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Guidebook on Climate Change Financing to support Sustainable Land Management (SLM) in Lao PDR

Part I of National Guidebook and Assessment

Global Mechanism of the UNCCD and
National Agriculture and Forestry Research Institute



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Introduction

1. 80% of the population in Laos rely on agriculture, collection of natural resources – such as NTFPs including bark, tubers, leaves, wild vegetables, fruit, invertebrate and vertebrate animals, as well as aquatic resources – fish and other aquatic resources from ponds, rice fields, wetlands and rivers for their livelihood.
2. The United Nations Framework Convention on Climate Change (UNFCCC) and other international organizations use differing descriptions to describe the term “climate finance”, which is a growing sector of financing for projects relating to Sustainable Land Management and Climate Change (SLM+CC). *Climate Finance* at its broadest definition includes all types of finance that is made available to support climate change adaptation and mitigation. This guide provides a detailed analysis of those resources that can benefit SLM+CC (UNFCCC and UNCCD) implementation in Lao PDR. A specific focus is on “climate resilient land management”.
3. The synergistic implementation of the Rio Conventions (UNFCCC, UNCCD and UNCBD) is especially important in the Lao context. The rural population as well as the national economy relies also on the country’s natural resource base (mining, forestry and energy sectors). However, Laos has low adaptive capacity as a developing country. Hence the people of Lao PDR are still highly vulnerable to the impacts of climate change.
4. Geographical and biophysical constraints for adapting to and mitigating climate change include the diverse terrain and varying soil types at different locations. 80% of the country is mountainous with 70% of arable land being under slopes.
5. There are 49 ethnic groups belonging to 3 larger groupings who have variations in their historic land use patterns, related to forestry, agriculture, agroforestry and the use of forest resources. Besides ethnic and cultural diversity, which has high potential for tourism, Laos is extremely rich in biodiversity. The fourth National Report on Biodiversity highlighted the species richness in Lao PDR, with 8000-11000 species of flowering plants, but very few studies on plant taxonomy.
6. The biodiversity and ethnic diversity has led to a varying degree of local adaptation and solutions, and Traditional Knowledge. This offers great potential for upscaling by accessing climate change financing for adaptation and

mitigation to develop and sustainably use the Agriculture Forestry and Land Use (AFOLU) sector.

7. The Government of Lao PDR has identified a 50% funding gap in the national budget, which relies on production from the natural resources and agriculture sector. Climate finance and innovative finance have the potential to bridge this gap between the identified need for climate resilient land management (adaptation and mitigation) and the available current investment flows, as increasingly already described in Lao National policies.
8. Several new emerging sources of climate finance are becoming available that Lao PDR could access. They have differing procedures depending on the fund, some having calls for proposal, some commencing with bilateral talks, and some operating on a rolling basis.
9. The United Nations Environment Programme (UNEP) defines climate change mitigation to involve reducing or preventing emission of greenhouse gases. Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behavior. Protecting natural carbon sinks like forests and oceans, or creating new sinks through silviculture or green agriculture are elements of mitigation. However, in many funds such as the NAMA Facility, mitigation projects increasingly need to show adaptation co-benefits, and vice versa.
10. For adaptation, the International Panel on Climate Change (IPCC) describes it to be adjustment in natural or **human systems** in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory, autonomous and planned adaptation.
11. Rainfall changes over longer periods are expected to have major implications for water and food availability as livelihoods are intimately linked to rainfed agriculture. The wet season (May – September) in Laos is characterized by humid winds coming from the Southwest, induced by the development of circulation features and convective activity in the tropical East Indian Ocean and the Bay of Bengal. The dry season is due to the East Asian Winter Monsoon bringing dry and cold winds (northeasterlies) along the east flank of the Siberian high and the coast of East Asia. Lasting about 6 months, the wet season accounts for nearly 90 % of total annual rainfall.
12. Corresponding with changes in availability of biodiversity and forest cover, average annual and seasonal rainfall has been declining in Laos for the last 50 years, while at the same time average annual and seasonal mean temperatures have been rising. Climate Change is expected to have a range of impacts, which

include increases in annual mean temperatures by up to or over 5 degrees in this century.

