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# Drivers of Forest Change in the Greater Mekong Subregion

## Lao PDR Country Report

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

Drivers of Deforestation in the Greater Mekong Subregion

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The USAID Lowering Emissions in Asia's Forests (USAID LEAF) Program is a five-year regional project (2011-2016) focused on achieving meaningful and sustainable reductions in greenhouse gas (GHG) emissions from the forest-land use sector across six target countries: Thailand, Laos, Vietnam, Cambodia, Malaysia and Papua New Guinea.

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# Executive Summary

Lao PDR still has one of the highest national forest cover percentages in mainland Southeast Asia.[1] However, illegal logging remains a serious issue adding to already extensive natural forest losses caused by large-scale conversions to agriculture, industrial tree plantations, mining, inundation areas of hydropower dams and other infrastructure projects as well as generally unsustainable legal logging practices. Timber is primarily exported to neighboring countries, especially Vietnam and China.[2]

The main objective of this study was to review and analyze existing information on the drivers of change currently affecting Lao forests - including both negative and positive drivers. This national study starts with a brief overview of the current situation in the forestry sector then continues by identifying and reflecting on Land Use & Forest Change (LUFC) drivers and actors to help understand current changes. An attempt is then made to identify past Policies & Measures (PAMs) that have helped to reduce deforestation and degradation by promoting Sustainable Forest Management (SFM) and forest conservation. It is clear from this review that the Government of Lao PDR (GoL), civil society and national media are all very much aware of the importance of maintaining healthy forests and are making numerous efforts to reverse the continuing downward trends in national forest status.

Indeed although the GoL has already put in place both laws and regulations sufficient to help protect national forests, enforcement of these laws needs strengthening. Therefore, this document recommends the following actions linked to law enforcement and monitoring of the nation's forests as an action plan for future intervention:

- Mandatory GPS Tracking of all Vehicles Licensed to Transport Timber;
- Strengthening of the Enforcement of Existing Forest-related Laws & Regulations;
- Creation of a New National Forest Real-Time Monitoring System;
- Improving Forest Management & Planning through Improved Mapping & Statistical Data;
- Improving the Performance of Existing Forest Protection Financial Incentive Schemes.

Whilst there are many other possible interventions that could strengthen the forestry sector, such as additional training in sustainable forestry techniques, the current increase in illegal logging activities and an associated loss of forestry sector revenue suggest that enforcement and monitoring should be the highest priority.

[1] In Lao PDR forests are defined as areas of at least 0.5 ha in size, with crown cover above 20%; with trees that will reach higher than 5 meters when mature. Dense forests have crown cover greater than 70%, medium-stocked between 40% and 70% and degraded forests have crown cover between 20% and 40%.

[2] Between16% to 25% of Vietnam's annual wood imports are from Laos.

# 1 Overview of Trends in Forest and Land Use Sector

Although Lao PDR still has considerable forest resources, significant deforestation and forest degradation have taken place during the past two decades, as evidenced by a substantial decline in the extent of natural forests. According to available official statistics from the Ministry of Natural Resources and Environment (MonRE), in the 1960s, national forest cover in Laos amounted to around 71.6 percent (17 million hectares). By 1992, this figure had declined to 47 percent (11.1 million hectares), decreasing further to 41.5 percent (9.7 million hectares) by 2002. By 2010, forest cover was estimated at 40.34 percent (9.5 million hectares). In particular, during the period 1992-2002 significant LUFC took place in Lao PDR, including pronounced deforestation at an annual rate of 1.25% - equivalent to loss of 140,000 ha of forest per year. However, these official statistics should be treated with caution as the accuracy of the forest maps from which they were derived is questionable.[3]

In addition to deforestation, many natural forests with lower productivity and impaired environmental functions suffered intensive degradation. The extent of the damage is highlighted by the nation's relatively small wood processing sector, which is now reporting shortages in high quality raw materials (Vientiane Times, 22 April 2014). The exploitation of natural forests during recent decades did little to benefit the rural poor and instead contributed to the degradation of the natural resource base upon which the majority of the population depends for their livelihood (World Bank 2001).

A decade has passed since the launch by MAF of the GoL Forest Strategy 2020 in 2005. Despite GoL efforts, the nation's forests continue to decline in terms of spatial extent, biodiversity, ecosystem services, rural livelihood benefits and national revenue contribution. The current national goal remains to increase forest cover to 65 percent by 2015 and 70 percent by 2020 (Vientiane Times, 9 July 2014). According to the Director General of the Department of Forestry, this goal is still achievable as "*dense forest still covered 40.3 percent of the country, with another 37 percent being covered by damaged forests. If no further damage is made to these forests, then the 37 percent (six million hectares of damaged forests) can be recovered within three to four years. The 70 percent forest cover will involve approximately 16.5 million hectares of land, with natural forests covering 16 million hectares and 500,000 hectares made up by industrial tree plantations such as rubber, eucalyptus and other trees planted for logging and trading purposes*." (Vientiane Times, 22 July 2014).

However, the current GoL target to completely re-forest the "*six million hectares of damaged forests*" may be difficult to achieve as many areas classified as "un-stocked" have already been deforested and converted to other land uses. Classification of such areas should therefore be reviewed. Further confusion results from use of forest statistics published by FAO Global Forest Resource Assessment (FRA 2010) which are based on a 10% minimum crown cover limit rather than the 20% limit set by GoL. Under the FAO definition, national forest cover in 2010 is estimated at 67.54% (15.59 million hectares) rather than 40.43% using the GoL definition.

Timely access to accurate forest data would help achieve nationally important objectives related to land use and infrastructure planning and also other areas. For example, malaria control and clearance of unexploded bombs could be greatly assisted by spatially accurate forest change maps showing where people are moving into forest areas and therefore likely to be more at greater risk. Public

[3] In 2010, the Forest Inventory Planning Department (FIPD) released an official national forest cover dataset based mostly on an older 2008 dataset which suffered a number of quality issues making it unusable for meaningful forest change analysis or accurate compilation of forest statistics. Additionally, and despite a National Forest Inventory (NFI) in 2011–2012 and continuing efforts to produce forest maps for Production Forest Area management plans, there is still no reliable up-to-date official map accurately depicting the current national forest extent that is publically available. FIPD has some accurate and up-to-date forest data (at least for Production Forest Areas) but this has not yet been released (Interview with MoNRE consultant, November 2014.)

accessibility to forest cover data is also a critical factor required for a national REDD+ program to be successful. [4]

Given the regional nature of this study and problems inherent in comparing countries that use different forest definitions, the best currently available option may be to use the available online, open source forest cover information. Several such global and regional forest datasets are available including a PALSAR global forest dataset recently released by the Japanese Space Agency. However, the dataset produced by Hansen/UMD/Google/USGS/NASA, 2013 "*High-Resolution Global Maps of 21st-Century Forest Cover Change"* is probably the best available, most suitable and most spatially accurate for the objectives of this study and is therefore selected as the basis for further analysis in chapter five.[5]

Three illustrative maps below display "hotspots of deforestation" in the north, south and center of the country and demonstrate the extent of the decline in forest cover over the last decade. Due to the lack of an accurate and useable official GoL forest cover data set, these maps are produced using data now publically available from Hansen/UMD/Google/USGS/NASA.

[4] As detailed for example at http://www.euredd.efi.int/transparency

[5] Hansen/UMD/Google/USGS/NASA, 2013 is freely available online at: http://www.globalforestwatch.org/country/LAO and http://earthenginepartners.appspot.com/science-2013-global-forest

