The Forestry Sector Strategy 2020 (FS2020) is the official guide for sustainable management and development in Lao PDR’s forestry sector. The FS2020 also presents the National Growth and Poverty Eradication Strategy (NGPES), which is the leading document for Lao PDR’s holistic development programme. The Forest Resources Inspection Strategy Action Plan was established in 2013; this document supports the FS2020 and details the Department of Forests’ inspection responsibilities and plan of action. It was designed to help address illegal logging, timber and wildlife smuggling, and related corruption issues in Lao PDR.

Lao PDR has made commitments to international agreements on forestry and other environmental issues such as the UNCCD, the UNFCCC, the CBD and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), among others.

2.3.3 Myanmar

Myanmar has an area of 67.7 million ha. With a total population of 53.9 million in 2015, there was a 28 percent increase from 1990 to 2015, with a 78 percent increase in the urban population while a 12 percent increase was observed in the rural population. Most of the population (66 percent) is still rural (World Bank, 2016).

Myanmar has a wide variety of forests, dominated by tropical evergreen forests, mixed deciduous forests, dry forests and temperate evergreen forests. The total forest area of Myanmar in 2015 was 29 million ha. Myanmar has retained forest cover of 43 percent and is the world's leading source of teak from natural forests. During 1990 to 2015, a 26 percent decrease was reported for overall forest cover. In the FRA 2015, Myanmar reported that the area of primary forest had largely remained constant. However, in recent years there has been a lack of updated and reliable data. Concomitantly, planted forests, which comprise only 3.2 percent of the total forest area, have shown an increase. Naturally generated forest experienced a 30 percent decrease during 1990 to 2015 (see Table 5).

Table 5. Changes in forest cover in Myanmar (1990-2015)

Myanmar	1990	2000	2005	2010	2015	Change from 1990 to 2015
	million (ha)					(%)
Primary forest	3.19	3.19	3.19	3.19	3.19	0
Planted forest	0.39	0.70	0.85	0.99	0.94	140
Naturally regenerated forest	35.63	30.98	29.28	27.59	24.91	-30
Total	39.22	34.87	33.32	31.77	29.04	-26

Source: FAO (2015a).

An over-reliance on forestry for the national economy, illegal logging, shifting cultivation and other causes resulted in a decreasing trend in forest cover during the period 1990-2015. All the direct causes of deforestation and forest degradation, which include overexploitation, illegal logging, shifting cultivation, agricultural expansion, demand for fuelwood, forest fires, settlement, and mining, appear to prevail in Myanmar.

Four governmental institutions under the Ministry of Forestry participate in the forestry sector. The Forest Department in a broad sense is responsible for ensuring production and protection functions of Myanmar's forests based on sustainability principles. The Myanmar Timber Enterprise (MTE) carries out various economic activities involved with the forestry sector such as harvesting of timber, milling, downstream processing and forest product marketing. In the dry zones of central Myanmar, the Dry Zone Greening Department (DZGD) works on reforestation in degraded land and associated restoration efforts. The Ministry of Forestry's Planning and Statistics Department (PSD) coordinates and facilitates work of the Department of Forests, the MTE, and the DZGD. It also functions as a forest policy forum.

The formulation of forest policy in Myanmar has an all-inclusive and well-adjusted approach and lies within the framework of environmental protection and sustainable development.



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Photo 4. Nursery in Yedashe Township, Myanmar

The policy takes into account the principles of forestry that were adopted at the United Nations Conference on Environment and Development (UNCED) in 1992. A law, replacing the Forest Act of 1902, was enacted in November 1992 and this new law stressed environmental protection and biodiversity conservation. It also provides the basis for creating permanent forest estate and protected areas. The law shows a shift in the role of the government from restricting access to forests as well as generating revenues to motivating locals and sharing management responsibilities in general. The Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law replaced the Burma Wildlife Protection Act of 1936 in 1994. The maintenance and restoration of habitats, protecting rare endangered fauna and flora, establishing natural protected areas and new parks, and management of buffer zones are highlighted in the law. Recently, the multistakeholder platform –the Community Forestry National Working Group (CFNWG) – undertook the revision of the 1995 Community Forestry Instruction (CFI) with the help of NGOs and development partners. The 1992 Forest Law has also been amended to include the changes in the CFI and other rules or instructions.

Myanmar has made commitments to international agreements on forestry and other environmental issues such as the UNCCD, UNFCCC and CBD, among others.

2.3.4 Thailand

Thailand has an area of 51.3 million ha and in 2015 the population hovered at 69 million. Between 1990 and 2015 it increased by 20 percent but the rural population decreased by

16.3 percent owing to migration to urban areas where a 103 percent increase was reported. Currently, rural and urban populations in Thailand are almost similar (World Bank, 2016).

Thailand is dominated by evergreen and deciduous forest. Formerly, more than half of the country was under forest cover, but forests have been depleted due to exploitation and conversion to other land uses; it had declined to below 40 percent by 1990. The total forest area of Thailand in 2015 was 16.4 million ha or 32 percent of the total land area. From 1990 to 2015, a 17 percent increase was observed in overall forest cover; planted forest and naturally regenerated forest areas rose by 49 and 23 percent respectively (see Table 6).

Table 6. Changes in forest cover in Thailand (1990-2015)

Thailand	1990	2000	2005	2010	2015	Change from 1990 to 2015
	million (ha)					(%)
Primary forest	6.73	6.73	6.73	6.73	6.73	0
Planted forest	2.67	3.11	3.44	3.99	3.99	49
Naturally regenerated forest	4.61	7.17	5.93	5.54	5.69	23
Total	14.01	17.01	16.10	16.25	16.40	17

Source: FAO (2015a).

Infrastructure development, land clearance for agriculture and the hotel industry, forest fires, illegal logging and agricultural expansion are the major factors behind deforestation in Thailand. These drivers are also connected to policy gaps and a management approach that lags behind international best practices.

Thailand's first comprehensive National Forest Policy was passed in 1985 based on the principles of SFM. It underscores environmental protection. Harmonized public and private sector management of forests is stressed as is reforestation for industrial wood production and environmental protection. Despite the logging ban on all commercial logging in 1989 illegal logging continued. In 1991, the Royal Forest Department (RFD) began developing a Community Forestry Bill to allow local community involvement in managing forests in and around national reserves. However, the bill has made little progress despite being redrafted several times. It was never passed and approved.

Thailand's forest-related policy, legislation and institutional frameworks distinguish protection and production forests. In 2002, the RFD was divided into three departments: the RFD (responsible for forests outside protected areas); the Department of National Parks, Wildlife and Plant Conservation, and the Department of Marine and Coastal Resources. At present, Thailand has six laws dealing with forests, namely: (1) The Forest Law B.E.² 2484; (2) the National Parks Law B.E. 2504; (3) the National Reserved Forest Law B.E. 2507; (4) the Wildlife Conservation Law B.E. 2535; (5) the Forest Plantation Law B.E. 2535; and (6) the Chain Saw Law B.E. 2545. These laws have issued rules and regulations to protect, conserve and

2 B.E. = Buddhist Era. The year 2484 = 1941, Common Era.

rehabilitate forest areas. Decentralization and public participation in policy, planning and management of natural resources in Thailand are still rather limited.

Thailand is a signatory to CITES, the Convention on World Heritage, the Ramsar Convention, the UNFCCC, the CBD and the ITTA, among others.

2.3.5 Viet Nam

The total area of Viet Nam is 33.1 million ha. The population was approximately 93 million in 2015, with a 37 percent increase occurring from 1990 to 2015. During this period rural and urban populations rose by 12.8 and 124 percent respectively. Most of the population (66 percent) lives in rural areas (World Bank, 2016).

Viet Nam’s southern border is close to the equator and the north touches the subtropical belt. With such diverse climatic conditions, its forest types are equally mixed. The dominant forest types are evergreen and semideciduous broad-leaved forests, deciduous forests, coniferous forests and open broad-leaved forests. The total forest area of Viet Nam is 14.8 million ha. Viet Nam has witnessed an increase in total forest area since 1990. According to the latest estimates the total increase in forest cover from 1990 to 2015 was around 58 percent. A 78 percent decrease was noted in primary forest, while a 279 and 38 percent increase was recorded in planted and naturally regenerated forest respectively (see Table 7).

Table 7. Changes in forest cover in Viet Nam (1990-2015)

Viet Nam	1990	2000	2005	2010	2015	Change from 1990 to 2015
	million (ha)					(%)
Primary Forest	0.38	0.19	0.09	0.08	0.08	-78
Planted Forest	0.97	2.05	2.71	3.82	3.66	279
Naturally regenerated forest	8.01	9.49	10.28	10.22	11.03	38
Total	9.36	11.73	13.08	14.13	14.77	58

Source: FAO (2015a).

In the 1940s, almost half the country was covered with forest, but this cover declined rapidly and by the 1990s it was only 27 percent. Forest quality also suffered. The main causes of deforestation and degradation included overharvesting, shifting cultivation, conversion to agriculture, encroachment and damage from war. Economic development policies, which promoted large-scale cash crop plantations, contributed heavily to the forest loss. The government thus introduced regulations to restore natural forests and afforest and reclaim degraded areas.

Since the nationwide introduction of free-market principles in 1986, and particularly during the last decade, substantial changes have taken place in the forestry sector, including the re-organization of state forest enterprises and changes in forest ownership and growth in wood product exports. Several major forestry programmes have been implemented including the

Five Million Hectare Reforestation Programme (5MHRP), which has contributed greatly to national forest restoration since 1998.

The Viet Nam Academy of Forest Sciences and Viet Nam Forest under the Ministry of Agriculture and Rural Development (MARD) are the key government institutions responsible for forestry sector development. The Revised Law on Forest Protection and Development (2004) and Land Law (2013) are key regulatory frameworks for forest management, which also provide a basis for Forest Land Allocation (FLA). In 2007, the government approved the Viet Nam Forestry Development Strategy 2006-2020. The strategy comprises five programmes (MARD, 2007): (1) the Sustainable Forest Management and Development Programme; (2) the Programme on Forest Protection, Biodiversity Conservation and Environmental Service Development; (3) the Forest Product Processing and Trade Programme; (4) the Programme on Research, Education, Training and Forestry Extension; and (5) the Programme on Renovating Forest Sector Institutions, Policy, Planning and Monitoring. In terms of ownership, According to MARD's 2013 survey, the state owns 66 percent of total forest whereas households own 24.5 percent and the remaining 9.5 percent is owned by communities, private enterprises and other organizations (Tuan, 2015).

Viet Nam became the first country to sign a full UN-REDD programme document and it is now the first pilot country to fully start implementing activities. The government is now also examining approaches to increase the value of natural forests through PES such as carbon sequestration, biodiversity, and genetic conservation. With all these innovations, the basis for implementing Forest Landscape Restoration (FLR) approaches in the country appears to be good.

Viet Nam is committed to international conventions and standards such as the UNFCCC, the CBD, the UNCCD, the Ramsar Convention on Wetlands of International Importance, the Convention for the Protection of World Cultural and Natural Heritage, ILO Convention No. 169, the ITTA and the VGGT, among others.



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Part 3. Negative drivers affecting forests in the Greater Mekong Subregion (GMS)

Negative drivers responsible for deforestation or degradation are usually divided into two categories: proximate (direct) or underlying (indirect) (Kaimowitz and Angelsen 1998; Kissinger *et al.*, 2012). Direct drivers may include human activities which directly influence forest cover, such as agricultural expansion, infrastructure development, forest conversion to other uses and mining. Indirect drivers can be a combination of demographic, economic, technological, social, cultural and political factors (Geist and Lambin 2001; Kissinger *et al.*, 2012; MEA 2005) that may operate at some distance from the forests they affect. A number of common drivers account for most of the deforestation and forest degradation throughout the GMS, although their extent may vary across GMS countries.