13. Climate Change activities in the AFOLU sector in Lao PDR are currently concentrating their work on adaptation, and building REDD Readiness. The Nationally Appropriate Mitigation Actions (NAMA) sector is emerging, with potential funding to be leveraged from the UK and Germany funded NAMA Facility. Besides the AFOLU sector, Lao PDR has significant potential to access mitigation funding from the waste, energy, and transport sectors. There is currently a transport sector NAMA initiative supported by Japan.
14. Adaptation and mitigation efforts in Laos in the AFOLU sector have potential in efforts that combine mitigation with adaptation cobenefits, such as agroforestry. Assisted Natural Regeneration of forest ecosystems offers potential across sectors, as it can be closely linked with watershed management benefit for hydropower benefit as well as food and nutrition security cobenefits.
15. Mitigation in the waste sector could include processing agricultural residue into biochar, energy pellets, or ethanol. The transport sector has potential in the development of public transport, with best practices from other countries suggesting properties close to public transport increase real estate prices close to public transport routes. Capturing emissions in industrial processes and recycling them for energy production has further possibilities. Lao Brewery Co Ltd (LBC) has an energy (fuel) efficiency Clean Development Mechanism (CDM) project. With support from Japan LBC have introduced a Vapor Re-Compression (VRC) system in the brewing process, a heat-pump system in the pasteurizing process, and a biogas boiler, which all contribute to major reductions in fuel consumption.
16. The second national communication of Lao PDR to UNFCCC¹ describes how the 2000 national Greenhouse Gas (GHG) inventory recorded emissions of a total of 43,811 Gg of CO₂ and the removal of about 2,047 Gg, for a net CO₂ emission of about 41,764 Gg. The German Society for International Cooperation (GIZ) are currently working with the Department of Disaster Management and Climate Change (DDMCC) on a new inventory. This was a substantial increase compared to the figures of 104 570 Gg in 1990, only 10 years earlier.
17. 72% of all emissions in Laos are from the forestry sector, which is partly related to the fact that all national energy production relies on hydropower and hence does not produce emissions. Households rely on firewood and charcoal for their energy production. CO₂ emissions in the energy sector were related primarily to

¹ http://unfccc.int/essential_background/library/items/3599.php?rec=j&preref=7740#beg

the use of biomass fuels derived from forest conversion. Fuel combustion from transport and other sources constituted less than 1 percent of the total.

18. Laos is in a unique position for Green Growth and potential to develop low carbon power production facilities for new electricity generation to create income and livelihoods. Laos is currently in a process of building their REDD Readiness, and more broadly, climate finance readiness, including exploring pathways of accessing international carbon markets in the agriculture, forestry and land use sector.

19. Laos joined the United Nations in 1955 and the WTO in 2013. Lao PDR has signed the three Rio Conventions (UNCCD, UNCBD, and UNFCCC). Over the last 20 years, the percentage of population living below poverty has declined significantly, from 46 to about 25.6 percent in 2009/10. The country is on track for meeting the Millennium Development Goals (MDGs) target on poverty reduction,² but some, such as child nutrition, gender equity are still off track. This is reflected in the Human Development Country Index³, where Laos is ranked 138th. GDP for the year 2012 was US\$ 9,299 million for all sectors at constant prices. At the end of 2012, per capita income stood at nearly US\$ 1400 at current US dollars (nearly US\$ 3000 in PPP terms in 2012 prices). The sectorial distribution of GDP is explained in the following pie chart.

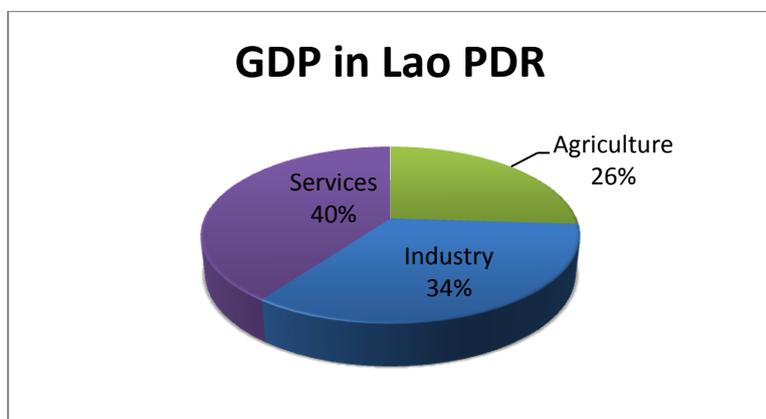


Figure 1: Sectorial distribution of GDP in Lao PDR

Climate Context and Observed Variability

20. Climate change is defined by UNFCCC as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the

² The incidence of poverty declined from 46% in 1992 to about 26 percent in 2010.