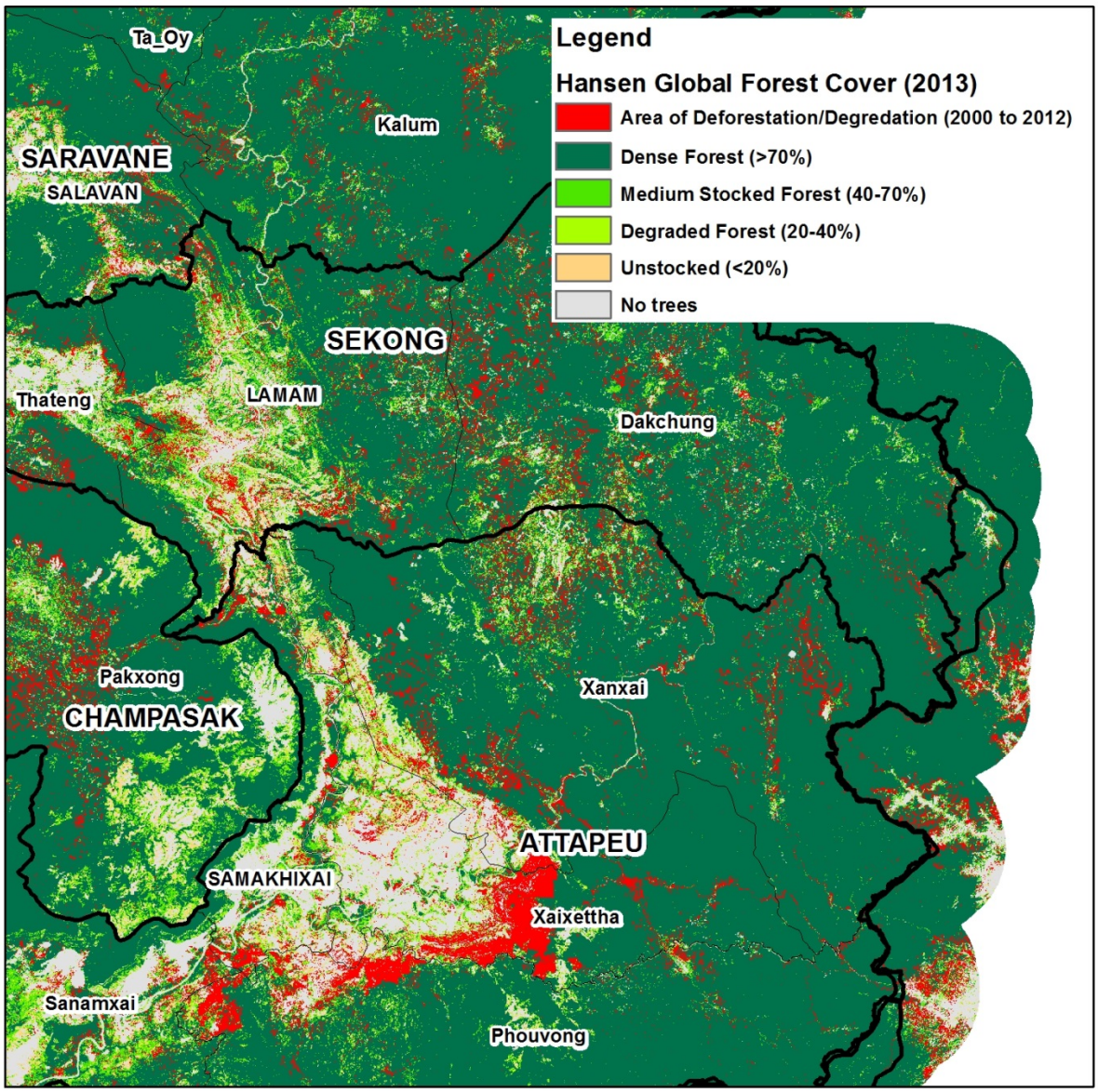


**Figure 1. Map showing Forest Cover Losses in Attapeu Province (2000 to 2013)**

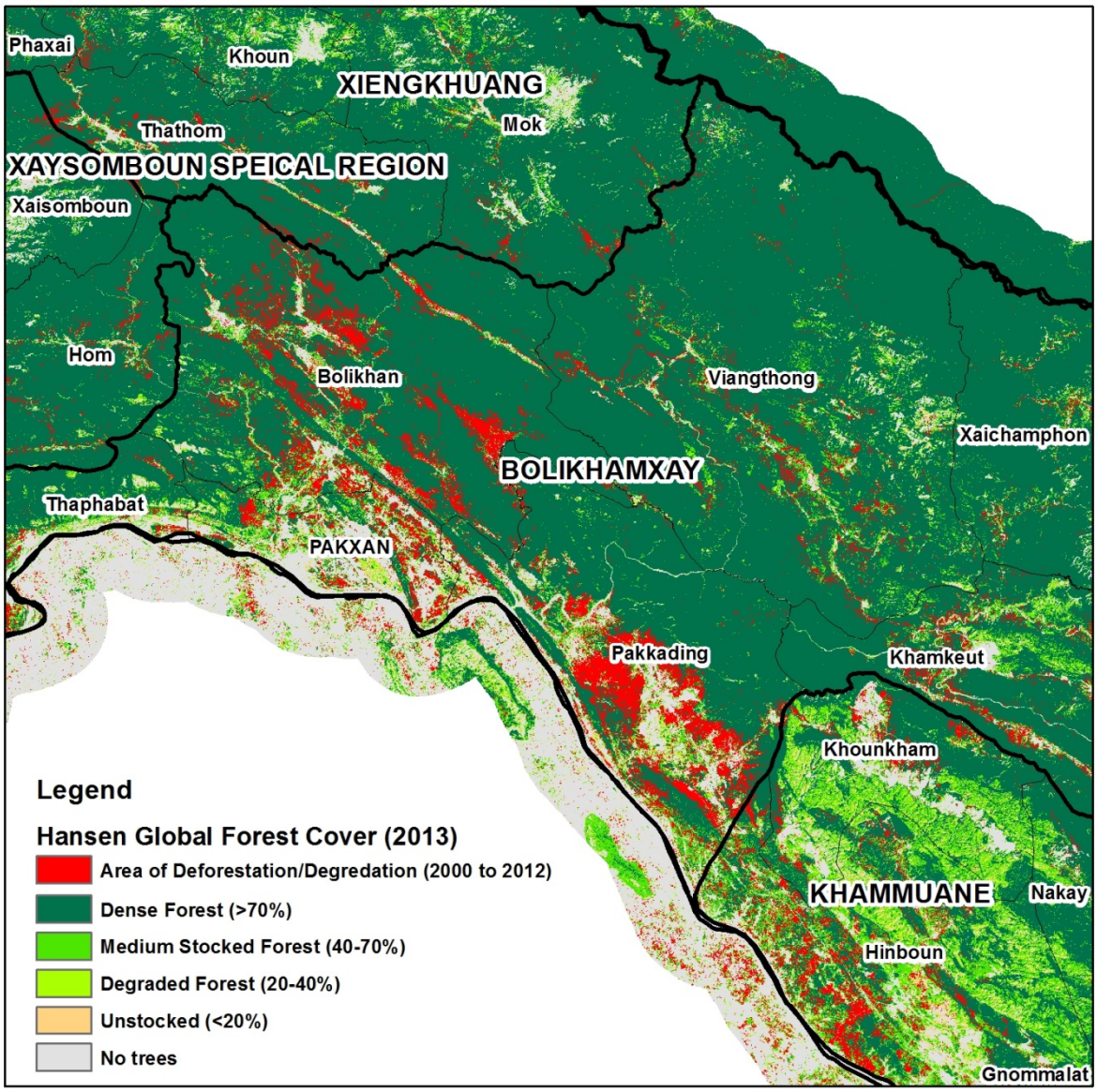


**Figure 2. Map showing Forest Cover Losses in Bolikhamxay Province (2000 to 2013)**

The three maps presented in this section and information on provincial forest losses in the table below show the widespread nature of deforestation in Lao PDR since 2000. The spatial distribution of deforestation shows that expansion of agriculture into more accessible forest areas continues to be a leading cause of deforestation throughout Laos. At the same time, large forest areas in more inaccessible and mountainous areas still remain relatively intact. However, the Landsat satellite imagery used for these maps is not sufficiently high resolution to detect the effects of selective logging or most other types of forest degradation.

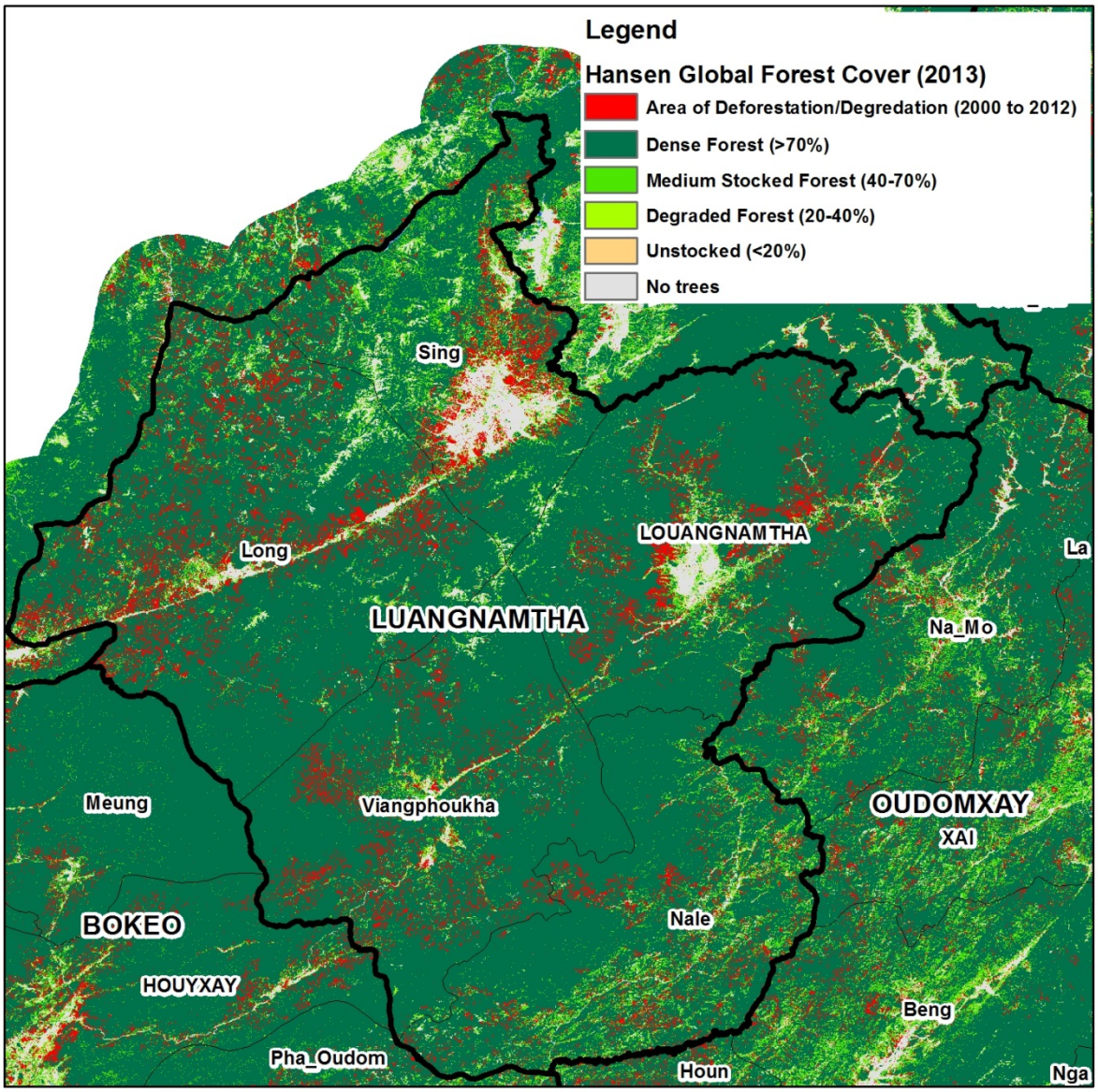


**Figure 3. Map showing Forest Cover Losses in Luang Namtha Province (2000 to 2013)**

The table below showing change in forest cover clearly demonstrates acceleration in the rate of forest loss nationwide between 2001 and 2012. Not a single province in the country has experienced a net gain in forest area, even for a single year in the twelve-year period covered by the analysis (2000 to 2012). The total average deforestation rate is 0.71% per year and rates above this average and even exceeding “1% provincial forest decline per year” are becoming more frequent as shown by the yellow (>average) and red (>1%) highlighted cells in the table.