3.1 Direct negative drivers

3.1.1 Agricultural expansion

Agricultural expansion is one of the most important deforestation drivers (Geist and Lambin 2002). Expansion of the agriculture sector in a country and the country's loss of forested area are often correlated. It is estimated that agricultural expansion is the proximate driver of about 80 percent of deforestation worldwide (Kissinger *et al.*, 2012), albeit with differences in geographical distribution. An analysis of national data for 46 tropical and subtropical countries representing about 78 percent of the forest areas in those domains (Hosonuma *et al.*, 2012) revealed that large-scale commercial agriculture is the predominant driver of deforestation, accounting for 40 percent while local subsistence agriculture accounts for an estimated 33 percent.

In the GMS, although the deforestation drivers are more diverse because of the difference among the individual countries, the agriculture sector is still the primary driver of deforestation (Costenbader *et al.*, 2015). The dependence of nearly 80 percent of the rural population on agriculture in the GMS makes it a critical driver of forest change. For this report, we include the area under commercial crops and plantations as the main cause of agricultural expansion along with the area under concessions for such activities.

The whole GMS region witnessed a 20 percent increase in agricultural area between 1990 and 2013 (Table 8). Statistics at the country level also show the same picture of increasing agricultural area. All countries showed an increase of more than 20 percent except for Thailand (Costenbader *et al.*, 2015). While agricultural expansion has had an impact on forests it has influenced forest change differently in GMS countries. Relatively, increase in agricultural land has impacted forests in a severe manner when forest land has been cleared, for example, for plantation or agro-industrial estates. Agricultural expansion may not always occur on forest land.

Table 8. Change and percent increase in agricultural land area in the GMS (1990-2013)

Country	Agricultural land area (1 000 ha)					Increase (%)
	1990	2000	2005	2010	2013	
Cambodia	4 455	4 770	5 356	5 655	5 800	30
Lao PDR	1 660	1 806	1 985	2 220	2 335	41
Myanmar	10 428	10 812	11 263	12 526	12 587	21
Thailand	21 383	19 834	19 610	21 060	22 110	3
Viet Nam	6 726	8 780	10 054	10 769	10 874	62
GMS	44 652	46 002	48 268	52 230	53 706	20

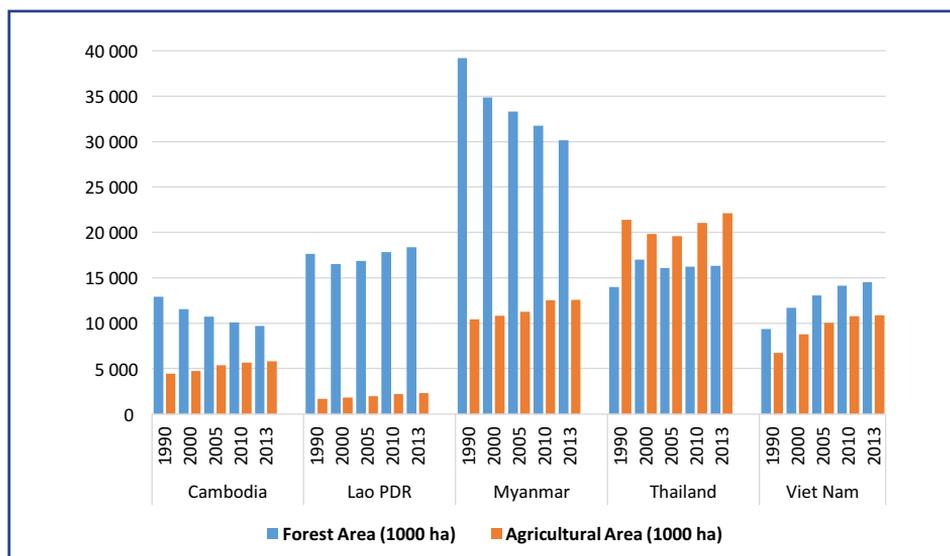
Source: FAO (2016a).

The data show that the increase in agricultural area was associated with the loss of forest cover in Cambodia and Myanmar (Figure 4). It is important to note that in the case of Cambodia the conversion of forest land for ELCs since 1990, including mining, has had a significant impact on forests. In Myanmar, forests suffered from unplanned and unrestricted agricultural conversion by rural populations as well as clear-cutting for commercial crop plantations including agricultural tree crops such as rubber and oil-palm.

The trend in Lao PDR is probably comparable with Cambodia and Myanmar. However, as explained previously, due to the inclusion of 'unstocked forest land' in a new definition of forests, Lao PDR now has more forest areas than reported in the past. In fact, the increase in agricultural area in Lao PDR is the second highest among GMS countries. Cash crop cultivation, establishment of industrial tree plantations and shifting agriculture are among the key drivers of forest change. All of these activities have had an impact on forests, including primary forests. For Thailand, after 2005 the forest area remained constant, but there was still an increase in agricultural area.

Although the agricultural land area in Viet Nam increased from 12.7 to 35.1 percent of the total land area from 1990 to 2013, Viet Nam is the only country in the GMS where the trend between agricultural expansion and deforestation now runs in parallel. This is an interesting phenomenon and quite in contrast with other GMS countries. An explanation for this is that Viet Nam has promoted massive afforestation and reforestation programmes in the last few decades. As a result of this effort, Viet Nam has increased its forest cover since 1990. Nevertheless, the new forests being established in Viet Nam are mainly monoculture plantations with acacia as the main tree crop. Despite this, remaining forests still face challenges. Forest conversion to annual crops and commercial perennial plantations at the household level continue to be an issue in many parts of Viet Nam.

Figure 4. Changes in agricultural area and forest cover in the GMS (1990-2013)



More than 90 percent of global natural rubber production originates from monoculture plantations in tropical Asia, especially from the GMS. This has resulted in the massive conversion of natural forest land in all Mekong countries to rubber plantations (FAO, 2000). Approximately 1.3 million ha of natural forests worldwide were converted to rubber plantations from 1990 to 2008; 11 percent occurred in Thailand and 5 percent in Viet Nam (Cuypers *et al.*, 2013). A recent study by Ahrends *et al.*, (2015) provided an even more distressing picture. Huge areas of rubber plantation, including in the GMS, have been established even in natural forests and protected areas. This has had a high impact on biodiversity and hydrological functions of the ecosystems.

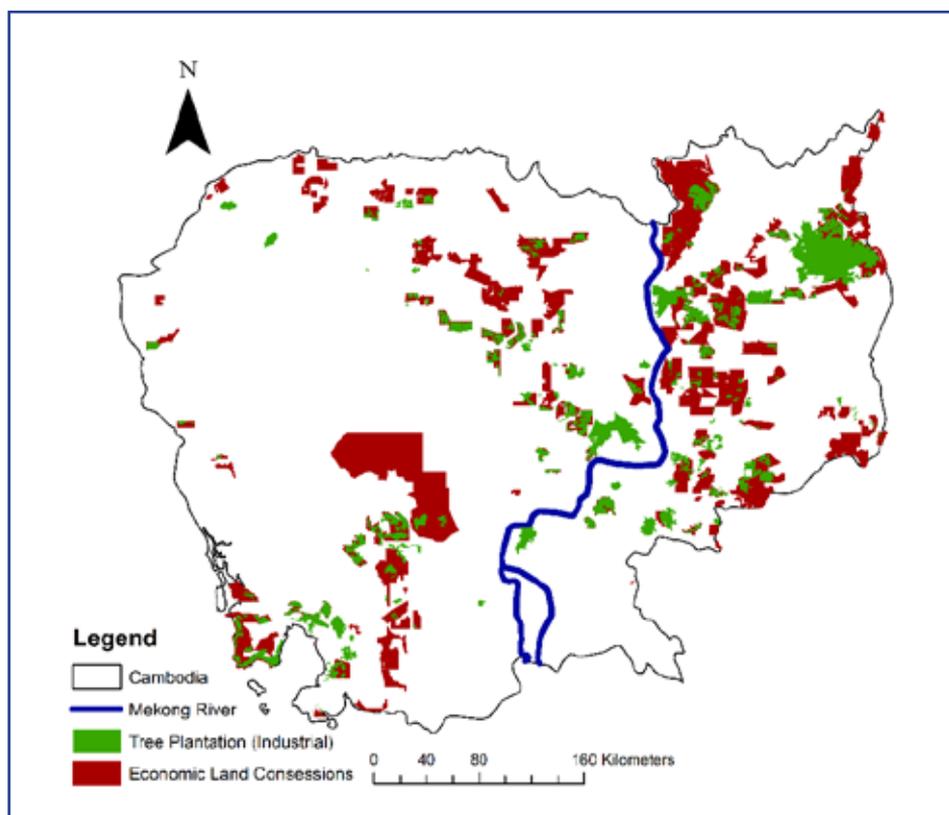
According to FAOSTAT, the rubber cultivation area for Thailand expanded from 42 000 ha in 2002 to 288 000 ha in 2011, a seven-fold increase (FAO, 2016a). In Viet Nam, the plantation area covered about 910 500 ha at the end of 2012 (Tuan 2015). Due to growing demand for rubber in China, a significant spike in rubber plantation was seen in Viet Nam by 2008, and this is expected to double within the next decade (Douangsavanh *et al.*, 2008). Recent increases in rubber prices, demand and development of clonal material suitable for cooler climates have led to forest conversion in Cambodia and Myanmar too. In Cambodia and Myanmar, the cultivation area is expected to grow in the near future (Li and Fox 2012).

In addition, oil-palm plantation has contributed to deforestation in the GMS, especially in Cambodia, Lao PDR, Myanmar and Thailand. Overall the GMS had a 938 percent increase in oil-palm plantations from 1990 to 2013 (FAO, 2016a). In Thailand, from 1990 to 2008,



Photo 5. Land clearing for agriculture in Northwest Viet Nam

Figure 5. Economic land concessions (ELCs) and industrial tree plantations in Cambodia



Sources: ODC (2016); GFW (2016).

approximately 110 000 ha of forests were cleared for oil-palm. It is reported that forest areas in Cambodia and Myanmar are under pressure from oil-palm as well (SEI 2016).

Rice is a staple food in the GMS – from 1990 to 2013, there was a 120 percent increase in rice cultivation (FAO, 2016a). Other major cash crops and plantations that are often associated with deforestation are coffee (Lao PDR and Viet Nam), tea (Thailand, Myanmar) and sugar cane (Lao PDR) (Stibig *et al.*, 2014).

In Myanmar, Lao PDR and Thailand shifting cultivation has also contributed to secondary forest loss (FAO, 2011). In coastal areas of Myanmar, Thailand and Viet Nam shrimp farming is a major driver of mangrove forest destruction (Ha *et al.*, 2012).

Agricultural expansion has been aided by government allocations of small and large concessions to local and foreign investors. Figure 5 shows the ELCs and the industrial plantation sites in Cambodia. ELCs for agriculture in Cambodia account for 10 percent of the total land area. Based on the Open Development Cambodia database (2013), this

has led to widespread forest clearance for rubber, palm oil, cashew nut, cassava and other crops.

In a report from Forest Trends (2015), data from the satellite imagery for Cambodia revealed that carbon emissions from forests cut inside concession areas were almost ten times higher than those outside the agricultural concessions.

The Conversion Timber Project (CTP) (2013) found that in Lao PDR for the period 1989-2011 there were 2 479 active concessional applications covering 1 416 000 ha and encompassing 45 and 47 percent of unstocked forest land and other forest lands respectively; there was a 20.6 percent increase in industrial tree plantation from the late 1990s to 2008 (Costenbader *et al.*, 2015).

To summarize the situation, agricultural expansion in different scales and forms has had an impact on forest change on the GMS. However, we have to note that agricultural expansion has different dynamics in each of the GMS countries. At the same time, it is a complex issue. The demand for agricultural products has increased due to population growth, rising incomes, more demand for meat and animal feed as well as other cash crops. There is also a link to urbanization. On the one hand, urbanization has created new consumption patterns that result in higher demand for agricultural and forest products. The low productivity of smallholder agriculture in many parts of the developing world also leads to agricultural land expansion. With this dynamic and variation between countries, we need to look at agricultural expansion within the context of each country.

3.1.2 Infrastructure development

Large-scale infrastructure projects, for example, hydropower dam and road construction, can severely affect forests and as a result wildlife, ecosystems and ultimately humans.