³ <http://hdrstats.undp.org/en/countries/profiles/LAO.html>

global atmosphere and which is in addition to natural climate variability observed over comparable time periods.”

Temperature Changes in Lao PDR

21. Research done by Aalto University and Chulalongkorn University used ECHAM4 A2 and B2 climate scenarios and detected increasing temperatures on both daily maximum temperature and daily minimum temperature. Their research suggests that the resilience of the livelihoods, i.e. community capacity to endure the pressure, “defines largely the extent to which they can adapt to future changes in the environment”⁴.

Rainfall Changes

22. The impact of GHGs on precipitation remains uncertain, particularly at local scales. Rainfall changes are more complex and spatially variable than temperature changes⁵.

23. Suzuki et al.⁶ analyzed 50 years of daily rainfall recorded in Vientiane over the period 1951–2000 by averaging several variables capturing rainfall patterns over two successive 25-year periods. Droughts were found to be more frequent during the second period. Most of heavy rainfall (>100 mm/day) was observed in August and September during the first period and more widely spread from May to September during the second one. An additional analysis was carried out by at four other rainfall stations in Laos over the same 25-year periods. Rain events were found to be heavier at the end of the rainy season during the second period at the four stations. Overall, the above studies reveal a general trend of increasing dryness over the second half of the twentieth century, with a more contrasted distribution of rainfall throughout the year.

24. Dry season rainfall has significantly increased in frequency (more rainy days) and intensity (higher cumulative rainfall depths) in the central part of the Mekong Basin from 1953 to 2004. Indicating that the wetting tendency of the dry and wet seasons in the central Mekong Basin most likely results from the global warming-induced weakening of the East Asia summer and winter monsoons and to the consecutive alterations of atmospheric water vapor circulation. (cumulative dry season rainfall increased by about 12 mm from 1953 to 2004, in average),

⁴ TKK & SEA START RC 2009. Water and Climate Change in the Lower Mekong Basin: Diagnosis & recommendations for adaptation, Water and Development Research Group, Helsinki University of Technology (TKK), and Southeast Asia START Regional Center (SEA START RC), Chulalongkorn University. Water & Development Publications, Helsinki University of Technology, Espoo, Finland.

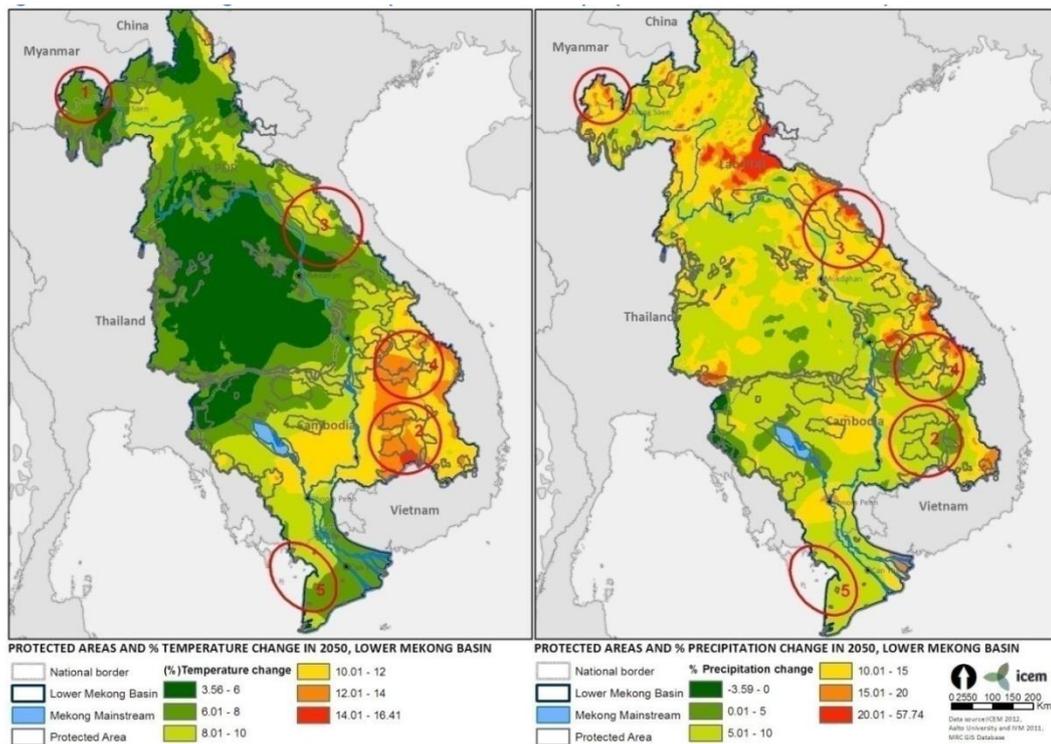
⁵ G. Lacombe et al. 2012. Wetting tendency in the Central Mekong Basin consistent with climate change induced atmospheric disturbances already observed in East Asia. *Theoretical and Applied Climatology*.