**Table 1. Net percentage change (gains – losses) in forest cover for 2001-2012 using a minimum crown cover of 20%**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Attapu** | -0.65 | -0.46 | -0.35 | -0.91 | -0.39 | -0.68 | -0.70 | -0.65 | -1.19 | -0.83 | -1.38 | -0.87 | **-0.76** |
| **Bokeo** | -0.20 | -0.40 | -0.58 | -0.36 | -0.37 | -0.78 | -0.85 | -0.66 | -0.86 | -1.16 | -0.85 | -0.90 | **-0.67** |
| **Bolikhamxai** | -0.36 | -0.56 | -0.72 | -0.41 | -0.63 | -0.75 | -1.49 | -0.60 | -1.27 | -1.32 | -1.33 | -1.22 | **-0.89** |
| **Champasak** | -0.40 | -0.46 | -0.37 | -0.45 | -0.34 | -0.72 | -0.63 | -0.68 | -0.66 | -0.67 | -0.71 | -0.37 | **-0.54** |
| **Houaphan** | -0.50 | -0.45 | -0.95 | -0.61 | -1.19 | -1.31 | -1.12 | -0.83 | -0.78 | -1.36 | -1.07 | -0.44 | **-0.88** |
| **Khammouan** | -0.28 | -0.39 | -0.42 | -0.53 | -0.48 | -0.70 | -0.83 | -0.37 | -0.79 | -0.65 | -0.90 | -0.80 | **-0.60** |
| **Louang Namtha** | -0.42 | -0.55 | -0.95 | -0.61 | -0.60 | -1.21 | -1.44 | -0.93 | -1.43 | -1.67 | -0.90 | -1.00 | **-0.97** |
| **Louangphrabang** | -0.30 | -0.42 | -0.73 | -0.47 | -0.49 | -0.80 | -0.61 | -0.36 | -0.67 | -1.05 | -0.48 | -0.43 | **-0.57** |
| **Oudamxai** | -0.31 | -0.55 | -0.91 | -0.50 | -0.41 | -0.87 | -0.77 | -0.42 | -0.97 | -1.35 | -0.50 | -0.43 | **-0.67** |
| **Phongsali** | -0.21 | -0.36 | -0.54 | -0.21 | -0.31 | -0.45 | -0.53 | -0.35 | -0.72 | -0.68 | -0.37 | -0.35 | **-0.42** |
| **Saravan** | -0.37 | -0.62 | -0.31 | -0.42 | -0.32 | -0.56 | -0.54 | -0.59 | -0.85 | -0.84 | -0.76 | -0.50 | **-0.56** |
| **Savannakhet** | -0.38 | -0.59 | -0.47 | -0.51 | -0.52 | -0.63 | -0.86 | -0.85 | -1.43 | -1.15 | -1.13 | -0.98 | **-0.79** |
| **Vientiane** | -0.22 | -0.28 | -0.45 | -0.50 | -0.54 | -0.99 | -0.95 | -0.67 | -1.24 | -1.27 | -0.78 | -0.43 | **-0.69** |
| **Vientiane Prefecture** | -0.69 | -0.74 | -1.27 | -1.25 | -0.67 | -2.28 | -1.72 | -1.46 | -2.30 | -2.23 | -1.80 | -1.57 | **-1.50** |
| **Xekong** | -0.50 | -0.67 | -0.45 | -0.71 | -0.57 | -0.67 | -0.86 | -0.85 | -1.01 | -1.04 | -0.92 | -0.73 | **-0.75** |
| **Xaignabouri** | -0.17 | -0.22 | -0.49 | -0.31 | -0.25 | -0.62 | -0.65 | -0.32 | -0.65 | -0.72 | -0.51 | -0.31 | **-0.43** |
| **Xaisamboun** | -0.14 | -0.15 | -0.25 | -0.24 | -0.20 | -0.51 | -0.64 | -0.45 | -0.60 | -0.88 | -0.63 | -0.49 | **-0.43** |
| **Xiangkhoang** | -0.28 | -0.31 | -0.68 | -0.45 | -0.48 | -0.88 | -0.77 | -0.49 | -0.71 | -1.12 | -0.66 | -0.33 | **-0.60** |
| **Grand Total** | **-0.35** | **-0.45** | **-0.60** | **-0.53** | **-0.49** | **-0.86** | **-0.89** | **-0.64** | **-1.01** | **-1.11** | **-0.87** | **-0.68** | **-0.71** |

Source: Hansen/UMD/Google/USGS/NASA, 2013

# 2 Drivers of Deforestation and Degradation

## 2.1 Direct Drivers of Deforestation and Degradation

In Lao PDR, deforestation is caused by many drivers but in particular illegal logging, agricultural expansion, industrial tree plantation development, hydropower development, mining and other infrastructure development. The first two drivers, illegal logging and agricultural expansion, probably have had the leading impact and are likely to continue to drive high rates of deforestation.

Forest degradation in Lao PDR is mainly caused by illegal logging and unsustainable timber extraction from commercial logging activities. Pioneering shifting cultivation also contributes depending on the scale of its application, with a lesser impact if carried out on a smaller scale (patches of less than 1 ha). Natural forest fires may also contribute but in both cases regrowth of swidden and burnt forest areas can be surprisingly rapid. Wood harvesting by rural households for domestic consumption most likely has a much less significant impact.

Historically, long-term deforestation sequences have usually started with commercial or illegal logging operations entering areas of dense primary forests, often in inaccessible and remote areas. Logging causes forest degradation and uncontrolled timber extraction also results in damage to remaining stands, while the construction of logging roads provides access for settlers and allows activities such as pioneering shifting cultivation to commence. This sequence of deforestation applies not only to Lao PDR, but also to all other countries in the region and beyond as documented by many previously studies (Thomas et al., 2009).

In many areas dramatic increases in the extent of coffee, rubber and industrial tree plantations have resulted in the fragmentation and loss of large areas of natural forest. In other areas, although the overall total area of forest appears to be relatively stable, there are extensive changes occurring due to shifting cultivation followed by rapid re-growth.[6]

Repeated uncontrolled logging, often in combination with illegal timber extraction and small scale pioneering shifting cultivation, causes degradation and fragmentation of contiguous forests.[7] Once fragmented and degraded, forests become more vulnerable to permanent conversion to agricultural. The impacts of this process are well documented and the gradual impairment and loss of the economic, ecological and socio-cultural functions of natural forest has already caused major negative impacts on the livelihoods of the rural population of Laos due to declining resource productivity, loss of biodiversity and impairment of environmental functions.[8] As a result conflicts over remaining forest resources continue to increase as the environment deteriorates.

Estimates of the magnitude of each of the main drivers of deforestation and degradation are shown in the table below.

[6] Thomas et al, 2010: Analysis of land use and forest changes and related driving forces in the Lao PDR. A contribution to the REDD+ Readiness Plan. Vientiane: Department of Forestry/Forestry Strategy Implementation Project. Unpublished.

[7] As above

[8] As above

**Table 2. Contribution of Direct Drivers to Deforestation & Degradation in Lao PDR**[9]

| Sources | Impact | Projected Annual Forest Loss Rate | Remarks |
|---|---|---|---|
| Wood Extraction | Forest Degradation | Estimated between 0.97 to 1.57 million cu. m per year during the period from 2002 until 2009 | Includes commercial logging, illegal logging & household consumption and the combined total represents the primary driver of unsustainable deforestation and degradation and is a high GoL priority to control. |
| Agricultural Expansion | Deforestation | Commercial 34,200 ha/year<br>Small-holder 14,700 ha/year | Since 2007 GoL has placed successive moratoriums on new concessions. |
| Industrial Tree Plantation | Deforestation | 6,000 ha/year | GoL is prioritizing tree plantations however deforestation occurs when plantations replace natural forest. |
| Pioneering Shifting Cultivation | Forest Degradation & Deforestation | 57,300 ha/year degraded | GoL continues to make efforts to control shifting cultivation. However, such areas typically regenerate quickly. |
| Hydropower | Deforestation | 13,100 ha/year | The rate is likely to increase further as many more new hydropower projects are built. |
| Mining | Deforestation | 5,100 ha/year up to 14,100 ha/year | Only certain types of mining (such as large-scale bauxite strip mining) are individually likely to cause extensive deforestation. However the cumulative effects of thousands of smaller local artisanal mines are probably a bigger driver of deforestation at present. |
| Infrastructure | Deforestation | 1,000 ha/year up to 2,000 ha/year | Direct impact may be relatively small but indirect impact especially due to increased accessibility due to road construction is much higher. |

[9] Primary source of data is the Projected Annual Forest Loss Rate estimates in the REDD-PP, (Unpublished 2010). The estimate for Industrial Tree Plantations is from the Sixth National Socioeconomic Development Plans (2006-2010) and alternate estimates from Watt P., 2010.

| Sources | Impact | Projected Annual Forest Loss Rate | Remarks |
|---|---|---|---|
| Urban expansion | Deforestation | Not significant except in Vientiane Prefecture where annual loss rates average -1.5% | Could also result in overall positive change due to associated rural de-population placing less pressure on forests. |
| Fire | Forest Degradation | MODIS satellite has detected more than 10,000+ fires in a one week reporting period | Satellite imagery shows that during dry seasons Laos may have a very high frequency of forest fires. However burnt areas typically regenerate very quickly. |

As shown in the previous table, unsustainable wood extraction, pioneering shifting cultivation, agricultural expansion and industrial tree plantation development are probably the most significant drivers of deforestation and forest degradation. However, it is difficult to estimate total national wood extraction and although official GoL quotas are clear for legal commercial logging (150,000 - 200,000 $m^3$ per year in the period 2002-2009 (MAF, 2005)) there are also many indications that logging companies exceed their quotas while the amount of timber harvested by illegal operations may even exceed the GoL quota itself. One estimate put illegal timber extraction levels as high as 600,000 $m^3$ per year in 2008 (Hodgdon, 2008).

***Agricultural Expansion*** due to cash crop cultivation is probably the single greatest current cause of direct and indirect deforestation (Stibig, 2007). This driver is quite complex and includes large concessions, medium to small scale investments, as well as household based activities. The impacts of all of them seem to have increased strongly nationwide, except large concessions which can be found mainly in the central and southern region. **The area of cash crop plantations increased from 17,700 ha in 1992 (Fidloczky, 2003) to around 320,000 ha in 2006 the dominant crops being maize, coffee, vegetables and fruits (Chapman, 2008). The Conversion Timber Project (2013) examined available concession records for the period 1989-2011 and found** that of 3,529 lease and concessional applications, 2,479 were still active covering an allocated area of 1,416,000 ha with an actual land utilization of 882,000 ha, which included 45% un-stocked forest land and 47% forest land.