Box 2. Hydropower development in the GMS

The Consortium of International Agricultural Research Centers' (CGIAR) database lists 755 dams in the GMS.

By the time of publication, of the 755 dams tracked, 537 had been completed, 152 are being planned/proposed, 52 are under construction and 14 have been canceled/suspended; 392 of the 755 dams are for hydropower, 337 for irrigation and there are 26 'other' types.

For hydropower dams, only those with 15 megawatt installed capacity or more have been mapped; dams with a reservoir area of 0.5 km² or more have been tracked for irrigation, multipurpose and water supply purposes.

Source: CGIAR (2016).

Unless infrastructure projects are designed to support sustainable development in the long term, countries will not be able to capitalize on the full potential of these investments.

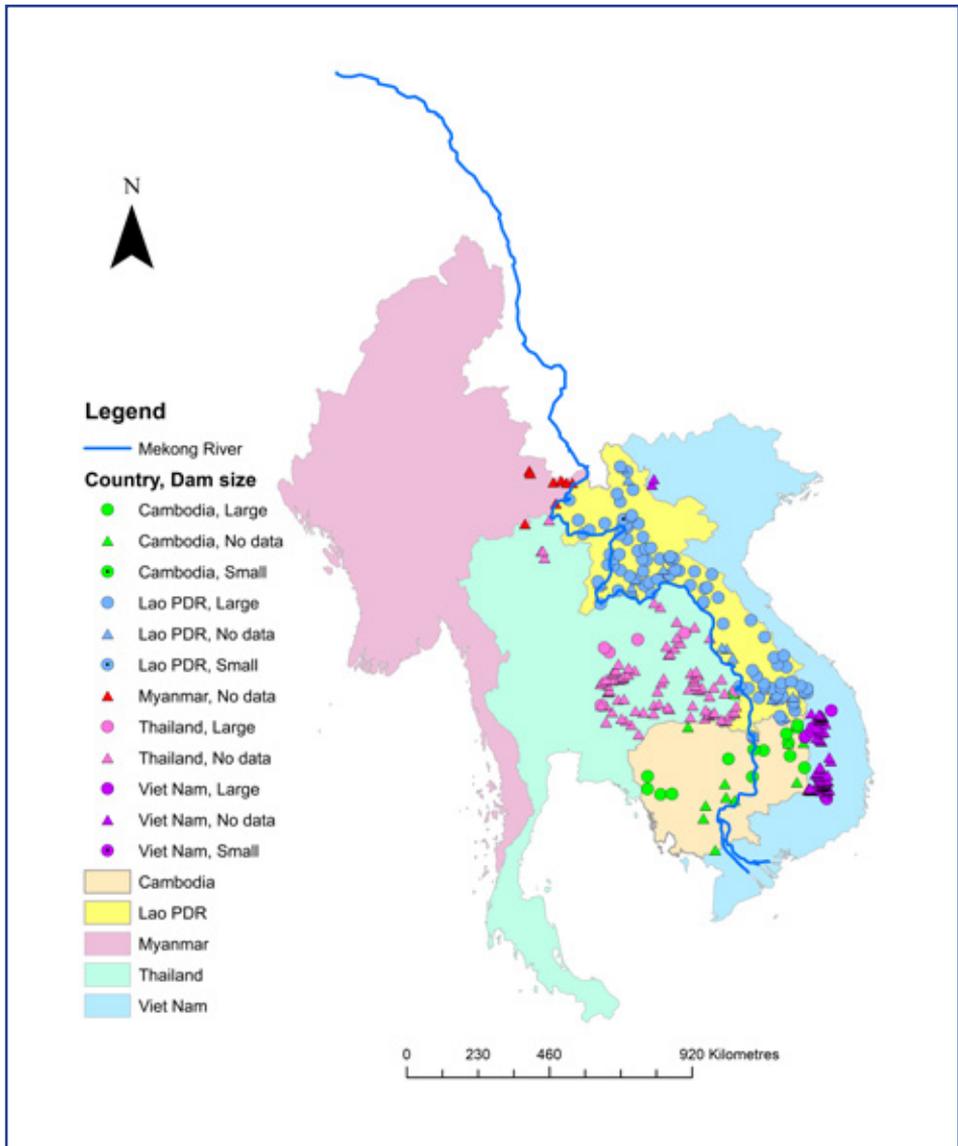
In particular, Lao PDR, which aims to become the 'battery of Southeast Asia' (Ferrie 2010), was constructing six large dams and planning at least 12 more by 2011 (FAO, 2011). Eleven dams were planned for the main course of the Mekong River, passing through Lao PDR and Cambodia, which has raised major concerns about potential environmental and social impacts (Roberts 2014). Myanmar has undertaken a major dam construction programme since 1988 that has often overlooked proper social and environmental impact assessments (Thaung 2008). 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 (USAID 2011).

The ongoing and planned construction of dams in the GMS poses serious environmental issues, especially where forest clearance is not done prior to inundation, which can result in vastly increased GHG (greenhouse gas) emissions from decomposing carbon stocks in submerged forests and soils (Yang and Flower 2012). Many hydropower projects grab sections of land that are used to grow rice as forest and residential areas. From a social perspective, this has caused loss of livelihoods and forces changes in traditional practices and cultures.

Other than the construction of dams, roads are also taking their toll. Forests are directly impacted by access roads to hydropower dams, often followed at a later date by illegal logging or land sale for various purposes such as the establishment of commercial timber or agricultural plantations, housing, resorts, land occupation, etc. The effects of roads are not very well documented for this region but it is known that past practices have not always provided adequate protection for forests. For instance, roads act as a driver of deforestation in Thailand and northeastern Lao PDR by opening up new areas to markets and increasing the profitability of deforestation-related activities (Rowcroft 2008). According to a recent study on deforestation drivers on Myanmar's forests, Liu *et al.*, (2016) classified roads as the second-most important. Regional transboundary roads such as the Phnom Penh-Ho Chi Minh City Highway and the East-West Economic Corridor have helped to connect the entire Mekong region, but also at the cost of direct and indirect impacts on forests (Leinenkugel *et al.*, 2014). 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.

The total road network in Cambodia, 44 919 kilometres, consists mainly of rural roads (33 005 kilometres), as well as 5 487 kilometres of national roads and 6 427 kilometres of provincial roads, which cause increased demand for land and resources. Immigrants arrive rapidly and often occupy land illegally, existing land-use plans are destabilized and land tenure conflicts become more prevalent (Cambodia R-PP 2011). New road developments have opened up previously inaccessible forests which could potentially result in more deforestation and degradation. Lack of state land registration and forest estate demarcation could also worsen the situation; in particular, protected areas adjacent to development zones are threatened by road development.

Figure 6. Hydropower dams in the GMS



Source: ODM (2016).

Lao PDR depends heavily on road transport for external and internal trade. The road network grew by 58 percent from 2000 to 2011. In Myanmar, most roads have been constructed north to south along the geographic orientation of the mountain ranges and rivers. The network includes 11 roads totaling 3 946 kilometres, designated as the Union Highway. Currently, east to west highways are being added to the existing north-to-south vertical highways. In all, 35 east-west highways totaling 15 208 kilometres and 45 north-

south highways (9 160 kilometres) are designated under a Union Highway proclamation. Included are highways under regional cooperation agreements the ASEAN highways, Asian highways, GMS economic corridor highways and an India-Myanmar-Thailand trilateral highway. Thailand has the most developed transport network, with 108 004 kilometres (2009) of national roads. The total length of the road system in Viet Nam is about 287 698 kilometres, of which 15 065 kilometres are national roads, 36 225 kilometres are provincial roads and the remainder is district, commune and village roads (ADB 2012).

Other than direct deforestation due to road construction, the establishment of new roads into formerly closed forests provides access and opportunities for forest extraction. Without carefully considering the full impacts of road construction on forests this may put more pressure on forests. While infrastructure development is important for economic growth, due consideration needs to be given to both environmental and social impacts.

3.1.3 Unsustainable and illegal logging

Illegal logging is the harvesting of timber in contravention of the laws and regulations of the country of harvest. Although sustainable and selective logging is not a threat to forests, unsustainable and illegal logging is a major issue throughout the GMS.

Illegal logging operations in the GMS vary in size from individual to much bigger scales, causing widespread concern in all GMS countries. Commercial logging and log exports are regulated by governments in all GMS countries. However, higher demand and weak law enforcement have hindered efforts to control logging and the log trade. Meanwhile, the demand for forest products from neighbouring countries and beyond has put greater pressure on the remaining forests. In addition to illegal logging, timber operations also may not necessarily adhere to the principles of sustainability. While these operations are legal, they cause negative impacts on forests due to excessive exploitation.

Data on illegal logging were not always available. When data were available there was always debate and disagreement. However, one issue that has been less debated is the need to address the seriousness of illegal logging in the region. According to UNODC (2013) and Souksavanh (2016), due to high demand for wood and wood products in the region and globally, GMS countries have faced serious issues in the trade of illegal wood and wood products.

Myanmar is well known for its Myanmar Selection System (MSS). However, disruptions in the forest management system due to political changes, overharvesting as well as the increasing illegal timber trade along the Chinese and Thai borders threaten to continue the long-term decline of Myanmar's forests. Myanmar lost more than 2 million ha of tree cover in the period 2001-2014. A 2014 environmental impact assessment (EIA) report found that potentially huge amounts of log exports from 2000 to 2013 were illegally harvested. Myanmar previously enacted a ban on raw timber exports in 2014 in an effort to stem the pressure on its forests. The trade in illegally harvested timber across the Myanmar-China border declined in 2015 as China's economy slowed and Myanmar's government changed hands (GW 2009).

More than half of all timber produced in GMS countries is estimated to come from conversion forests. Though reliable data are not widely available, estimates suggest that timber derived from conversion forests cannot be ignored. In some cases, the issue is alarming (cited by Costenbader *et al.*, 2015). The contribution of illegal and unsustainable logging to deforestation is also linked to transboundary trade between the GMS and neighbouring countries. Continuing regional and global demand for wood products continues to drive logging in Lao PDR, Myanmar, and Cambodia. China and India purchase approximately 80 percent of Myanmar’s wood product exports (Costenbader *et al.*, 2015). Efforts to ensure SFM and law enforcement is currently insufficient, which explains why the region continues to struggle with illegal and unsustainable logging. Further efforts and resources to support law enforcement, prevent corruption and increase transparency are essential to combat rampant illegal logging.

3.1.4 Mining

Mining contributes directly to deforestation because forests have to be cleared, but also indirectly as it creates needs for additional infrastructure (e.g. access roads, housing compounds, etc.). GMS countries are putting more efforts into the extraction of their mineral resources, which can be seen as a result of mining’s increasing share in the GDP (Table 9).

Table 9. The mining sector’s share in the GDP of GMS countries

Mining sector’s share of the GDP (%)		
Country	2000	2010
Cambodia	0.24	0.62
Lao PDR	0.20	7.42
Myanmar	0.59	0.91
Thailand	2.37	3.42
Viet Nam	9.65	10.86

Source: ADB (2011).

In Cambodia, 401 882 ha of land is under mining concessions; in 2011, mining exploited 38 831 ha of natural protected areas. The effect is small scale though. Projected deforestation due to mining activities in Lao PDR is 5 100 ha/year up to 14 100 ha/year (Costenbader *et al.*, 2015). Many mining concessions, especially for gold, have been allocated in forest areas in the far north of the country and rehabilitation of affected areas is almost non-existent. New natural gas pipelines have disturbed forests in Myanmar in both the southern lowland rain forests and from western Myanmar to Yunnan Province in China where new pipelines are being built to transport gas. New pipelines planned or underway in Thailand and Viet Nam may have similar impacts to those observed in Myanmar.