⁶ In: G. Lacombe et al. 2012. Wetting tendency in the Central Mekong Basin consistent with climate change induced atmospheric disturbances already observed in East Asia. *Theoretical and Applied Climatology*.

impact on agriculture is negligible: total rainfall depth from November to April, averaged over the period 1953–2004 (about 175 mm within 6 months) is far too low to allow rainfed crop production during the dry season. Allen et al. found that typical crop water requirements in this region vary from 500 to 1,500 mm per cropping cycle⁷. Moreover, this slight rainfall increase is not likely to have an impact on irrigation requirements of dry season crops. Although the annual number of rainy days and total annual cumulative rainfall depth have increased from 67 to 72 days/year (variable 20) and from 1,403 to 1,447 mm/year (variable 8) over the period 1953–2004, respectively, effects on agriculture production are not straightforward: the insignificant increases in the magnitude and frequency of extreme events may have offset the possible water-related yield increases through higher crop damages.

25. The emergency food security assessment conducted by WFP⁸ shows that the three main shocks experienced by food insecure households were rodent infestation (37%), drought or irregular rainfall (21%), and floods (17%).

Figure 1: Protected areas and temperature & precipitation changes by 2050⁹.



⁷ Allen RG, Pereira LS, Raes D, Smith M (1998) Crop evapotranspiration—guidelines for computing crop water requirements. Irrigation and drainage 56. FAO, Rome

⁸ Lao PDR – Emergency Food Security Assessment: Northern Provinces, November 2009.

<http://www.wfp.org/content/lao-pdr-emergency-food-security-assessment-northern-provinces-november-2009>

⁹ International Centre for Environmental Management. www.icem.com.au.

Figure 2 Mean Annual rainfall map¹⁰

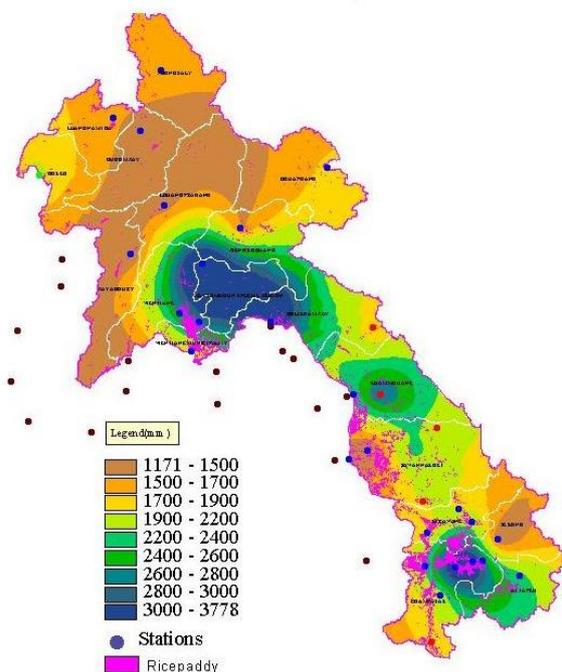
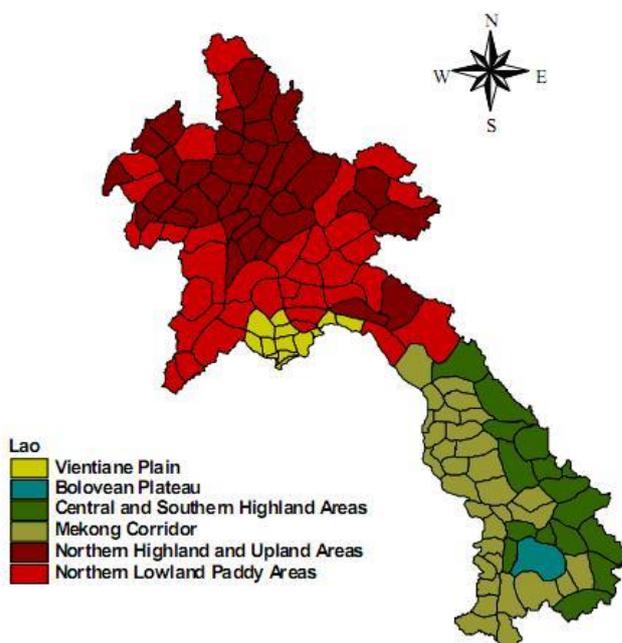