***Establishment of Industrial Tree Plantations*** is also a rapidly increasing driver, growing nationwide from around 48,000 ha at the end of the 1990's (MAF, 2005) to 147,000 ha in 2008 with a pronounced peak during 2005/06 when 35,000 ha of plantations were established (Akkharath, 2008). In 2009 the GoL approved applications from 388 foreign and 728 domestic companies for 396,000 ha of land for industrial tree plantations, of which 60% were located in the lowlands of the central and southern regions (VT, 29.06.09). In 2009, 66,000 ha rubber, 33,000 ha Eucalyptus, 8,000 ha palms, 17,000 ha Acacia and 17,000 ha Jatropha plantation were established (Voradet, 2009), However, these figures do not account for household-based activities and small scale investment (Akkharath, 2008).

***Shifting Cultivation*** and its contribution to deforestation is difficult to estimate as research data is contradictory and the long-term impact therefore still open to debate. Official data showed that shifting cultivation covered approximately 300,000 ha annually by end of the 1980s and caused extensive forest destruction. Other available data suggests that shifting cultivation still causes deforestation, especially in the northern region and on the fringes of National Protected Areas (NPA's). The impacts of shifting cultivation triggered creation and implementation of GoL programs to promote transformation of the traditional livelihood systems into more sedentary agricultural production including the *Shifting Cultivation Stabilization Program* (since 1989), the *Land and Forest Allocation Program* and the *Community Forestry & NTFP Program* (both since 1993) and the *Village Relocation Program* (since 1994) and other livelihood support projects. These resulted in reduction of the extent of shifting cultivation from an average of around 180,000 ha per year during 1994/95 (MAF, 2005) to 119,000 ha during 2001/02 to 29,400 ha in 2005 (MAF, 2008). The national land use

and forestry survey in 2002/03 however reported that shifting cultivation decreased from 625,000 ha in 1992 to 516,000 ha in 2002 (Fidloczky, 2003). Recent regional studies have confirmed these trends (Stibig, 2007).

***Hydropower Development*** receives highest priority by the GoL as it is considered a key sector to drive economic development and to generate income. Due to the high potential in Lao PDR and increasing energy demand in neighboring countries, a common slogan used in this context is 'to develop Lao PDR as the battery of Southeast Asia' (Lawrence, 2008). In 2008 the total installed capacity was 700 MW produced by nine operating plants. A further seven plants with capacity of 2,250 MW were under construction and a 58 were in preparation (Phomsoupa, 2008). The overall potential to produce energy from hydropower is estimated at around 26,500 MW (VT, 15.05.09) and MoU's with Viet Nam and Thailand are already signed to develop capacities of around 12,000 MW (Phomsoupa, 2008). It contributes to deforestation directly because of clearance of inundation areas and indirectly because such clearance is often associated with illegal logging in adjacent forests (Stibig, 2007). Logging often starts before feasibility studies have been completed and includes areas well above inundation level, with little supervision or enforcement (Anon, 2000). In addition, villages have to be resettled creating pressure on forests in new locations. New hydropower plants also require construction of roads and high voltage power lines with attendant direct and indirect impacts on forests.

***Mining*** contributes directly to deforestation because forests have to be cleared, but also indirectly as it creates needs for additional infrastructure development (e.g. access roads). However past and current forest losses associated with mining are considered less than hydropower and in recent years GoL has enforced frequent and lengthy moratoriums on the granting of new mining concessions. Related investments also rise and fall depending on international demands for minerals and exploration and prospecting generally does not have a significant impact on forests. The main forest loss concern is in relation to a few mega projects currently under consideration, concerned specifically with strip mining of Bauxite in Southern Laos. 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.

***Infrastructure*** development of roads and power lines has so far either been closely linked to major hydropower and mining projects or improvements in main national roads that provide direct links to neighboring countries and access to foreign markets. So far the establishment of new local roads has been limited, but there is a shift from improving national roads towards creating better access to villages. This could have a more pronounced impact and lead to deforestation as such new local roads often traverse forested areas. Forest areas cleared during infrastructure development often appear more expansive than necessary and in some cases the entire project can appear to be motivated more by logging profits than by actual transport/development needs.

***Urban Expansion*** results mainly from strong socio-economic development and increased population in urban centers, which is partially due to in-migration trends from rural towards urban areas. In relation, urban areas have increased in size since 1992 from around 84 000 ha to 135 000 ha in 2002 (Fidloczky, 2003). This equals an average increase of around 5 000 ha per year and extrapolations based on these data would mean that currently around 170 000 ha are occupied by urban areas. This trend is likely to continue or even accelerate.

***Timber Harvesting for Household Consumption*** is assumed to have increased in line with population growth from 630,000 $m^3$ per year in 1992-2002 to 770,000 $m^3$ per year in 2002-2009 (World Bank 2001; Thomas et al, 2010). Total domestic timber demand was recently estimated at 1.57 million $m^3$ per year.[10] Families are normally entitled to cut up to 5 $m^3$ of timber per year from village utilization forests for their own use. In theory, an application to the village authorities may also be required,

[10] Projected annual forest loss rate estimated in the Lao PDR Readiness Preparation Proposal (Unpublished 2010).

which will be checked and decided upon by the village head or the Village Development Committee (VDC).

Numerous actors are involved in deforestation and forest degradation including farmers, shifting cultivators (especially in Northern provinces), logging companies and contractors, military, State Owned Enterprises (SOE), local and foreign investors (e.g. business persons, traders), construction companies and government authorities. In many cases more than one actor is involved (see Analysis Chapter 5) and the decision of individual actors or groups of actors to undertake activities that cause forest degradation and deforestation can be influenced by multiple factors and underlying drivers. Together, these drivers and actors present a complex system of interacting interlinked elements that are often site-specific and unstable over time. As such, in the majority of cases there is no simple single cause-effect relationship that explains local deforestation or forest degradation.

For example, it is clear that some drivers create access and other conditions necessary for further drivers to act. Road construction, logging operations, agricultural expansion, industrial tree plantation development, mining, hydropower and other infrastructure development all increase access to forest areas and facilitate migration into larger forest complexes where activities such as pioneering shifting cultivation may in turn take place. There is an additional risk of a vicious cycle where, for example, deforestation and degradation on village land leads to poverty that villagers try to compensate for through further unsustainable logging. Agriculture expansion and industrial tree plantation development may have similar effects and in some instances development of tree plantations should in fact be considered as deforestation because the plantations directly replace existing natural forests (Nanthavong et al. 2009).

## 2.2 Indirect Drivers of Deforestation and Degradation

There are many indirect drivers underlying the direct drivers already listed. It is helpful to broadly categorize such indirect drivers as follows:

**(a) Governance Issues** such as lack of transparency in decision making, corruption (e.g. linked to logging/processing quota and illegal timber transport), weak law enforcement and power imbalances. The latter includes difficulties in controlling the logging and timber transportation operations of State Operated Enterprises (SOE), especially companies connected with the military that have powerful political and business connections providing them with impunity from law enforcement agencies.

**(b) Institutional Issues** such as weak and insufficient capacities within agencies and local authorities contribute to the failure to properly plan, supervise and control forest-related activities. Such weakness leads to a range of resource management and protection issues such as non-existent or inappropriate boundary demarcations for both protected areas and logging operations, estimation of the Annual Allowable Cut (AAC) above sustainable forest resource potential and logging of timber in excess of the quota. Weak cooperation, lack of information exchange and insufficient extension services leads to inadequate knowledge of legislation and regulations by logging companies and resulting violations, e.g. logging of trees smaller than the legal minimum harvestable limit.

**(c) Regulatory Framework issues** such as inappropriate implementation of Government policies, regulations and programs; inconsistencies in legislation, investment promotion measures, and shortcomings in implementation of land use planning/land allocation due to lack of qualified staff, equipment and funds. An example would be bartered deals that allocate special logging quotas to foreign companies in compensation for infrastructure development without consideration for sustainable forestry planning.

**(d) Economic Factors** include national and local development priorities, regional and national economic growth and steadily increasing investment in mining, hydropower and other infrastructure development (e.g. roads, electricity). Other relevant economic factors include widespread rural poverty, insufficient land access and tenure security in rural areas and limited awareness of land and resource use rights.

**(e) Market Issues** such as the increasing accessibility of forest areas, strong domestic, regional and international demand for timber and forest products, especially high value timber species (e.g. *Dalbergia* sp., *Pterocarpus* sp., *Afzelia* sp), and over capacity in the wood processing industry. In the

absence of financial incentives to maintain and sustainably manage forests, higher profitability can be gained by conversion to other land uses such as agriculture or industrial tree plantation or by unsustainable commercial, or illegal logging.

**(f) Environmental Issues**, for example, more severe droughts in combination with a rise in the frequency of lightning strikes under altered climatic conditions could together both stress forests and increase the extent and damage caused by natural forest fires. There is also a strong possibility that new major infrastructure projects such as the Hongsa coal power plant will produce environment pollution ("acid rain") that will also directly contribute to future forest decline especially in areas with susceptible soils.

# 3 Drivers of Sustainable Forest Management, Forest Conservation, Afforestation and Reforestation

Important drivers with regards to sustainable management and conservation of forests in Lao PDR can be broadly categorized into environmental or economic concerns as follows:

a. The need to maintain and increase **Government Revenues** from the taxes collected from logging operations. Increasing levels of illegal logging are directly resulting in less revenue being generated by the forestry sector. Given the importance of the sector the GoL is obviously very concerned by any loss of revenue and this is becoming one of the most important drivers of efforts to address illegal logging.

b. The need to maintain **Food Security: Non-Timber Forest Products (NTFPs)** provide important sources of food, particularly for poorer rural populations during non-cropping seasons. Income derived from the sale of NTFPs can also be used to buy food. Sustainable commercial production of NTFPs can also support important local industries producing e.g. rattan furniture, wild honey, various botanical oils, spices and mushrooms. Forest production systems are, in general, less labor and energy intensive than agriculture because preparation, planting, irrigation, fertilizer and pesticide/herbicide inputs are usually not required.

c. The need to maintain **Wood Energy production,** particularly the traditional burning of wood-fuel for cooking and heating, continues to meet the majority of energy demand in rural areas.

d. **Protection of Biodiversity**. Lao PDR is an important global center of biodiversity and home to many endemic and threatened species with previously unknown species being discovered on a regular basis. There is thus a great need to protect and conserve remaining natural habitats. Forests form important biodiversity corridors through which threatened species (such as the Saola antelope first discovered in 1992) can migrate to maintain viable populations without becoming trapped in isolated pockets. The GoL has designated a considerable portion of the country's forests as nationally protected forest or conservation area forest. The system of National Protected Areas (NPAs) consists of 21 NPAs and 2 corridors. The total area within the NPA system now equals more than 3.5 million ha, equivalent to almost 15% of the national land area. In addition to the NPAs, there are also many provincial and district level conservation and protected areas established country-wide, further increasing the overall protected area to more than 20%.