In Lao PDR, the main forest loss concern is the potential effects of a few mega projects currently under consideration; also, specifically, strip mining of bauxite in the south of the country. The tens of thousands of small artisanal mining operations probably have a bigger

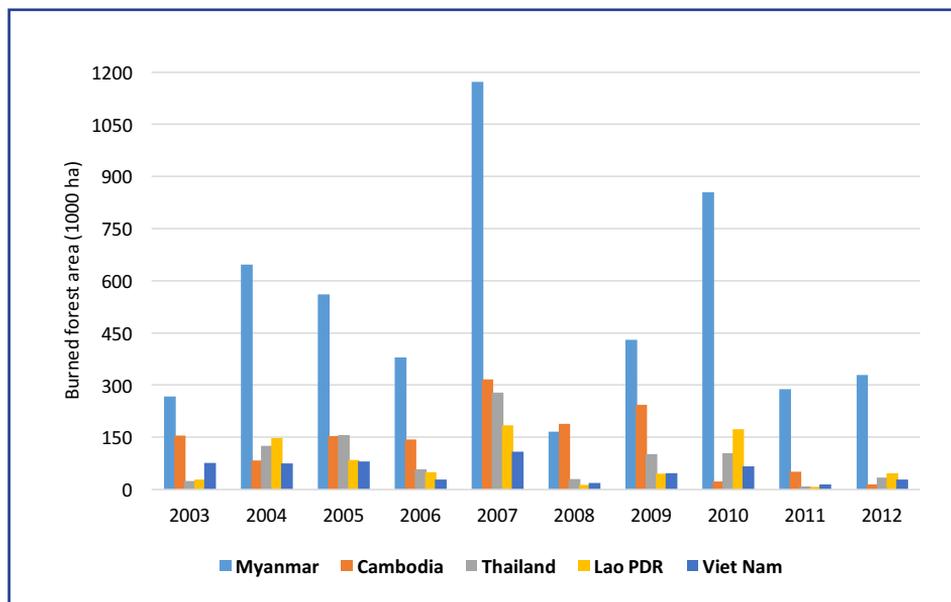
total impact on forest resources than current large-scale mining operations. The impacts of mining pollution on forests also need to be considered, in particular, the potentially serious local impact of acid rain on poorly buffered forest soils surrounding the new Hongsa coal power station.

3.1.5 Forest fire

Fire is another significant driver of forest degradation and to a lesser extent of deforestation in GMS countries. Forest fires include accidental and human-induced fires. Although low-intensity fires are a common tool for forest and agricultural management and are also used for hunting, mushroom and bamboo shoot cultivation, unmanaged fires often burn out of control and inflict extensive damage to forest areas.

Fire is a major driver of forest loss in Myanmar, Cambodia and Lao PDR, and in some areas of other countries where dry dipterocarp forests are extensive (Figure 7).

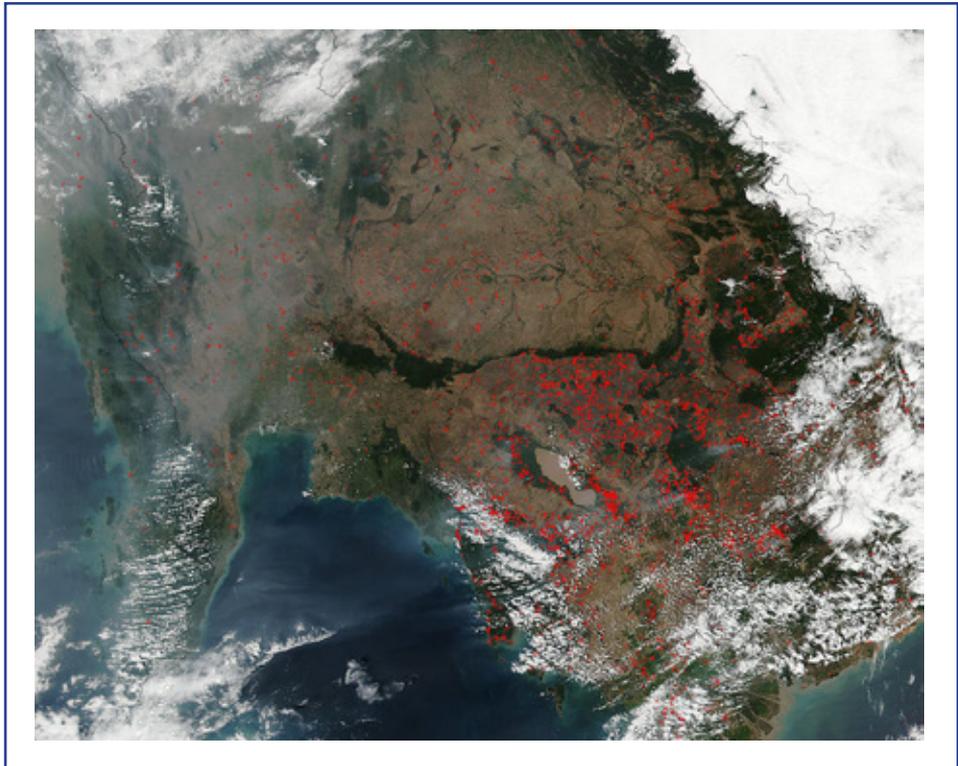
Figure 7. Burned forest area in GMS countries (2003-2012)



Globally, the highest percentages of forest areas burned are typically reported from Africa and Asia. Myanmar and Chad reported more than 6 million ha of forests being annually affected by fire during the early 2000s (FAO, 2006). In recent years forest fires have remained an issue in the GMS, especially during the dry period and El Niño events. Using data from 2000-2005 and digital earth technology, Liu *et al.*, (2016) concluded that forest fires were an important driver of deforestation in Myanmar during the observation period.

For Cambodia and Thailand, a visible-light image, taken from the Visible Infrared Imaging Radiometer Suite (VIIRS) instrument aboard NASA-NOAA's Suomi NPP satellite in February 2016, showed hundreds of fires, including many in forested areas. The VIIRS image showed the heat signatures from fires in red (Figure 8).

Figure 8. NASA's VIIRS image showing fires burning across Thailand and Cambodia



Source: NASA (2016).

Human-induced fires occur annually in the dry dipterocarp forests during the dry season and in Cambodia, they burn from December to March, but onset times vary (Goldammer and Furyaev 1996). Typical reasons behind these fires are to facilitate hunting, shifting cultivation, pest removal, grass growth for cattle grazing, stubble burning and honey collection. Some fires are also attributed to accidental burning from discarded cigarettes or unattended cooking fires (Schulte and Schone 1996; Crutzen and Andreae 1990; Maxwell 2004; Stott 1988; Wharton 1966).

Dry season fires are a significant direct cause of forest degradation in Thailand and many forest ecosystems are vulnerable. The Forest Fire Control Division (FFCD) of the RFD (FFCD 2011a) reported that forest fires occur each year during the dry season from December to May. All fires recorded were human-induced. From 2005 to 2010 and based

on Forest Fire Statistic Reports from the FFCD (FFCD 2011b), the annual frequency of forest fires had fallen to within the range of 4 350 to 9 447 events corresponding to a burned surface area of 6 785 to 30 284 ha. In a study by Junpen *et al.*, (2013), a total of 27 817 fire hotspots (FHS) associated with forest fires were detected by the Moderate Resolution Imaging Spectroradiometer (MODIS) during 2005 to 2009. These FHS mainly occurred in the northern, western and upper northeastern parts of Thailand. Each year, the most significant fires are observed during January to May, with a peak in March. They concluded that the main reasons include the gathering of NWFPs (39 percent), hunting (24 percent), land clearing for agriculture (19 percent), accidental fires (10 percent), illegal logging (2 percent) and others (6 percent). Approximately 90 percent of the fires take place in deciduous forests.

For Lao PDR, satellite imagery shows that during dry seasons there is a very high frequency of forest fires. However, burned areas typically regenerate very quickly (Thomas 2015). According to the Department of Forest Protection of Viet Nam (DoFP), there were around 704 forest fires yearly during the period 2002-2010, which resulted in a loss of around 5 000 ha of forest annually (Thuy *et al.*, 2012).

3.2 Indirect drivers

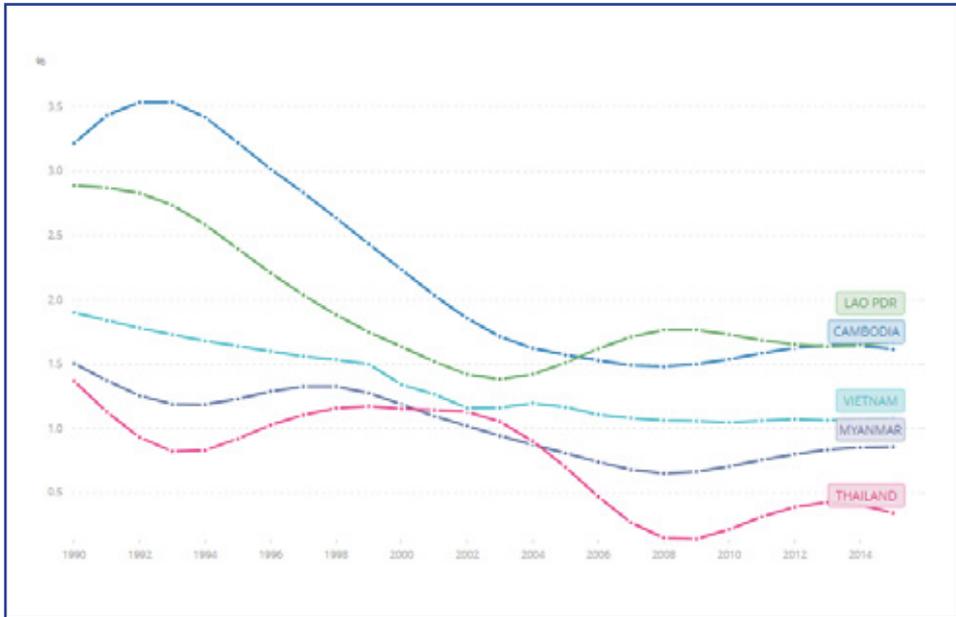
3.2.1 Demographic changes

The GMS region has undergone demographic changes in the last 25 years. Key demographic changes that may have an impact on forest include population growth, urbanization and migration. Between 1990 and 2015 an additional 57 million people joined the region. The Population growth rate has not been the same for all GMS countries (Figure 9). Cambodia and Lao PDR have had relatively higher annual growth compared to other GMS countries. Population growth has been detrimental to forests.

All GMS countries, except Thailand, have high proportions of people living in rural areas who mainly depend on agriculture and natural resources for their livelihoods. The increase in population in rural areas puts pressure on forests as demand for the expansion of agriculture and forest products is also rising. Cambodia and Myanmar exemplify where population increase has also resulted in the decrease of forest area.

In the case of Thailand where rural and urban populations are almost balanced, the pressure on forests may take different forms. On the one hand, pressure from rural populations on forest resources may have decreased as more people derive their income from urban centres in sectors such as services and industries. On the other hand, the urban populations may have more demand on forest products as they have better purchasing power. In general, this move towards urban areas and the related increases in purchasing power of consumers are commonly accompanied by dietary shifts, such as increasing consumption of animal-based food commodities that require

Figure 9. Population growth rate in GMS countries (1990-2015)



Source: World Bank (2016).

more land and resources for production, which may also affect forests negatively. In fact, it is interesting that the forest area in Thailand has not changed significantly in the last 15 years. However, secondary forests have tended to decline while plantations have increased.

Another aspect that may lead to deforestation or forest degradation is migration, both in terms of migration within a particular country or migration to another country. In Cambodia, for example, farmers search for new land for rice paddies due to inefficient farming systems and lack of access to irrigation. These circumstances also lead to forest conversion as farmers cultivate additional land for new rice paddies in order to meet high market demand and accommodate rural population growth. This also applies to migration to neighbouring areas. In all GMS countries, migration to urban areas continues unchecked.

3.2.2 Socio-economic progress of the Greater Mekong Subregion (GMS)

From 1990 to 2015, GMS countries made significant socio-economic progress, in part due to the adoption of market-based economic principles. The significant differences in per capita income, GNI per capita (see Table 1), the dependence of economies on various resources and the high degree of inequality pose various threats to natural systems such as forests. An increasing trend towards industrialization has been driven largely by trade, driven in turn by the extraction of natural resources (ADB, 2012). In many cases, the result

has been severe pressure on the resource base, leading to forest depletion, degradation and fragmentation.