Figure 3: Agro-climatic zones of Lao PDR¹¹



¹⁰ EC FAO Food Security Programme: Managing Climate Risks for Food Security in Lao PDR.

¹¹ <http://www.foodsecurityatlas.org/lao/country/availability/AgroEcologicalZones>

Figure 4: Rice yields over time in Champasak Province influenced by floods and droughts¹²

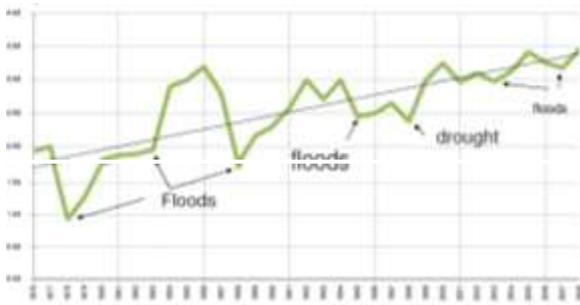
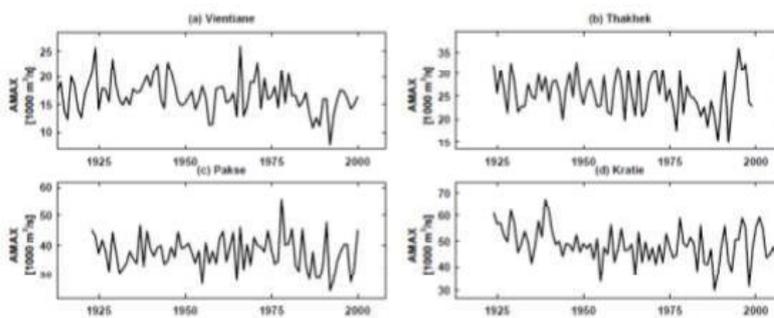


Figure 5: Observations of long-term (1923-2006) annual maximum discharge in LMB stations downstream of Vientiane¹³.



Climate Change Projections

26. Projections consistent warming trends across the whole country with spatial variations in magnitudes. Mean annual temperatures are projected to increase by 1 to 4 C by the end of the century. Potential increases in rainfall are projected to be +10-30% in particular in the eastern and southern part of Laos¹⁴. However, it should be noted that mean annual rainfall between historical decades can vary

¹² Support to the EC Programme on Linking Information and Decision-Making to Improve Food Security for Selected Greater Mekong Sub-Regional Countries. Managing Climate Change Risks for Food Security in Lao PDR, 2011.

¹³ Delgado et al (2010): Flood Trends and Variability in the Mekong River. Accessible online at: <http://www.hydrol-earth-syst-sci.net/14/407/2010/hess-14-407-2010.html>

¹⁴ Support to the EC Programme on Linking Information and Decision-Making to Improve Food Security for Selected Greater Mekong Sub-Regional Countries. Managing Climate Change Risks for Food Security in Lao PDR, 2011.

by as much as +/- 30%¹⁵. Temperatures could even rise by 3-5 C on average, with pockets of even higher increases.¹⁶