e. **Reducing Emissions from Deforestation and Degradation (REDD+)** helping mitigate increasing levels of greenhouse gas emissions from the forest sector, has been attempted by the national REDD+ program. Unfortunately, the slow bureaucracy and complexity of international processes mandated by REDD+ have resulted in very limited national successes despite significant amounts of donor money and time. It is now becoming clear that the current implementation of the national REDD+ program is proceeding too slowly, and other simpler and more direct approaches are required.

f. The need to protect **Watersheds from Erosion, help Mitigate Flooding and Maintain Local Weather Regimes**. Forests provide important ecosystem services in maintaining water quality, reducing erosion, stabilizing mountain slopes and preventing landslides. Forests can

also help control flooding in small and medium-sized watershed catchments during rainfall events (FAO, 2005). Trees can help de-saturate soils, reducing landslide risk, and can also help stabilize soil through deep and extensive rooting. Additionally, natural daily forest evapotranspiration cycles are an important in maintaining local weather and rainfall patterns.

g. The need to protect forest areas of pristine beauty for both **Tourism and Cultural** reasons. National protected areas can help generate substantial tourist and recreational industries. Many indigenous ethnic groups in Laos rely heavily on forest areas for their livelihoods. At the same time, some of these indigenous groups consider some areas of forest as "Spirit Forest" requiring the highest degree of protection from disturbance.

h. The need to control **Forest Fires to Minimize Trans-boundary Smoke Haze** as agreed under ASEAN sponsored regional agreements.

i. In addition, the GoL considers forest areas in proximity to national borders as important strategic buffer zones that need to be protected for **national security** reasons.

j. Pressure on forests in some regions of Laos (e.g. Eastern Savannakhet) has decreased due to **Rural Depopulation,** as people continue to move from poorer rural areas to urban areas (or to Thailand) to find better economic prospects.

k. The need to meet increasing international demand for **Certified Timber Products** under **Forest Law Enforcement and Trade Initiative (FLEGT)** and other similar initiatives.

l. **Secure land tenure** also help to reinforce the desire to protect the forest owned.

In addition to the above drivers, natural processes can also drive positive changes in forestry. If degraded forests can be spared from further disturbance or conversion, natural conditions in Laos are conducive to rapid re-growth, forest regeneration and the eventual recovery of timber and dense forests. A similar 'recovery' process (also called succession) is possible if tree seed sources exist in the vicinity of abandoned agricultural land. Both processes can also be supported by human interventions with enrichment plantings or assisted natural regeneration.

With respect to government efforts to drive positive change in forestry, the GoL has struggled for several decades to balance needs in the forestry sector, frequently with an eye on improving conservation and implementing sustainable forest management. During the 1990's, the forestry sector grew faster than the rest of the economy (MAF, 2005) due to rapidly increasing log extraction, increasing wood processing capacity and increased export of wood products including mainly sawn wood, but also logs (World Bank, 2001). Most of the log extraction that took place was not, however, based on systematic forest management, including inventory and planning (ADB, 2000). Instead, until 2000, logging was based on a centralized system, whereby quotas were issued by the Prime Minister's Office based on proposals from both the Ministry of Agriculture & Forestry and the Ministry of Commerce & Tourism and the wood processing industry. This system was criticized for basing quotas on GoL's fiscal requirements and the needs of the processing industry that exceeded sustainable production levels. The procedures and criteria for the setting and granting of quotas were also not clear, with decisions often made on an *ad hoc* basis (World Bank, 2001). Additionally, companies often harvested above their allocated quotas and there were many other irregularities related to logging, grading and log sale (MAF, 2005). In 2000, however, the GoL began to phase out this system (PM Order 10/ 2000) and bring in a system with logging allowed only in infrastructure development areas and production forests with approved management plans (World Bank, 2001).

Despite the first of several partial logging moratoria being announced by *Prime Ministerial Decree Nº 67* in 1991, log extraction continued to increase from 300,000 $m^3$ in 1990, peaking during 1994/95 at 874,000 $m^3$ and returning to a level estimated at 734,000 $m^3$ in 1999. Average annual log production between 1990 and 1999 was around 530,000 $m^3$ of which 43% came from production forests and 57% from forest conversions related to infrastructure and hydropower development (World Bank, 2001).

Due to increasing environmental concerns the GoL continued to reduce the annual logging quota to around 260,000 $m^3$ from 2000 until 2002, to some 150,000 $m^3$ for 2004/05 and further to less than 100,000 $m^3$ in 2005/06 and 2007/08 except 2006/07 when the quota was temporarily raised above 400,000 $m^3$ to allow for hydropower development related logging operations such as NT2 (Tong,

2009). At the same time as reducing the logging quota drastically, the GoL also decided in 2001 to implement a ban on the export of raw logs (Sayakoummane, 2007). By doing so, GoL hoped to promote national capacity to produce and export finished wood products instead of simply exporting unprocessed lumber. However progress in developing a national wood products industry has been slower than expected.

In 2001, there were 160 sawmills, two plywood mills and 1,269 small furniture manufactures, most of which were located in the central and southern provinces. PM Order Nº 18/2002 was then issued directing the closure of sawmills, However, implementation did not occur until 2007, when out of 587 sawmills and secondary processing factories, 326 were closed, 185 were required to improve operations within one year and only 76 were allowed to continue operations. Out of 1,528 furniture factories, 1,188 were closed, 212 required improvements within one year and only 128 were allowed to continue operations (Tong, 2009). However by 2009 there were still an estimated 900 wood processing factories in operation (Vientiane Times, 26.06.09).

More recently, a key GoL concern related to agricultural concessions has been the inappropriate selection and allocation of state land (VT, 09.07.09). In many cases fallow or swidden agricultural land in village forests, classified as 'degraded' or 'unstocked,' has been allocated without the proper participation and representation of local communities. However, fallow areas are often not 'unproductive' lands, but play an important role in supporting the livelihood of farmers. Encroachments into protected forest areas are reportedly the result of poor land surveying and in relation to both these issues and existing plans and protection measures, authorities need to monitor the implementation of investment projects more closely (Vientiane Times, 25.06.09).

# 4 Policies and Measures (PAMs) Addressing Land Use & Forest Changes (LUFC)

In the context of LUFC, Government Policies at both national and local level are important underlying drivers of forest change, providing directions and priorities for overall socio-economic development and guiding different sectors related to land and natural resource management. For example, national development policies to achieve Millennium Development Goals and poverty alleviation in many cases also impact directly on LUFC. Sustainable economic growth, accelerated social development, and poverty reduction remain strategic objectives of the *Socio-economic Development Strategy to 2020* (ADB, 2009). Highest priorities of the GoL include addressing poverty, improve the living standard of the population, and removing the country from the list of Least Developed Countries (LDCs) based on steady economic growth. Therefore hydropower and mining have been singled out as priority investment and growth sectors, as they play an important role for industrial development in Lao PDR, but also in the GMS and ASEAN regions. Beside this they are also emphasized in the GoL *National Growth and Poverty Eradication Strategy* (NGPES) as they have high potential for stimulating economic growth and increasing revenue for the GoL (Callander, 2007).

Government programs facilitate the implementation of national policies and can be important drivers of LUFC.

Legislation regulates the implementation of policies and programs. In the past, weaknesses within the national regulatory framework including overlaps, loopholes and inconsistencies helped facilitate drivers related to LUFC. Today, with various revisions, the situation has improved.

Land tenure is very important in the context of forest conservation in Lao PDR. *Secure land tenure*, especially over communal forestland, can help avoid deforestation in the context of investment and concession allocation by giving communities a larger stake in their forests. However, land tenure in rural areas is still not widely secured, as previous efforts related to land registration have so far mostly prioritized urban areas. Three types of land tenure by defined law in Lao PDR, including individual, collective or communal, and state property. The first category includes *land of individuals or families* who possess land certificates or land titles, but also land under customary land rights mainly in rural areas. The second category includes *communally managed lands* that play a crucial role for the social, economic and cultural well-being of rural communities (Seidel, 2007). With the exception of both

national production and conservation forests, forests in rural areas are considered communal property and their use is based on customary user rights including locally defined rules and regulations managed and controlled by communities. The third category is designated ***State land*** and includes the areas covered by national production, protection and conservation forests, but also any other land defined as forest land[11] and in includes specifically designated land.[12] Although ***State land*** is defined by the law and its categorization looks simple in theory, in practice there are many difficulties and conflicts regarding the allocation of such land for concessions. It often includes land that is utilized by communities for upland cultivation, or even village forest areas which are managed under traditional user rights.

## 4.1 Policies and Measures addressing Land Tenure and Land Management

The list of overlapping (and sometimes conflicting) legislation and regulatory initiatives that must be considered in the context of land use planning in Lao PDR is long and includes the following:

- Investments and concessions, especially the Law on Investment Promotion No. 02/NA (2009) and the Presidential Decree on State Land Leases and Concessions No. 135/PM (2009).
- Land Law No. NA/04, (2002), especially the amended Land Law (2003) and the PM Decree 88 on the Implementation of the Land Law (2008).
- Forestry Law No. 06/NA, (2007) and relevant decrees.
- Decree on the Compensation and Resettlement of the Development Project of People Affected No. 192 /PM covering entitlements to compensation, allowances and economic rehabilitation, monitoring and evaluation, and implementation arrangements
- Labor Law No. 43/NA, (2013) which applies to conditions for employees working within the forestry sector and elsewhere.
- Environmental Protection Law, No. 29/NA, (2012), including the following articles in particular:
    - Art.6. Principles for the protection of the environment;
    - Art 7. Commitment to "protecting, improving, rehabilitating, controlling, monitoring and inspecting the environment";
    - Art 68. Actions that are prohibited.
- Prime Minister Order No. 13/PM (June 2012), which suspends approvals until December 31, 2015 of investment proposals for rubber and eucalyptus plantations (Article II) and initiated a review of concessions and their benefits.
- The Lao Front for National Construction issued Guidelines on Consultations with Ethnic Groups affected by Public and Private Development Projects (May 2013).
- Ministerial Agreement on Endorsement and Promulgation of a List of Investment Projects and Activities Requiring for Conducting Initial Environmental Examination or Environmental Impact Assessment, No. 8056/MONRE, (December 2013)
- Ministerial Instruction on Initial Environmental Examination of the Investment Projects and Activities, No. 8029/MONRE, (December 2013)
- Shifting Cultivation Stabilization Program (Prime Ministerial Decree No. 117/1989), MAF Instruction No. 1220, and the Land and Forest Allocation Program (MAF Instruction No.