The international timber trade plays a significant role in the economies of GMS countries and has contributed to deforestation and degradation in the region. Lao PDR, Cambodia and Myanmar were major sources of illegal timber in the 1990s and 2000s, leading to significant forest depletion in these countries (Costenbader *et al.*, 2015).

Furthermore, increased affluence has provided more scope to purchase products from forests. Demand for furniture, timber for housing and other forest products continues to increase.

3.2.3 Weak governance

Governance is an important aspect in forest management. Good governance with the presence of checks and balances will ensure better SFM. However, in an environment of weak governance and high corruption, as is often the case in the GMS countries, forests have been impacted negatively. One of the main issues faced by the region is illegal logging and illegal timber trade. This is widespread and continues unabated despite increased efforts to address the issue, e.g. FLEGT/VPA. While some progress has been made to curtail it, illegal logging remains an issue. Timber is also traded illegally across borders in the GMS. Table 10 shows the perceived level of public sector corruption among GMS countries and their relative ranks among 168 countries considered for 2015.

The extent of the impact of weak governance on forests is not a straightforward matter to calculate. Based on the perceived level of public sector corruption in Table 10, forest cover should have declined in all GMS countries. However, this is not the case. Lao PDR and Viet Nam have experienced increases in forest cover. How is this possible? To answer the question the phenomenon should be studied comprehensively. Illegal logging has an impact on forests but not necessarily always in terms of deforestation.

Forest ecosystems may have been badly affected by illegal logging but countries regard such degraded forest as forest area. Therefore, the total volume of forest area may not

Table 10. Perceived level of public sector corruption and ranks for GMS countries

Country/ Territory	2012	2013	2014	2015	Rank out of 168 (2015)	Forest trend 1990-2015
	Score: 0 (highly corrupt) to 100 (very clean)					
Cambodia	22	20	21	21	150	Decreasing
Lao PDR	21	26	25	25	139	Increasing
Myanmar	15	21	21	22	147	Decreasing
Thailand	37	35	38	38	76	Increasing
Viet Nam	31	31	31	31	112	Increasing

Source: Transparency International (2016).



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Photo 6. Wood processing in Bac Kan, Viet Nam

change despite illegal logging. In the case of Lao PDR, reclassification of forest area has led to an upswing in the country's forest area. One thing that is certain is that illegal logging has had a negative impact on forest ecosystems. It has also caused loss of income for GMS governments.

Clearly the issue of weak governance requires attention by GMS countries. Its impacts on forest have been largely indirect but in the long run it may jeopardize the remaining forest in the region.



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Part 4. Positive drivers affecting forests in the Greater Mekong Subregion (GMS)

This section explains key positive drivers for SFM, forest conservation, afforestation and reforestation. **Direct drivers** that enable positive changes of forests in the GMS include human activities that directly promote and enhance SFM, forest conservation, afforestation and reforestation. **Indirect drivers** of positive changes are the underlying policies and enabling environments supporting them. Direct and indirect positive drivers are interlinked and thus it is challenging to separate them completely. They both interact to induce positive changes. For example, good policy environment (an indirect positive driver) may provide incentives for conservation and SFM activities (a direct positive driver), which may result in better forest management outcomes.



There were positive trends and results in forestry in the GMS between 1990 and 2015. However, positive developments have not occurred in the same way in all GMS countries. Some countries made more progress than others. As described earlier, three out of the five GMS countries (Lao PDR, Thailand and Viet Nam) have exhibited positive trends, in that forest area has stabilized or increased. Especially noteworthy is Lao PDR's forest reclassification, which explains the increase in the national forest area. For Thailand and Viet Nam, it is encouraging to observe that both countries have increased their plantation forests.

In all GMS countries, new regulations and policies related to logging, timber exports, protected areas, green products and so forth were formulated to conserve existing natural forests and promote a shift towards value-added processing, participatory forestry and SFM. As a result, more sustainable ways of managing forest resources have been promoted. Most of the increase in forest area has been achieved through the establishment of new forest plantations and restoration of degraded land. The commitment of GMS governments to sustainable management of the region's forest ecosystems has led to recent reforms that have increased public participation in some countries and the development of improved forest policies and forest management practices.

4.1 Direct positive drivers

4.1.1 Afforestation and reforestation

In response to various environmental concerns, forest landscape restoration through afforestation and reforestation has been placed high on the agendas of many governments worldwide (e.g. China, the Philippines and Viet Nam), especially in countries that have experienced high deforestation rates in recent decades (Rudel 2008). In GMS countries various efforts have taken place in the last 25 years. Small- to large-scale afforestation was conducted involving various actors such as the government, the private sector and local communities. However, progress has been different from country to country. Table 11 summarizes the situation. It can be seen that Viet Nam by far has the largest programme compared to other GMS countries.

Table 11. Reforestation and afforestation in the GMS (1990-2010)

Country	Reforestation(1 000 ha/year)				Afforestation (1 000 ha/year)			
	1990	2000	2005	2010	1990	2000	2005	2010
Cambodia	0.6	0.7	5.9	5.9	n/a	n/a	n/a	n/a
Myanmar	28.4	30.5	29.6	27.4	n/a	n/a	n/a	n/a
Lao PDR	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Thailand	0	0	0	0	n/a	n/a	n/a	15.4
Viet Nam	116.7	209.5	327.8	37.0	32.3	118.2	138.9	197.6

Source: FAO (2015a).

Forest plantation programmes can be an important mechanism for bringing back forest cover and for producing timber, NWFPs, rehabilitating ecosystem services and so forth. Provision of timber from plantations may reduce pressure on natural forests. However, plantations largely produce different types of timber from natural forests. Thus natural forests are not easily substituted for timber production. Fast-growing plantation species do not substitute for the highly prized hardwoods found in natural forests. It is also recognized that plantations cannot provide the same ecosystem functions as natural forests.

In order to understand the effort made by Viet Nam, it is useful to look at the history of forestry in the country. In 1943, the natural forest area in Viet Nam was 14.3 million ha or about 43 percent of the country's territory. At that time most of the forests were primary forests. Due to war and forest exploitation, forest area dropped to 33 percent in 1976 and to 27 percent in 1990. The government recognized the urgency of reforestation for environmental protection and biodiversity conservation, and thus implemented widespread and ambitious reforestation projects from 1990 onwards. Consequently, Viet Nam's forest area coverage increased to 32 percent in 1999, and 49 percent in 2015. This increase has resulted largely from reforestation programmes and land reforms, namely: the 'Greening the Barren Hills Programme' (or Programme 327) and its successor the Five Million Hectare Reforestation Programme (SMHRP).

In Thailand, the government has a commitment to rehabilitate degraded forest areas and increase forest cover in the country. A number of reforestation and tree-planting campaigns have been launched. Planting rates during the period 1981-1990 (4th, 5th and 6th Plans) reached 40 000 ha per year and rose to 160 000 ha per year in 2006 during the 9th Plan. As a result of the plantation programme, timber and pulpwood are mainly produced from plantations of fast-growing tree species and a limited area of teak, mainly planted by the Forest Industry Organization (FIO) (Emmanoch 2015).

For Cambodia, the RGC released a subdecree on the use of state land for reforestation that encouraged communities and the private sector to take part in reforestation activities. Delux (2015) suggested that the Forestry Administration designated 96 000 ha for plantation development, of which 14 000 ha have been planted to date. Similarly, tree planting has been introduced by the Government of Lao PDR since 1979. Most of the plantation in Lao PDR is rubber plantations (GoL 2009). For Myanmar, the Forest Department set a goal of establishing up to 1 million ha of community plantations by 2030-2031 in its 30-year plan. However, by 2015 only around 8 093 ha had been established (Than 2015).

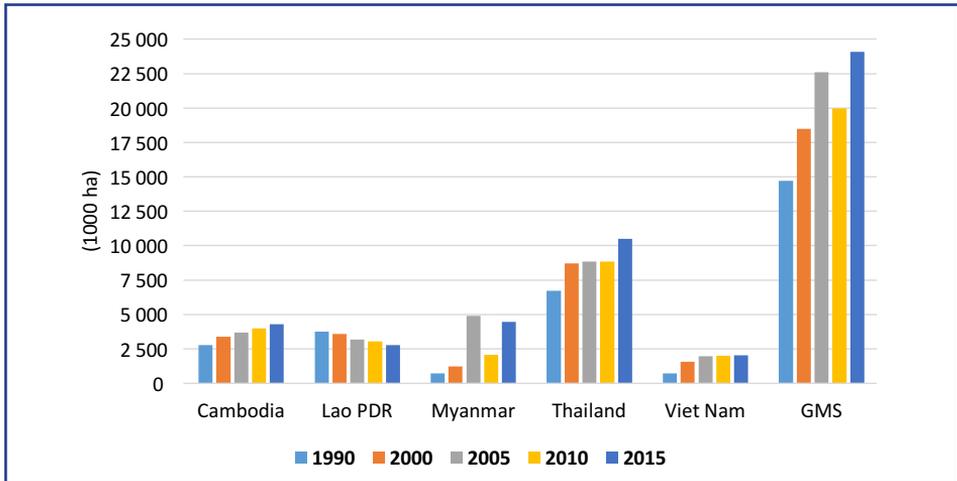
Factors influencing the development of forest plantations in GMS countries include market growth, infrastructure and economic development, increased interaction between farmers and markets, privatization of forest land, globalization and increased agricultural efficiency (Sikor 2001).

4.1.2 Conservation of biodiversity and forest protection

Conservation of biodiversity and forest protection have become increasingly important aspects of forest management in the GMS. Forests in the region are rich with biodiversity and

the governments have increasingly become aware of its importance for forest protection and ecosystem services. Figure 10 shows the area of forests designated for the conservation of biodiversity up until 2015. Cambodia, Myanmar, Thailand and Viet Nam generally have increased the area of forest for biodiversity conservation. However, Lao PDR had a decrease of such area. Overall, for the GMS there is a positive trend.

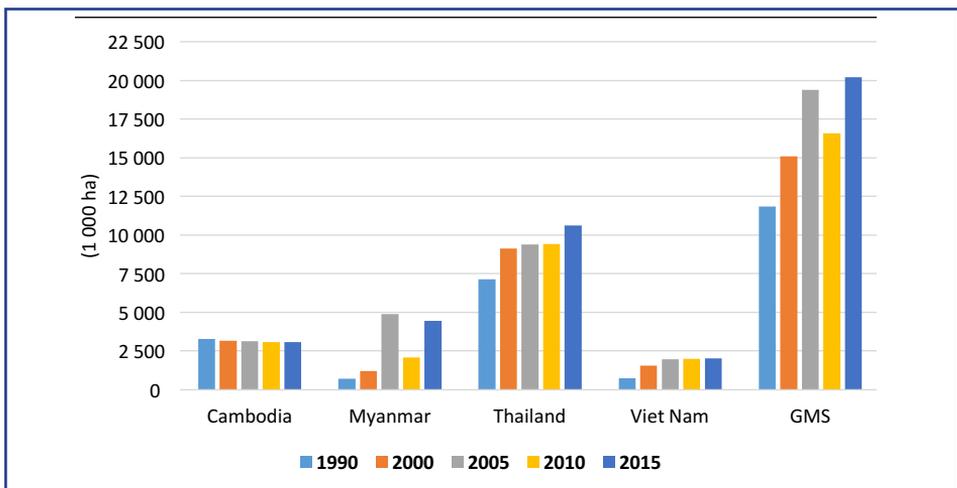
Figure 10. Forest areas designated for conservation of biodiversity



Source (FAO, 2015a).

During the same period, protected forest areas in the GMS showed an increase of around 70 percent (Figure 11). Of all GMS countries, Thailand has the largest area of protected forests accounting for 53 percent of the GMS. In this context, increases in the extent of protected

Figure 11. Protected areas in GMS countries (1990-2015)



Source (FAO, 2015a).

areas were made in Myanmar, Thailand and Viet Nam, while there was a decrease in protected area in Cambodia. There are no data available for Lao PDR.

The protective functions of the forests in the GMS include climate enhancement, protection from soil erosion and protecting coastlines, watersheds and water resources. Although data are not readily available for all the ecosystem services of the forests, available data showed that the forest area for soil and water protection ranged from 35 percent in Viet Nam to 96 percent in Thailand.

Efforts to conserve and protect forests have been made possible for several reasons. In Thailand, for example, severe floods in the southern part of the country in 1989 forced the government to take more serious forest protection measures. A Cabinet resolution on 17 January 1989 resulted in a timber-harvesting ban in the country followed by various policies to support SFM, forest conservation and forest protection. Furthermore, GMS governments have designated more areas for forest protection and conservation such as national parks, wildlife sanctuaries, biosphere reserves and so forth. At the same time, there has been an increase in awareness of the importance of maintaining the remaining natural forests and more information has become available on the protective functions of forests and the value of ecosystem services. While it is difficult to obtain concrete data on financial aspects, it could also be true that governments may have increased budget allocations for forest protection and conservation compared to the outlay 20 years ago.

4.1.3 Involvement of people in forestry

Over time, GMS governments have realized that for forest management to be successful there is a need to involve people, especially those who have a high dependency on forest resources such as local and indigenous people. This is also intended to ensure that they can benefit from forest management, e.g. enhanced livelihoods and income. At the same time, governments also expect local people to help in forest protection and conservation. Development of participatory forestry, local forest management initiatives and land allocation have helped to improve forest management. Villages and communities that manage their own forests have demonstrated greater ownership of their resources, identified forest values and benefits and redirected development decisions in a way that enables SFM, forest conservation and forest regeneration.

Viet Nam has implemented some of the most comprehensive forest and land-use allocation policies in the region. Since 1983, approximately 3.7 million ha have been allocated to households and individuals (Jong *et al.*, 2006). The 5MHRP, Degraded Forest Land Allocation (FLA) scheme and National Mangrove Restoration and Development Plan for 2008-2015 have all allocated considerable areas of forest land to local households and communities, which have been reforested (Clément *et al.*, 2007). The 5MHRP has provided local people with payments, tax incentives and favourable loans for forest protection (Binh 2003). Furthermore, through forest land allocation and community forest management programmes, reforestation efforts involve communities, groups of households and individuals. By 2015, about 1.13 million ha of forest (85 percent of which was natural forests)

Table 12. Trends and progress of forest allocation policies in Viet Nam

Before 1990	1990-2000	2000-2013	By 2020
The state owned most forests and forest enterprises	Introduced the economic reform policy through the Law on Forest Protection and Development 1991 (LFPD) and Land Law 1993. Land is owned by all people, but the state is the people's representative; allocation of forests and forest land with multiple types of owners.	The revised Forest Law 2004, Land Law 2003 and further revision in 2013 recognized the tenure rights of local people and greater security was provided; seven categories of land use were established.	Reduction of areas under state ownership, focus on special-use and protection forests; legal documentation and forest allocation completed.

were managed under the CFM system. A number of studies in Viet Nam showed that local communities are able to manage their common-pool resources in a sustainable way (Tuan 2007; Ngai 2008; Tuan 2011).

In Cambodia, community forestry (CF) was introduced to encourage poor and vulnerable communities to participate in forest management and derive benefits. The National Forest Programme NFP (2010-2029) set a target to allocate 2 million ha of production forest for establishing CF and the FA developed a CF subdecree and guidelines for forest-dependent communities for establishing CF. Under this framework, communities have legal rights to manage their forests for 15 years through a CF agreement between the Community Forest Management Committee (CFMC) and the FA. Moreover, several NGOs strongly support the establishment of CF in Cambodia. However, the detailed requirements for compiling the CF management plan, including a CF resources inventory, data analysis and other procedures can slow the process of achieving approval from the FA cantonment and the MAFF. Although many CFs have been established, approved and authorized, very few CFs have had their management plans approved and implemented.

In Myanmar, the Forest Department set a goal of establishing up to 1 million ha of community plantations by 2030-2031 in its 30-year plan. However, by 2015 only around 8 093 ha had been established. A Community Forestry National Working Group (CFNWG) is the latest response by the Forest Department, CSO, and CBOs including RECOFTC and FAO's Forest and Farm Facility, to promote CF in Myanmar.

In Thailand, to increase forest area and provide timber for domestic consumption, the RFD created the Community Forest Programme (CFP) in 2000 with overall support from the government. The main objective of the programme was initially to establish a timber source for household use but the programme evolved beyond this and embraced forest protection and production as well.

GMS countries have set targets in terms of areas they want to allocate to communities through various programmes as reflected in Table 13. Only Viet Nam has achieved its target in full. Other countries are lagging behind.

Table 13. Progress towards achieving national GMS social forestry targets in 2016

Country	Area covered by official agreement (ha)	Target area (ha)	Target period	% achieved by 2016
Cambodia	296 240	2 000 000	2029	15
Lao PDR	N/A	N/A	N/A	N/A
Myanmar	113 765	919 000	2030	12
Thailand	750 457	1 600 000	2025	47
Viet Nam	4 256 375	4 000 000	2020	100

Source: RECOFTC (2017).

4.1.4 Demand for green forest products

Demand for green forest products is a positive driver for forests throughout the world including in the GMS. As SFM is becoming a core objective for managing forests, the demand for sustainably-managed forest products is also increasing, especially from countries in Europe and the USA.

Demand for green wood products and verified legal timber from forests constitutes a longstanding driver for efforts targeted at forest certification, forest legality such as FLEGT/VPA, conservation of remaining natural forests and other efforts at the national level on SFM. It has also triggered countries to supply timber from plantations to some extent in order to meet the ever-growing demand for timber. Sloan and Sayer (2015) noted that in Southeast Asia planted forests contribute around 49 percent of total wood production. However, underlying benefits of plantations in terms of biodiversity conservation and ecosystem services are usually far fewer than those provided by primary forests and plantation species often have a much lower timber value than native forest species.

Recently, to address deforestation and forest degradation, a range of public and private policy instruments has been developed, including forest certification, the FLEGT Action Plan and national government procurement policies. Their main purposes were initially to address deforestation; these measures are now acting as a positive driver because they are addressing weaknesses in forest legislation and law enforcement in the GMS.

Voluntary certification schemes for sustainable timber were initiated to assure consumers that timber has been produced in a sustainable manner. In many respects, this was an attempt to respond and address to weak legislation and law enforcement. Forest certification provides an independently verified measure of SFM based on a more or less consistent set of criteria and indicators.

The EU FLEGT Action Plan also sets out measures to prevent the import of illegal timber into the European Union (EU), improve the supply of legal timber and increase the demand for timber from responsibly managed forests, consequently generating an increase in the adoption of SFM. On the supply side, the Action Plan supports timber-producing countries with measures that include the promotion of fair solutions to illegal logging through Voluntary

Partnership Agreements (VPAs). It also focuses on complementary demand-side measures to reduce the consumption of illegally harvested timber in the EU (EU Timber Regulation – EUTR). This requirement to prove that timber is not coming from illegal sources may narrow the gap with sustainably sourced timber.

As a result, the first East Asia-Pacific Ministerial Conference on FLEGT 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”. 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 provide the basis for deepening cooperation and implementing joint actions, as well as identifying potential partners for collaboration in strengthening FLEG in ASEAN.

In reality, the FLEG process has led to a growth in SFM initiatives in GMS countries, especially because G8 countries are the destination for more than 80 percent of Viet Nam’s exports and nearly 50 percent of Thailand’s exports of furniture and other wood products. 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 Viet Nam and Thailand that in turn transform them into products exported to G8 countries.

Other than FLEGT, VPAs are bilateral trade agreements between timber-producing countries and the EU that aim to support countries in producing legally verified timber. Thailand has begun negotiating a VPA under the EU-FLEGT process to ensure that wood products can be exported to the EU while natural forests are protected. The EU-FLEGT scheme will not only support lawful timber production but is also likely to help promote SFM, reforestation and afforestation.

4.1.5 Payment for ecosystem services (PES) and REDD+

As a part of SFM, various incentive-based programmes have been introduced in GMS countries in recent years in an attempt to encourage more sustainable forestry practices. One of them is payments for ecosystem services (PES). PES provide needed stimulus to protect existing forests, ensure and maintain forest ecosystem services. PES projects and pilots have been tested in GMS countries at a different scale and using different modalities. For example, there have been direct contracts between companies, such as those dealing with hydropower, and local communities that have protected forest ecosystems. The largest example of a working PES system in the GMS is Viet Nam’s national-level PFES programme, which has been operating at the pilot level in two provinces since 2008. In addition, 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. 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 (Clements *et al.*, 2010). Legislative provisions enabling PES system development exist in Myanmar and

4.2 Indirect positive drivers

4.2.1 Supportive forest policies and legislation

Long-term forest exploitation in the GMS has led governments and CSOs to reconsider their actions and forest management policies and legislations. Policies have been directed towards managing existing forests sustainably. In adopting the statement of Forest Principles and Chapter 11 of Agenda 21, the 1992 UN Conference on Environment and Development (UNCED) recognized the importance of sustainably managing all types of forests to meet the needs of present and future generations. Since the 1990s, SFM has been at the forefront of the international agenda and is now widely embraced by intergovernmental, regional, national and subnational institutions. In 2004, ASEAN member states approved the Vientiane Action Program (2004-2010) and its goal to eradicating unsustainable forest management practices by 2010. By 2015, all GMS countries had developed policies and legislation supporting SFM at least at the national level.

Socio-economic progress and the shift towards the diversified market-based economy approach is not uniform among all GMS countries. Owing to this variability the adoption of SFM policies and legislation also varies among countries. However, numerous programmes and initiatives have been implemented in GMS countries at various scales to promote SFM practices. Now, the legislation governing the forestry sector ranges from biodiversity conservation and wildlife laws to regulations on harvesting, sale, transport, import and export of wood products.

As a result of SFM policies and initiatives, a number of key indicators suggest progress towards SFM in the GMS in recent years. Some of these changes can be summarized as follows:

- Forest area that falls under protected area increased by around 70 percent from 1990 to 2015;
- Forest area designated for conservation of biodiversity increased by around 64 percent from 1990 to 2015;
- Forest area designated for the protection of soil and water has increased by around 42 percent; and
- Forest area certified under the Forest Stewardship Council (FSC) certification scheme has also increased (Figure 12).

The area of forests under management plan has also increased for all of Asia over the period (FAO, 2015a), but country-specific data are only available for 2010. Community participation, emphasis on soil and water conservation and management, and protection of high-value forests were integral parts of most management plans (Table 14).

These criteria suggest that official governmental commitment to sustainable management of the region's forest ecosystems has led to recent reforms. The FSC promotes environmentally appropriate, socially beneficial and economically viable management of the world's forests. An increase in the FSC-certified forest area in the GMS is shown in Figure 12. Despite an increase in FSC-certified forest area in the GMS countries, however, more effort is required to boost the certification. At the same time efforts need to be made to maintain the good management of certified forests as the FSC can revoke the certificates as well. This has happened in a few cases recently.