[11] Forest lands are all parcels of land that have or not have forest coverage which the State has determined as forest lands (Art. 4, Forestry Law)

[12] Examples include roads, infrastructure and army facilities.

822) both of which are designed to halt environmental degradation by controlling the expansion of shifting cultivation, particularly in the upland areas.

- Ministerial Instruction on Environmental and Social Impact Assessment of the Investment Projects and Activities, No. 8030/MONRE, (December 2013). The Environmental Impact Assessment Guidelines (2012) details the requirement for developers to undertake an IEE or an ESIA, identify risks and detail any actions necessary to avoid, mitigate or rehabilitate or compensate for negative impacts.

The allocation of land assets to concessions or leases has long been an important tool of policy and authorities in Lao PDR, resulting in the generation of substantial revenues for government. Perhaps as a direct result, authorities have frequently granted concessions and leases to develop land without ensuring best planning practices and the assessment of all social and environmental impacts. To add to the difficulties of adequate oversight, national, provincial and district government authorities have separate abilities to grant land concessions to private investors. A lack of effective coordination between the different agencies has sometimes led to unclear and often overlapping mandates and responsibilities.

Relevant land use legislation began to emerge during the 1990s and has been continuously refined since then, culminating in a number of recent laws and decrees that have strengthened the legislative framework considerably. Major legislative improvements include the *Forestry Law* (2007) and the *Land Decree* (2008), which now make clear provisions related to the concession management. A new draft *National Land Policy* is currently being debated by the National Assembly (Vientiane Times 1 August 2013). If passed, the new policy should further ensure that the value of existing natural resources on the land including natural forests, biodiversity values, or the historical or natural charm of a particular area is better taken into account before the granting and approval of new concessions.

To summarize, substantial improvements in the regulative framework have already been made, and the main issue now is how to best enforce these laws (Hanssen, 2007).

### *4.1.1 Land Administration and Institutions*

A consolidation of land-related institutions occurred in 2011 in Laos, when the National Land Management Authority, the Water Resource and Environmental Administration, the Geology Department, and the Protection and Conservation divisions of the Department of Forestry merged to create a single new *Ministry of Natural Resources and Environment (MoNRE)*. MoNRE programs include the following: Land Management (including the land-use planning and allocation program); Geology and Minerals; Forest Management; Water Resources and Disaster Risk Management; and Environment and Climate Change. MoNRE now is involved in approving all land concessions other than those for mining projects (REDD Desk, 2011; GOL, 2011; Wellmann, 2012).

The Ministry of Planning and Investment is the lead agency in processing land concession applications and issuing concession registration certificates to domestic business and foreign investors (Wellmann, 2012).

The Ministry of Agriculture and Forestry (MAF) administers and manages all land classified as agricultural or forestry land, which composes most of the rural land in Lao PDR. MAF is in charge of managing all matters regarding crops, livestock, soil, irrigation, watershed management forests and protected areas. Much of MAF's authority has devolved to Provincial Agricultural and Forestry Offices and to District Agricultural and Forestry Offices (World Bank, 2005). MAF's overall goals are related to production for food security, commercialization of agriculture and commodity production, stabilization of shifting cultivation for poverty reduction, and sustainable forest management.

At a local level, *Pho Ban* or *Nai Ban* (village heads elected by the village population for three-year terms) and administrative committees administer land-use rights under customary law. These traditional authorities manage community land and resources, mediate land disputes and may allocate agricultural land.

## 4.2 Policies and Measures Addressing Deforestation/Degradation, Promoting Sustainable Forest Management (SFM), Forest Conservation and Afforestation & Reforestation (A&R)

The Forest Strategy 2020 initiative (MAF, 2005) categorized forests into three main types: protected forest, conservation forest and production forest. The most recent official statistics show that there are 49 protected forests with a combined area of 7.4 million hectares, 24 national conservation forests with a total area of 4.7 million hectares, and 51 production forests with a combined area of approximately 3.1 million hectares.

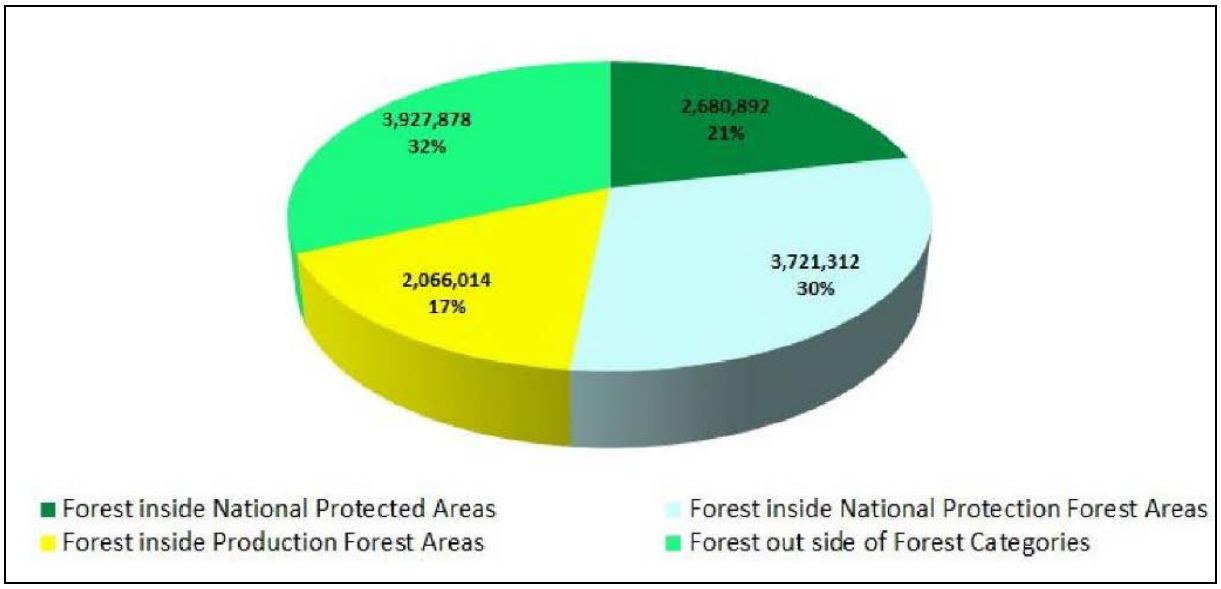


**Figure 4. Forest Area by category (percentage & hectares)**

Source: MoNRE (2014)

Thus, conservation areas already represent more than 50% of national territory. Industrial tree plantations form a key element of the GoL forestry sector plans and efforts to attract investment. The Forestry Strategy 2020 (FS2020) envisages 500,000 hectares of tree plantations and calls for development of production forest area management plans, allocation of community forest areas, and further efforts to demarcate different forest areas on the ground.

As one of its long-term national strategic goals, the GoL wishes to transform upland traditional subsistence livelihood systems into more sedentary and commodity-oriented agricultural systems. To achieve this objective, the GoL has developed a suite of new national regulations and policies (e.g. the *Forestry Strategy 2020* and the *Forestry Law Enforcement Action Plan*) and implemented the following programs: the *Biodiversity Conservation Area Program* (since 1988), the *Shifting Cultivation Stabilization Program* (since 1989), the *Land & Forest Allocation Program* (since 1993), and the *Village Relocation Program* (since 1994). Since initiation of these programs, some targets have been achieved (e.g. Land use planning & land allocation has been conducted in over 70% of all villages nationwide). Unfortunately, the anticipated positive impacts for rural communities in both environmental and livelihood terms have been less easy to identify. Indeed, some past programs have, in some cases, created unintended and un-wanted problems such as insufficient access to land for sustained livelihoods, lower agricultural productivity and food insecurity due to falling soil fertility caused by reduced rotation periods in the context of swidden agriculture. Land scarcity in resettled villages, where insufficient land was allocated also increased pressure on surrounding forests both within and outside the affected village territory.

Both the old *Forestry Law* (1996) and updated *Forestry Law* (2007) prioritized tree plantations on degraded forestland by granting land leases to individuals and organizations. Thresholds for

converting forests or forest land were set in Article 14, whereby district authorities could approve areas up to 3 ha, the Provincial Authorities between 3 ha and 100 ha and the MAF up to 10,000 ha. The National Assembly alone can approve concessions exceeding 10,000 ha. At all levels, the designation of "degraded forestland" became a central factor in allocation of land for industrial tree plantation development or for other use. In relation, degraded forestland was defined as '*forest which has been heavily damaged, e.g. the land has no forest or the area is defoliated…*' Insufficient specificity left the definition open to interpretation, however, and resulted in deforestation, especially in the context of large-scale concessions.

Conversely, areas that have been completely deforested, even for a considerable time, are still sometimes mistakenly mapped as "*degraded forest.*" As the laws for designating areas suitable for plantation development are very much driven by this forest classification, it is important that the classification is done correctly and updated in a timely manner.

In addition to these issues, incompatibilities remain between the *Law on the Promotion of Foreign Investments* and the new *Forestry Law* regarding threshold levels of investment capital required for granting concession leases and approving new concession contracts.

The key authority for forestry sector law enforcement is the *Department of Forestry Inspection (DoFI)* under MAF, as outlined in the Forestry Law (2007). It comprises four divisions: Administration and Planning, Inspection, Investigation and Case Tracking. DoFI's mandate is to prevent, detect and suppress forestry related crimes including illegal logging, smuggling and trade of timber and wildlife, forest-related corruption, and illegal land encroachment. It is empowered to conduct enforcement operations, investigate allegations, make arrests and pursue prosecutions in collaboration with other national law enforcement agencies. However, it has been hampered by inadequate staff and financial resources although it has received support from SUFORD and IUCN, and from other law enforcement agencies (Boungnakeo, 2008).

The most relevant forestry-related authorities at provincial level are the Provincial Agriculture and Forestry Office (PAFO), the Provincial Forestry Inspection Office (PFIO) and the Provincial Land Management Authority (PLMA), and at the district level the District Agriculture and Forestry Office (DAFO) and the District Land Management Office (DLMO). Lack of capacity poses at provincial and district levels, however, poses an especially significant challenge.