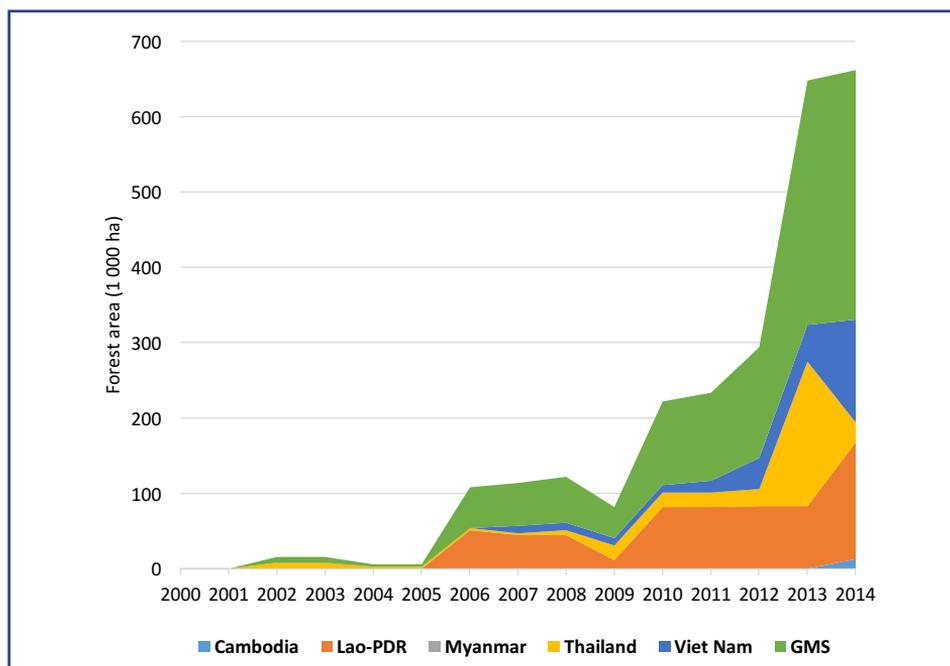
Table 14. Forest area under management plans in the GMS

Country	Forest area with management plans in 2010		Requirements for forest management plans		
	Total (1000 ha)	% of forest area	Soil & water management	High-value conservation forest delineation	Community involvement/social consideration
Cambodia	0	0	Yes	Yes	Yes
Lao PDR	2 237	13	Yes	Yes	Yes
Myanmar	31 273	98	Yes	Yes	Yes
Thailand	13 312	82	Yes	Yes	Yes
Viet Nam	8 375	59	Yes	Yes	Yes

Source: FAO (2015a).

GMS countries have also introduced favourable policies on forest tenure that provided local communities an opportunity to manage forest resources. There are many forms of tenure reform such as village forestry in Lao PDR, community forestry in Myanmar and FLA in Viet Nam. In fact, Viet Nam has moved forward with further reform for forestry and land by allocating those resources to individual households for their management and use. This is a further step towards privatization. In Viet Nam, households with legal certificates (known as Red Books) pertaining to FLA can realize economic benefits that directly contribute to their livelihoods and help to increase income. This provides an incentive for managing forest resources sustainably.

Figure 12. Area under Forest Stewardship Council (FSC) certification (2000-2014)



Source: FAO (2015a). Data provided by the FSC.

Table 15. Policies and initiatives addressing forests and forestry in the GMS

	Cambodia	Lao PDR	Myanmar	Thailand	Viet Nam
State forest management programmes	<ul style="list-style-type: none"> • 2001 Land Law • 2003 Forestry Law • 2007 partnership with National Forest Programme Facility • National Forest Programme 2010-2029 	<ul style="list-style-type: none"> • 2007 Forestry Law • SUFORD sustainable management plans • FSC certification in production forest; • Forestry Strategy 2020 released in 2005 	<ul style="list-style-type: none"> • State-run Myanmar Selection System (MSS) • 1992 Forest Law (last major changes made in 2005) 	<ul style="list-style-type: none"> • 5-year NESDPs (improved forest management) • 20 laws relevant to national forestry management 	<ul style="list-style-type: none"> • 2004 Law on Forest Protection and Development
Land-use planning	<ul style="list-style-type: none"> • Land Law (2001) • Sub-Decree on ECL (2005) • Sub-Decree No. 83 on Procedures of Land of Indigenous Communities (2009) 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 2014 Draft National Land Use Policy (based on 2012 National Dialogue on Land Tenure and Land Use Rights) • National Spatial Planning System proposed under National Spatial Development Planning Act 	<ul style="list-style-type: none"> • National Land Policy 1987 • Land Code 1954 • Agricultural Land Reform Act (1975) 	<ul style="list-style-type: none"> • Land Law of 2003 • 1998-2010 SMHRP) • FLA
Protected area systems	<ul style="list-style-type: none"> • Royal Decree on Protected Areas (1993) • Protected Areas Law (2008): includes Community PAs 	<ul style="list-style-type: none"> • 1989 Decree on Wildlife, Aquatic Life Conservation and Hunting/ Fishing Control (118/PMC) • 1993 National Biodiversity Conservation Areas (Decree 164) 	<ul style="list-style-type: none"> • Protection of Wildlife and Wild Plant and Conservation of Natural Areas Law (1994) • Protected Area System (PAS) 	<ul style="list-style-type: none"> • Wildlife Protection Act 1992 • National Park Act 1961 • National Forest Reserve Act 1964 	<ul style="list-style-type: none"> • 1986 Decision of Minister of Forestry (categorizing forests) • 2001 Decision on Management of Special Use Forests (est. 3 subzones)
Logging bans and enforcement	<ul style="list-style-type: none"> • 1997 log export ban • 2002 logging ban (large-scale logging) 	<ul style="list-style-type: none"> • Log export ban • 2007 Forestry Law 	<ul style="list-style-type: none"> • 2005-2009 Kachin State Logging Ban • April 2014 raw timber export ban 	<ul style="list-style-type: none"> • 1989 commercial logging ban on natural forests 	<ul style="list-style-type: none"> • 1995 partial logging ban

	Cambodia	Lao PDR	Myanmar	Thailand	Viet Nam
Participatory forestry	<ul style="list-style-type: none"> • Commune Administration Law (2001) • 2003 Sub-decree on Community Forest Management (guidelines) • 2006 Community Forestry Prakas (guidelines) 	<ul style="list-style-type: none"> • LFA policy • 1995 FOMACOP • 2004-2011 SUFORD 	<ul style="list-style-type: none"> • 1992 Forest Law • 1995 Forest Policy • 1995 CFI • 2001-2031 FMP 	<ul style="list-style-type: none"> • 2007 Community Forest Bill (status unclear) • 1994 TAO Act • 1986 CF Division in the RFD • 1998 Decentralization Act 	<ul style="list-style-type: none"> • Law on Forest Protection and Development (LFPD) 2004
Payments for ecosystem services (PES)	<ul style="list-style-type: none"> • Biodiversity-related PES projects (2002) 	<ul style="list-style-type: none"> • Payments for Watershed Ecosystem Services (2008) • Climate Protection through Avoided Deforestation (CiPAD) 	<ul style="list-style-type: none"> • National Environmental Conservation Law (2012) 	<ul style="list-style-type: none"> • Numerous PES-type projects 	<ul style="list-style-type: none"> • Degraded Forest Land Allocation Policy • 2004 National Forest PES (PFES) Policy • 2008 pilot PFES projects (Lam Dong and Son La provinces) • 2010 national PFES programme
Allocation of land	<ul style="list-style-type: none"> • 2001 Land Law • New Law on Forestry (2002) • Social Land Concessions (2003) 	<ul style="list-style-type: none"> • LFA • SUFORD project 	<ul style="list-style-type: none"> • Myanmar Forest Policy (1995) • CFI (1995) 	<ul style="list-style-type: none"> • Environment Fund • Agricultural Land Reform Act of 1975 (ALRA) 	<ul style="list-style-type: none"> • Degraded Forest Land Allocation Policy • National PFES Policy • SMHRP 1998-2010 • National Mangrove Restoration and Development Plan
Private sector encouragement	<ul style="list-style-type: none"> • Forestry Law and Policy Statement • Sub-Decree 26 'Roles for Granting User Rights to Cultivate Tree Plantation within State Forest Land' (25 March 2008) 	<ul style="list-style-type: none"> • Promote NWFPs and green forest products 	<ul style="list-style-type: none"> • 1992 Forest Law No. 8/92 • Foreign Investment Law, No. 21/12 (2012) • 30 Year Forestry Master Plan 	<ul style="list-style-type: none"> • National Forest Policy • Potential PEFC membership 	<ul style="list-style-type: none"> • Forestry Development Strategy (1995) • Forestry Sector Development

Source: Costenbader et al., (2015).



A summary of policy efforts and progress in GMS countries is provided below:

The Government of Cambodia is implementing a number of policies and measures to combat deforestation and forest degradation. State forest management instruments such as the Land Law of 2001, the Forestry Law of 2003, the 2007 partnership with the National Forest Programme Facility and the National Forest Programme 2010-2029 are helping to delineate permanent forest estate (PFE) and production forests, develop management plans, make socio-economic assessments and introduce timber marking. Government Directive 001 (Order 01BB) suspended the granting of new ELCs and called for a review of existing concessions. The 2005 Sub-Decree on Economic Land Concessions helps with the integration of community land-use plans into decentralized planning, while Sub-Decree No. 83 (2009) is helping with the processing of land titles for communities. The 2001 Land Law is also helping with the allocation of forest land to locals. For protected area management, the Royal Decree on Protected Areas 1993 and the Protected Areas Law 2008 are the main laws. Logging is addressed through the 1997 log export ban and 2002 logging ban; in particular, the 2002 ban is designed to ensure sustainable forestry and to address large-scale logging. The private sector is encouraged to participate through the Forestry Law and Policy Statement. Similarly, Sub-Decree 26 of 2008 stipulates private sector investment in forest rehabilitation.

The Government of Lao PDR has made efforts to improve national laws and regulations, including the drafting of a new National Land Policy that is currently being debated by the National Assembly. Efforts are being made to reduce the impacts of shifting cultivation; grant



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Photo 8. Forest at Beoung Yak Lom, Ratanakiri Province, Cambodia

conservation or protected status to over 50 percent of forests; and multiple regulations and moratoria target banning the export of unprocessed logs and the closing of unlicensed sawmills. The Forestry Law of 2007, the Sustainable Forestry and Rural Development Project (SUFORD, 2004-2011), FSC certification of production forests and the Forestry Strategy 2020 released in 2005 are the main state forest management instruments. The SUFORD forest management model puts production forest under participatory management, while the Forest Strategy 2020 aims to increase national forest cover to 70 percent by 2020. The Forestry Law of 2007 addresses illegal logging. The SUFORD model, the Land and Forest Allocation (LFA) policy and the 1995 Forest Management and Conservation Programme (FOMACOP) are promoting participatory forest management. The LFA along with SUFORD contribute to land allocation for locals.

To combat deforestation and forest degradation the Government of Myanmar is undertaking measures related to FLEGT, REDD+, land-use policy formulation, community forestry, responsible tourism and a master plan for energy use. The main state forest management instruments are the Myanmar Selection System (MSS) and Forest Law 1992 to which major changes were made in 2005. The MSS has been a model SFM system since the early twentieth century; it is based on annual allowable cuts, girdling and selective rotation but financial and political pressures hinder its implementation. The Raw Timber Export Ban of 2014 prohibited raw teak log and roundwood exports. The Kachin State Logging Ban, 2005-2009 (together with a ban in China), reduced illegal logging by 70 percent in Myanmar (GW 2009). Participatory forest management is addressed through the Forest Law of 1992, Forest Policy of 1995, CFI of 1995 and Forestry Master Plan (FMP), 2001-2031. The CFI enables communities to co-manage forests for fuelwood, practise small-scale agriculture and reforest degraded forest lands (Woods and Canby 2011). The Myanmar Forest Policy of 1995 allocates 30 percent of the total land area to reserved forest areas and 5 percent to protected areas; encourages participatory forestry; and increases farm incomes via community and agroforestry systems (FAO, 1997).

In Thailand, national policy has evolved from emphasizing growth and industrialization during the 1960s to 1980s to focus more on environmental considerations and sustainable development. From the late 1980s to date, Thailand has experienced first a reduction and then a gradual increase in forest cover as a result. Mechanisms currently employed in Thailand to combat deforestation and forest degradation and increase forest cover are policy support, law enforcement, forest land management, community forestry, engagement of religious institutions in forest conservation, CSR, ecotourism and urban forestry. State forest management programmes fall under five-year NESDPs; a commercial logging ban in 1989 was imposed in response to the severe floods. Community participation has been encouraged through the Community Forest Bill of 2007, Tambon Administration Organization (TAO) Act of 1994, Decentralization Act of 1998 and establishment of the Community Forestry Division (CFD) in the RFD in 1986. The private sector is encouraged through the National Forest Policy and Potential PEFC membership scheme.

Various policies in Viet Nam have been initiated with support from international NGOs and development organizations. The Law on Forest Protection and Development 2004 is the main state forest management legislation and it not only categorizes forests but also authorizes

reforestation policies, forest management plans, increased legal production, certification and mechanisms for legality assurances for the industry. The Land Law of 2003, 5MHRP and FLA address land-related policies. Participatory approaches were initiated in the 1990s for community forest management. Restrictions on the use/export of domestic timber were implemented through a partial logging ban in 1995; to encourage sourcing of legal timber, the government is actively participating in the EU-FLEGT. Forest land allocation programmes have allocated forest land since the late 1990s to households and communities for long-term use and SFM to lessen the dependency on state forest enterprises. The National PFES Policy, 5MHRP and National Mangrove Restoration and Development Plan 2008-2015 (NMRDP) have also been instrumental in advancing SFM in Viet Nam. The private sector is encouraged to participate through the Forestry Development Strategy of 1995 and the Forest Sector Development Project (FSDP), which advocate the sustainable management of plantation forests and conservation of biodiversity in special-use forests by the private sector.

4.2.2 Awareness of Sustainable Forest Management (SFM)

There has been increasing integration between communities, mass organizations, environmental NGOs, governments and the private sector. In recent years, global **increases in environmental awareness** have helped to stimulate demand for forest governance reform in the GMS, which has been strengthened by growing CSO efforts in many countries (FAO, 2011). A wide range of developments is likely to affect the direction of progress, taking into account sustainability and forest protection. For example, technology could



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Photo 9. Local furniture industry in Myanmar

have indirect impacts. In recent years, growing numbers of people have gained access to mobile phones, which can be used to report illegal activities. Satellites increasingly are being used to monitor logging (e.g. the Global Forest Watch of the World Resources Institute). All of these factors are indirectly driving forest conservation, rehabilitation, and reforestation, although measuring their impacts is challenging.

Employment of appropriate technology is also helping government agencies to achieve targets in an effective manner. Thailand has adopted satellite technology to support forest management since the beginning of the first NESDP. Satellite images and aerial photos can be used to indicate forest areas and boundaries with high accuracy and cost effectiveness and can be combined with patrol techniques to help protect forests and safeguard communities. Surveys using helicopters, cameras and high-resolution remote sensing data can also help to counter illegal logging and forest encroachment.

There is also an increasing awareness at the corporate level towards adopting SFM and some major palm oil producers and traders (e.g. Wilmar International, Golden Agri-Resources and Cargill) and consumer goods companies (including Hershey's, Unilever and Mars) have adopted zero deforestation policies and/or sustainability standards (UNCS 2014). Similarly, large furniture companies such as IKEA have joined a project supporting SFM in Viet Nam. This project will help to identify and evaluate options for and barriers to SFM certification and at the same time will help to empower forest-dependent communities by involving them in forest management.

4.2.3 Opportunities provided by SDGs and the Paris climate change agreement

Two important discourses may influence forest management in positive ways: the Sustainable Development Goals (SDGs) and the Paris Agreement. When the SDGs were formulated and agreed by 193 countries in 2015, forests were explicitly mentioned, especially in SDG 15 (Life on land), which is related to sustainably managing forests, combating desertification, halting and reversing land degradation, and attenuating biodiversity loss. There are two important targets related directly to forests:

1. By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular **forests**, wetlands, mountains, and drylands, in line with obligations under international agreements.
2. By 2020, promote the implementation of sustainable management of **all types of forests**, halt deforestation, restore degraded **forests** and substantially increase afforestation and reforestation globally.

While forests are linked directly to SDG 15 they contribute to many more SDGs. Forests are also important for SDG 1: No poverty; SDG 2: Zero hunger; SDG 3: Good health and well-being; SDG 5: Gender equality; SDG 6: Clean water and sanitation; SDG 7: Affordable and clean energy; SDG 8: Decent work and economic growth; SDG 11: Sustainable cities and communities; SDG 12: Responsible consumption; SDG 13: Climate action; and SDG 14: Life below water.

Another important discourse is the Paris Agreement that was adopted by consensus on 12 December 2015. The agreement was adopted by 196 Parties to the UNFCCC within the purview of keeping global average temperature under 2°C. It also outlined a commitment to investigating action needs to confine average temperature to below 1.5°C. The commitment is being implemented through the so-called Nationally Determined Contributions (NDCs) through which countries will outline their best efforts to contribute to the main goal of keeping temperature under 2°C. Countries will submit a national inventory report on anthropogenic emissions and information for tracking progress on implementing NDCs on a regular basis.

These two global agendas will influence forests directly or indirectly. As countries are making commitments to achieving the SDGs and Paris Agreement it is anticipated that they will put more concerted effort into achieving their national SDG targets and NDCs. Furthermore, various global funding instruments have already been introduced such as the Green Climate Fund (GCF) and Global Environmental Facility (GEF). The latter was introduced much earlier and has always had a strong forestry component. There is a fairly good chance that forest-related emission reduction projects will be supported by both groups. Certainly, there are various other funding conduits too, e.g. the private sector, industries and so forth. While it is difficult to predict the direct impact of this new development on forests, it is perhaps safe to say that forests are likely to benefit positively.



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Part 5. Conclusions

This report has discussed the negative and positive drivers of forest change in the GMS, a region that is dynamic and rapidly changing. Population growth, high rural populations in most GMS countries and at the same time urbanization, significant socio-economic progress and shifts towards more diversified market-based economies are common characteristics of all the GMS countries. The divergent economic, cultural, social and historical values pose variable degrees of threat to the environment and particularly forests.

The study shows that although estimates on the extent of forest area change in the last 25 years vary among GMS countries and often time data are contested, the overall picture for the GMS is forest area decline of around 5 percent from 1990 to 2015, mainly due to forest loss in Cambodia and Myanmar. As discussed, forest area change refers to the conversion of forest area to non-forest area, e.g. agriculture, mining, infrastructure, etc. However, it is important to recognize that there have been changes as well in terms of shifting from primary forests to naturally regenerated forests (or secondary forests). Another change is the increase in plantation forests in most GMS countries. These changes have not been equal in all GMS countries.

Natural forests continue to be threatened in most GMS countries. They are illegally logged or converted to other uses. Both primary and secondary forests experience degradation

owing to encroachment, fires, shifting cultivation, etc. Despite the pressure on natural forests Viet Nam and Thailand have put significant efforts into forest plantation, which has contributed to an increase of forest area. All GMS countries now are putting in place more favourable policies on SFM, forest protection and conservation.

Forest change in the GMS has taken place as a result of several drivers. Our results concluded that both positive and negative drivers coexist. The direct negative drivers include agricultural expansion, infrastructure development, unsustainable and illegal logging, mining and forest fire. Agricultural expansion is the primary driver of deforestation and forest degradation because of conversion of forests to agricultural areas, the dependence of nearly 80 percent of the rural population on agriculture, establishment of plantation estates and so forth. In terms of infrastructure, road construction and hydropower dam are the most prominent negative drivers. Roads open up access to remote areas that may, in the end, allow easier access to forest areas. Last but not least, illegal logging and forest fires also cause forest loss in GMS.

Indirect negative drivers include demographic change, socio-economic progress and weak governance. While not directly altering forest area, they contribute to forest loss in different ways. For example, urbanization and more advanced economies such as Thailand and to some extent Viet Nam increase the demand for forest products as people have more purchasing power. Weak governance results in corruption and illegal logging. All of these factors have had had negative impacts on forests.

The report also discusses the positive drivers, both direct and indirect, that promote SFM, conservation, afforestation and reforestation. Involvement of people is another important positive driver. The various programmes and initiatives that support SFM, afforestation, reforestation and forest conservation in the GMS are all direct drivers. The positive drivers have worked due to supportive policies and legislation, awareness on the importance of SFM, and hopefully, also opportunities provided by SDGs and the Paris Agreement.

Overall, there is an indication that the GMS has increasingly embraced SFM and moved towards forest transitions, especially in Viet Nam and Thailand. Enhanced stakeholder engagement at various levels of decision-making in the context of forest management is an important step towards managing forests sustainably and this indicates that governments are trying to make more efforts towards achieving SFM. Similarly, international demand for green products and timber certification schemes and agreements like the EU-FLEGT also make GMS governments reconsider their actions and forest management policies and legislations.

The analysis of the existing policies shows that although significant policies are in place to address negative drivers at various levels, the main challenge is in their implementation for improved forest management. To make the existing policies more effective there is a need for better governance systems and more decentralized forest management and decision-making.

While this report has shown what the GMS has achieved in the last 25 years, the region will continue to undergo more changes in the future due to population and socio-economic growth, which will further increase pressure on forests; this threat makes SFM adoption by GMS countries even more important.



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Part 6. Recommendations

This report suggests that there is an immediate need to tackle negative drivers and concomitantly concentrated efforts are required to strengthen the positive drivers. This can only be accomplished with a clear roadmap involving the participation of multistakeholders, respecting the rights of local people and taking into consideration the various commitments of GMS countries to regional and international conventions and agreements. Almost all these actions require a continuous and integrated approach rather than serving as one-off activities.

Forests in the GMS continue to be threatened by various negative drivers, many of which are outside the forestry sector. Agricultural expansion, infrastructure development, logging, mining and forest fires are important negative drivers affecting forests in the region. Fostering intersectoral coordination at country and regional levels is crucial in addressing the challenge of mitigating negative drivers. This can only be done by implementing comprehensive practices and approaches (such as landscape-level planning, integrated watershed management, integrated and participatory land-use planning, decentralization and so forth) with proper monitoring, evaluation and harmonization among different policies, objectives and sectors.



The involvement of various sectors will not only help with reconciliation but also stimulate more people's involvement in forest management. Such practices and approaches should guarantee that SFM and forest conservation goals are given higher priority in relation to demands from agricultural, infrastructural and economic development. For agriculture, there is a need to be more focused on increasing environmentally friendly and highly productive crops instead of clearing forest land for agriculture. One of the key messages of the latest State of the world's forests 2016 (FAO, 2016b) declares, "Food security can be achieved through agricultural intensification and other measures such as social protection, rather than through expansion of agricultural areas at the expense of forests".

Regional cooperation needs to be improved given the illegal and unsustainable logging in GMS countries. Improvement in regional and bilateral cooperation to address negative drivers is necessary to address 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 these critical issues together in order to have a lasting impact.

Forest law enforcement and penal code reform are needed to ensure that countries target major forest crimes, in particular, 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. In conjunction with the EU Timber Regulation, the VPA process aims to reduce demand for illegal timber. Legislation in the US, Australia and Japan is similarly supportive of efforts to eliminate trade in illegal timber and support the sustainable management of forests.

More localized ownership and control of forest land and more local participation in forest management decisions and land-use planning can improve the sustainability of forest management. Land allocation to local populations can act as both an incentive mechanism and a forest management system towards more sustainable forest development outcomes. Similarly, CF initiatives hold considerable promise in most GMS countries, and with more complete granting of access rights and better quality land to manage, could encourage better protection of standing forest and restoration of degraded forest land.

Demand for sustainably certified forest products could help to drive positive forest and land-use outcomes in GMS countries as could agricultural commodity supply chain approaches backed by governments and companies in consumer countries. "Legality", "Deforestation free" and "Sustainability" approaches all attempt to ensure that corporate sourcing and national trade policy are aligned with environmental protection, labour and human rights standards. PES and REDD+ initiatives also hold considerable promise for GMS countries to incentivize forest protection, and regeneration of deforested and degraded areas, and should be scaled up in GMS countries. By targeting incentives to priority high-value conservation areas and increasing payments in line with income needs, incentive programmes may have greater impacts.

Finally, governance needs to be improved through strengthened law enforcement, transparency, monitoring and evaluation, and anticorruption measures. In various instances, GMS countries have developed rules and legislation but improper implementation due to lack of governance leads to conflicts and confusion among stakeholders. Despite most countries having relatively comprehensive forest management frameworks in place, implementation challenges prevent their consistent application.

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ISBN 978-92-5-109911-7



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I7758EN/1/08.17