### *4.2.1 Relevant Programs & Initiatives*

There are several existing initiatives at the regional, national and local level that are relevant in addressing drivers of deforestation and forest degradation. They are listed and briefly described below:

***Reducing Emissions from Deforestation and Forest Degradation (REDD+)***

Lao PDR has participated in international REDD+ negotiations under the UNFCCC for several years. In 2008, it became one of the first member countries of the Forest Carbon Partnership Facility (FCPF).[13] The National REDD+ Readiness Preparation Proposal (R-PP) was submitted in late 2010 (DOF-MAF 2010) to the World Bank Forest Carbon Partnership Facility (FCPF) Secretariat and subsequently accepted. Progress on REDD+ has suffered some delays due to institutional uncertainty prior to and during establishment of MoNRE in 2011. Initially the mandate of MoNRE Department of Forest Resource Management (DFRM) relative to REDD+ was unclear,[14] and the relative responsibilities of DRFM and the Department of Forestry (DoF) within the Ministry of Agriculture and Forestry (MAF) needed further clarification.[15] The DFRM has responsibility for REDD+ implementation in Protection and Conservation Forests while DoF has responsibility for REDD+ implementation in Production Forests and in non-state forest areas under village management. Both

[13] MAF Decree No. 1313 (November 2008) established the REDD+ Task Force.

[14] Initially spelled out in a PM Decree in November 2011.

[15] PM Decree in June 2012

ministries are piloting REDD+ in their respective territories. Finally, in June 2013 it was decided that DoF will be the Implementing Agency for the FCPF and DFRM will be the Implementing Agency for REDD+. Laos receives technical and financial support for REDD+ from several bilateral and multilateral donors.

The ***Lao-German Climate Protection through Avoided Deforestation (CliPAD) Program*** is combining technical and financial cooperation to support the GoL in developing concepts, instruments and mechanisms, and implementing REDD demonstration activities at a pilot scale in and around National Protected Areas (NPAs) in northern Laos. The planned duration of the program will be until 2020. Activities will focus on "carbon-sensitive" areas and include land use planning, development of alternative income generation and benefit-sharing mechanisms, and local governance aspects, including monitoring, law enforcement and access to land by local communities (GTZ, 2009)

The ***Forest Law Enforcement and Trade Initiative*** (FLEGT) (EU). In May 2003, the European Community adopted the FLEGT *Action Plan and Regional Programming for Asia* (EUTR 995) that seeks to support improved governance in timber-producing countries and to ensure that illegal timber does not enter the EU. A Council Regulation approved in 2005 provides the legal framework for a licensing scheme to control the entry of timber into the EU (Rosander, 2008). At the core of this are Voluntary Partnership Agreements (VPAs) with timber-producing countries that wish to eliminate illegal timber from their trade with the EU. At the beginning of 2012, the Government of Lao made a formal request to negotiate a Voluntary Partnership Agreement (VPA) with the EU. In May 2012, the German Development Cooperation pledged funds to provide technical assistance for the FLEGT process through a ProFLEGT project. VPA negotiations were expected to start in early 2014. The development of a Timber Legality Assurance System (TLAS) and pilot activities at the provincial and district level will follow once the negotiations have started. The lead agency for the FLEGT process is the Department of Forest Inspection (DOFI) within the Ministry of Agriculture and Forestry (MAF). The Ministry of Industry and Commerce is responsible for national and international regulations on transport, processing and export of timber and wood products. The Ministry of Natural Resources and the Environment (MONRE) is the coordinating partner for other cross-sector issues such as National Protected Areas (NPAs) and National Forest Policy (e.g., legality definition and forestry law; Brunschon, 2014).

Lao PDR joined as a pilot country of the **Forest Investment Program (FIP)** in June 2010. Approval was granted by the FIP Steering Committee in April 2013 and by the World Bank Board of Directors in May 2013. The FIP consist of four components including: 1) 'Protecting Forests for Ecosystem Services'; 2) 'Smallholder Forestry' 3) 'Scaling-up Participatory Sustainable Forest Management'; and 4) Creating an enabling environment for the participation of villages and stakeholders. Responsibility for implementation of these four components is split between the IFC, ADB & World Bank.[16]

***GoL Tree Planting Initiatives*** Tree planting has been a national priority for the GoL since 1979, when PM Provision Nº 74 first promoted tree planting on bare land, and in 1980, June 1st was designated as "National Tree Planting Day". A reforestation fee is levied on logs and NTFPs harvested from natural forests is also used in nursery construction, seedling production and plantation development. In 2009, Laos had approximately 300,000 ha of tree plantations, of which 136,000 ha (46%) are rubber plantations (GoL 2009). By 2011, approximately 400,000 ha of rubber plantations and 300,000 ha of other industrial tree plantations had been established or were in the process of being developed (Barney 2011).

The ***SUFORD SCALING UP (SUFORD SU)*** (MAF, WB, Finland).[17] The SUFORD SCALING UP project builds on participatory approaches to sustainable forest management (PSFM) implemented under the Sustainable Forestry For Rural Development (SUFORD) project and will support the implementation of PSFM in a total of 41 Production Forest Areas (PFAs) with an aggregate area of

[16] Further information online here http://theredddesk.org/countries/initiatives/forest-investment-program-lao-pdr

[17] SUFORD SU: http://www.suford.org/overview/

2.3 million ha. SUFORD SCALING UP will also (i) incorporate and monitor forest carbon emission reductions; (ii) explore opportunities to introduce performance payments for forest carbon sequestration; (iii) emphasize developing sustainable livelihood options; and (iv) foster inter-agency coordination at the landscape scale. The project objective is to "execute REDD+ activities through participatory sustainable forest management in priority areas and to pilot forest landscape management in four provinces." Addressing climate sustainability is central to the project with its objectives to mitigate local and global climate change.

**The *Forest Management and Community Support Project*, FORCOM** (JICA) commenced in 2004 and aimed to improve forest management, stabilize shifting cultivation and reduce poverty, and focused on promoting income generation activities to ensure alternative livelihoods for farmers, and enhanced capacities for villagers. Support was provided for participatory planning, forestry extension, establishment of producer groups and REDD-related activities including piloting of carbon monitoring and related research.

Lao PDR is part of the **USAID Lowering Emissions in Asia's Forests program (USAID LEAF)**, which is building capacity and strengthening regional collaboration in forest monitoring and piloting of techniques that can be applied in the REDD+ process. USAID LEAF activities are focused at the national level and also in Houaphan and Attapeu Provinces.[18]

Projects implementing **Payment for Environmental Services (PES)** have only recently started in Laos, the first being in Borikhamxay province with the participation of Australian Centre for International Agricultural Research and undertaken by MONRE, MAF, and the National University of Laos.

# 5 Analysis

Despite GoL policy and regulatory reforms, an unsustainably high level of illegal logging continues in the countryside almost unabated, causing widespread deforestation and degradation. There is a public perception that law enforcement agencies are unable to adequately police the forestry sector and ensure compliance with laws and regulations. The high price of wood on international markets is a major driving force behind illegal logging, transportation and saw milling. Furthermore, salaries currently provided to civil servants at all levels are insufficient to motivate action concerning difficult issues (e.g., non-compliance of companies with laws and regulations). At the same time, low salaries can promote efforts to find 'additional' income including through corrupt practices. The situation is exacerbated by the fact that national tax revenues from legal logging activities are no longer meeting GoL expectations while commercial logging in production forest areas is yielding less as marketable trees above a minimum harvestable diameter dwindle in number.[19]

Additional forest law enforcement efforts are required and could quickly recover costs by helping to deter further tax avoidance and by imposing fines on wrong doers. Monitoring of logging activities is currently insufficient and this contributes to continuing forest loss. Further efforts and resources to support law enforcement, prevent corruption and increase transparency are essential to combat rampant illegal logging.

One indicator of the gap between GoL's stated regulatory aims and conditions in the provinces is the number of unauthorized sawmills still operating without GoL approval despite current and past directives from the Prime Minister's Office requiring strict enforcement by provincial authorities. The export of unprocessed timber also continues in spite of repeated GoL regulations limiting exports to semi-finished or finished wood products and preventing the export of raw logs and lumber. Despite the ban on the export of raw logs, many timber trucks continue to cross the border every day with

[18] Further information online here http://www.leafasia.org

[19] "Laos Launches Plan to Stem Illegal Logging After Revenue Drop." Radio Free Asia, 8 July 2014 http://www.rfa.org/english/news/laos/logging-07282014192020.html

impunity and it would appear that logging companies are circumventing logging and export bans by involving local communities in illegal harvesting. Rural communities paid by logging companies are unlikely to support law enforcement efforts and in some cases, local authorities are also complicit in illegal logging activities and receive financial contributions. Similarly, prosecutors are often unwilling to move against well-connected offenders.[20]

In practice, forests are often protected by inaccessibility but the establishment of new roads into formerly closed forests provides access and opportunities for logging. Controlling access to forest areas by erecting forest gates and manning checkpoints, especially around forest containing high value timber, is therefore essential to prevent extraction of illegally logged timber. Delineation and demarcation of forest area boundaries in the field needs to be greatly improved with appropriate signage, fencing, road gates and boundary posts. Efforts to detect and apprehend illegally extracted timber are best focused at the beginning of the supply chain, before timber reaches processing plants or international borders. However, better coordination with the customs and law enforcement agencies in neighboring countries would also improve results.

In the context of low forestry sector transparency, movement towards sustainability could begin with publication of full details of logging quotas received by individual companies. Logging quotas should be based on the sustainable production potential of forests and as such, updated management plans for the 106 Production Forest Areas need to be prepared and approved with local community involvement.

In the context of agricultural expansion and the establishment of industrial tree plantations, deforestation generally occurs because non-forest land uses are more profitable. On the other hand, there are no appropriate incentives available to encourage communities to protect forests from destruction and degradation. So far, neither REDD+ nor Payment for Ecosystem Service (PES) schemes have been able to ensure forest communities actually receive benefits for protecting forests. Financial mechanisms have to be developed to make incentives and credits available to target groups. Although various agricultural micro-credit, village revolving funds and savings groups exist, PES-related schemes still have not been established at the national level and correction of this critical failure is urgently needed if forests are to be protected. Sub-national REDD+/PES projects while acting as useful pilots are threatened by "leakage," whereby any local benefit of avoided deforestation and degradation may be lost as forest exploitation shifts to other areas.

In some areas, the current unsustainable pressure on forests results not only from unsustainable logging but also from insufficient community access to land. This often happens where land access has been limited by government programs (e.g. LUP/ LA, resettlements) or where villagers have lost land to government-approved commercial concessions or hydropower projects. Weak land tenure security in rural areas, where often only customary rights pertain, allow speculative land grabbing that has increasingly resulted in the loss of communal and household land. In such cases, villagers are under increased pressure to encroach into forest areas and undertake e.g. pioneering shifting cultivation to produce rice and avoid food insecurity, or supplement income through illegal logging.

Staff capacity and extension services within the forestry sector, as in all sectors, can always be improved. Insufficient extension services result in ignorance of laws and regulations, use of inappropriate technologies and lack of consideration of alternatives to illegal or unsustainable logging. Insufficient staff capacities are a main reason for inadequate implementation of policies, programs and law enforcement efforts.

Despite the GoL policy to reduce shifting cultivation, in almost all circumstances where sufficient land is available, *rotational shifting cultivation* with adequate fallow periods can help meet poverty reduction, biodiversity conservation and REDD+ goals. NTFPs and agro-biodiversity are most abundant in secondary forest fallows and there are ways to manage rotational cropping systems that are both highly productive and highly protective. However, if fallow periods are shortened from the

[20] As detailed in multiple forestry sector related news articles published in the Vientiane Times during 2014.

required period of seven to eight years down to three of four years, then rotational shifting cultivation becomes much less sustainable and long-term degradation is likely to occur.

Since May 2007 the GoL has been more cautious in granting large-scale concessions after a land *concession moratorium* was announced by the Prime Minister due to complaints related to the negative impacts of concessions on the environment and local livelihoods. Since its introduction in 2007, the concession moratorium has since been lifted for short periods on several occasions only to be re-applied again. As with logging quotas, movement towards sustainability could begin with publication of detailed information on allocation of land concessions.

# 6 Proposed Action Plan Including Priority Interventions and Timing

The following section identifies several specific high priority initiatives and policy options for consideration by national forestry sector decision makers to address ongoing deforestation and degradation, and to prepare the country to meet the requirements of the recently initiated FLEGT (Forest Law Enforcement and Trade) initiative.

## 6.1 Mandatory GPS tracking of all Vehicles Licensed to Transport Timber

The GoL should consider issuing regulations requiring that all timber transport companies must undertake mandatory continuous GPS satellite vehicle tracking of all trucks licensed to transport timber and especially trucks used to export timber, with tracking units designed to record when the vehicle is hauling a full load or travelling unloaded. Specifically, one year after the PM decree is issued, if authorities find a vehicle transporting timber that does not have a government-approved vehicle tracking device installed and functioning correctly then that vehicle should be impounded, the timber cargo confiscated and appropriate fines imposed. Customs officials at cross-border check points and forestry inspection officers at internal check-points should have the ability to quickly query the vehicle tracking device and enable determination of the point where the timber was loaded. This should be as simple as typing the license plate of the vehicle into an internet search page that then loads a map of the vehicle's recent movements. If the cargo originates from an unapproved location and not from a licensed saw mill or approved concession area, or if the GPS tracker has been disabled, then permission to export the timber should be denied and other possible sanctions also considered.

Periodically, authorities should also audit licensed timber companies to ensure that a company's vehicle fleet is operating and being loaded only at approved locations (licensed sawmills or approved forest concession areas). Audits should also ensure approved quotas are not exceeded and that tax revenues collected from the company are in agreement with the amount of timber shown to be transported by the vehicle tracking records. If, for example, it appears that the company may be paying less export taxes than the vehicle records suggest are due, then border check point customs records and recorded surveillance camera video footage could provide further evidence of possible tax avoidance and/or surpassing of approved quotas.

Furthermore, the complete annual data archive of vehicle tracks collected by such a national system should be made public for independent review and analysis. This would go a long way to helping Laos meet the requirements of the FLEGT initiative.

When drafting the new regulation, the GoL should review the following decree, issued on September 10, 2014 by the Government of Vietnam: *Decree No 86/2014/ND-CP (Decree 86) On the Transportation Business* that contains the following provision; "*Transportation enterprises must possess vehicles with tracking devices, install computers with Internet connections, supervise and handle information displayed in tracking devices"* that applies to all types of freight (not just timber). Therefore, all trucks crossing the border into Vietnam should already be equipped with such tracking devices.

## 6.2 Strengthen Enforcement of Existing Forest-related Laws & Regulations

Improved law enforcement capabilities are vital both to sustainable forest management and also to the success of FLEGT in controlling illegal logging. However, it is pointless for donors and GoL to concentrate on further legislative and regulatory improvements when regulations are not implemented in rural areas, often with impunity due to the general weakness of law enforcement. Stronger enforcement should also aim to address the associated issue of lower than expected revenues from the forestry sector. Penalties for illegal logging (and tax evasion) should also be increased to help address the problem.

The deployment of forest rangers and other law enforcement officers should be better planned and prioritized, especially with respect to localities that still have high valuable tree species or have high biodiversity value. Priority should also be given to efforts to better protect accessible forest areas,

especially in border areas. Forest patrols, road checks and inspections should be more frequent and without prior warning.

GoL should review the relative success of NGO-supported law enforcement programs in Cambodia and consider the possibility of allowing similar programs to operate in Laos. For example, GoL should look at the organizational structure, training & embedded technical advisors and direct financial and logistical support provided to the Government of Cambodia Forest Ranger patrols as undertaken by WildAid, Conservation International and the Wildlife Conservation Society in various protected areas of Cambodia.

Steps should be taken to provide adequate salaries, appropriate incentives (e.g. performance based bonuses) and training to law enforcement staff and to increase operational budgets. Training should include use of modern surveillance equipment and tools.

Financial rewards, especially in cases that result in a successful prosecution, should also be provided to encourage the public and "whistle-blowers" to identify companies engaged in illegal logging. Local-level and community-based monitoring should be encouraged using rewards and a share of revenue generated from forests as a positive incentive.

## 6.3 Create a New National Forest Real-Time Monitoring System

GoL should create a system to implement daily monitoring of the nation's forests using near real-time satellites to help detect possible illegal logging in protected forest areas. In addition to free daily MODIS fire monitoring satellite data, GOL should also consider using other sources of satellite data for near real-time forest monitoring such as the new European higher resolution SENTINEL satellites. GoL should consider formally requesting the European Community and European Space Agency special access to this imagery with the status of "Copernicus Data User with the ability to task imagery" for the purposes of national forest monitoring and protection. Similar requests should be made to NASA and the Japanese Space Agency. If real-time satellite imagery monitoring detects illegal forest clearance, appropriate local authorities should be quickly notified in order to respond and prevent further damage and loss.

## 6.4 Improve the Performance of Existing Forest Financial Incentive Schemes

Financial incentive schemes aimed at promoting investment in protecting forests, such as REDD+ and PES schemes, have so far have proven inadequate to halt or even slow the rate of decline of the nation's forests. There is a great need for REDD+/PES to show positive results and ensure local forest communities receive timely and adequate financial incentives to protect forests. In the case of sub-national REDD+/PES programs, care needs to be taken to address the complex problem of "leakage" where deforestation and degradation is transferred to areas outside the REDD+/PES scheme.

More meaningful stakeholder participation is another key element that needs further attention. For example, community and participatory forest management and forest enterprises as developed by the SUFORD project are helping ensure local commitment to forest management and better local benefit sharing. There is a strong argument to be made that encouraging a broader range of investment models and approaches would help bring strength through diversity.

## 6.5 Improve Forest Management & Planning thru better Mapping & Statistical Data

GoL should continue to carry out and update detailed assessments of sustainable logging quotas in each Production Forest Area, based on inventories of age class, yields and forecasted production by species. This will help determine appropriate quotas for future production. Natural forest production forecasts under sustainable management conditions should also be prepared and published. In addition to state operated PFAs or concessions awarded to internationally backed operators, there are a large range of other forestry models and approaches that could help the GoL to achieve the far-reaching development objectives laid out for the Lao forest sector.

As already mentioned, the current best publically available national forest map from 2010 is unusable due to its poor spatial quality. The ongoing National Aerial Ortho-photo program at the National Geography Department (NGD) is creating, a national high quality aerial photo mosaic and associated land use product. This has much better resolution than available satellite imagery that is typically currently used for forest inventory. NGD has been digitizing land use and other features including forest boundaries from new "orthophotos." Digitizing of Southern Laos is now complete and ready for distribution with the rest of Laos to follow. However, forest type definitions used by NGD when undertaking digitization are not identical to those used by FIPD, and some interpretation maybe be necessary to compare NGD forest cover maps with those produced by FIPD. The high resolution of the aerial imagery provides a much better opportunity to identify areas of degradation that satellite based techniques can miss due to rapid re-growth. In addition, aerial photography facilitates use of stereo techniques not usually available form satellite imagery.

Historically, National Forest Inventories have relied heavily on manual stereo analysis of aerial imagery. Although the skills required for such stereo analysis techniques have become somewhat neglected as NFIs have moved towards satellite imagery, advances in automated stereo analysis software tools and the advancing usability of cheap and small Unmanned Aerial Vehicle (UAV) platforms means stereo analysis techniques should again become a critical component of future forest inventory program that FIPD would do well to consider. In addition, although extensive aerial Lidar-based survey remains prohibitively expensive, new high-resolution radar has recently become available. The latter includes the free data from the new European Sentinel satellites, and the relatively cheap Japanese PALSAR-2 satellite should also be considered as an opportunity to further enhance the accuracy of existing visual satellite-based mapping efforts.

The Forestry Inventory Planning Department (in cooperation with MoNRE and other relevant ministries) should make further efforts to:

- Improve the quality, reliability, timeliness and public accessibility of national spatial datasets, maps and land-related statistics (e.g., forest cover, land use, land suitability and information on concessions) to both the public and to the private sector.
- Ensure communities receive a large format, printed hardcopy map delineating forest zones overlaying the new national aerial photographic imagery and zoomed to be used as an accurate base map to help better planning at the village level and to aid land registration, development and extension activities (e.g., accurate demarcation of borders of areas such as NPAs, PFAs, local conservation areas, village forests and community-based forest management including NTFPs but also for allocation of land to investors).
- Strengthen cross-sectorial coordination, information sharing and collaboration among relevant agencies such as (Ministry of Agriculture & Forestry, Ministry of Natural Resources & Environment and the Ministry of Planning & Investment and National Geography Department) in the generation and sharing of land management-related information, including national land use and forest cover maps and satellite imagery.

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