27. Significant changes in precipitation and temperature may induce higher agricultural yields as steepest temperature and precipitation increases will predominantly affect the coldest and driest land areas of the region. Snidvongs et al found doubling of CO₂ concentration, dryer dry season and a 1-month delay in the onset of the rainy season, using the CCAM model. Using 15GCMs, MacSweeney et al estimated annual rain changes between 1970-2090 to be 0.3-0.6 mm/year, while Sweeney et al estimated annual rain changes from 1976 to 2030 to be 0.1-9.9/year¹⁷.
28. An Aalto University study¹⁸ rainfall estimated fluctuations in the first half of the 21st century, but then increasing trend during the latter half of the century. This increasing trend results from increasing rainfall intensity, as the length of the rainy season is estimated to be more or less the same than currently. The study also lamented that the flaw in most studies is that they are sectoral and that the broader adaptation context is missing, in that social, economic, institutional and political issues in the region are not considered to the extent they should be.
29. Keskinen et al listed environmental challenges (e.g. floods, drought, decrease in natural resources, climate change) along with social, economic and institutional restrictions to be the main challenges in the Lower Mekong Basin, and suggested diversifying the livelihood base and strengthening the existing livelihood strategies as a solution¹⁹.
30. Keskinen et al also studied the hydrological impacts of climate change simulated for the period 2010-2049 based on two main impacts: 1) changed basin hydrology due to climate change-induced changes in temperature, and 2) sea level rise, and their projections suggest rising sea levels as well as longer wet seasons for Cambodian Tonle Sap plains. This is likely also to have similar impacts on the lower Mekong stretches and rice paddy fields in Laos.

¹⁵ IWMI & World Fish, Johnston et al. (2009): Scoping Study on Natural Resources and Climate Change in Southeast Asia with a focus on Agriculture.

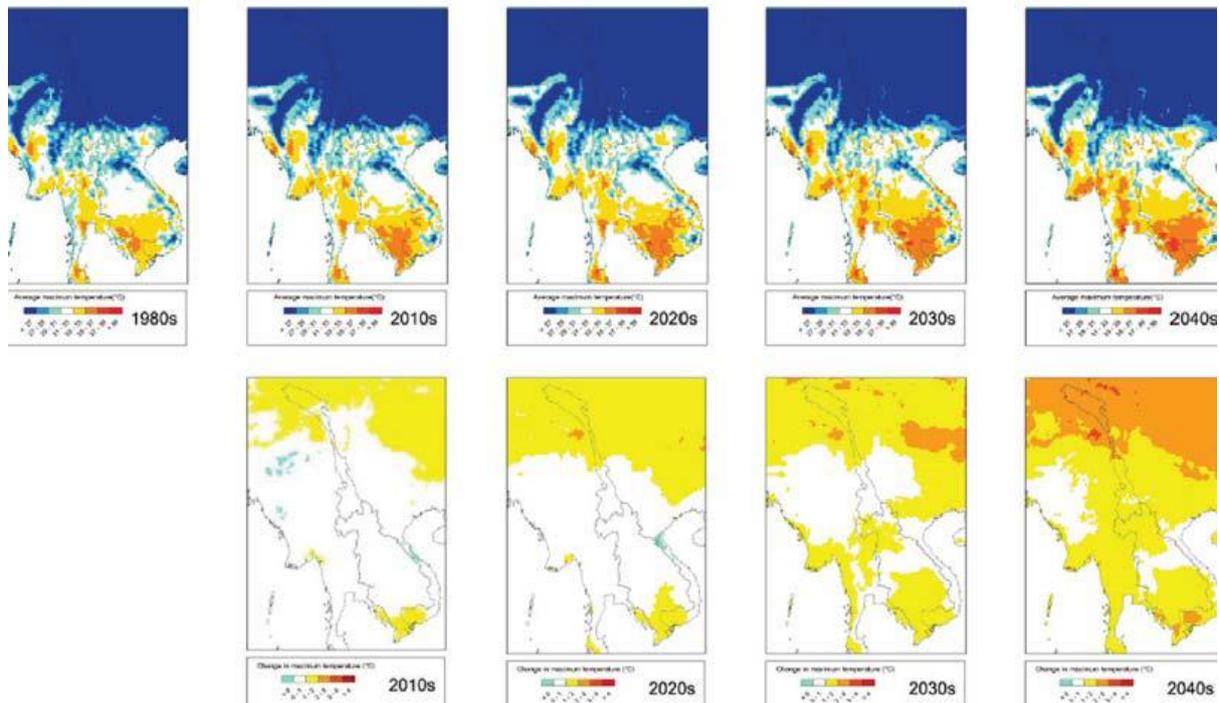
¹⁶ Mekong Adaptation and Resilience to Climate Change (Mekong ARCC) Synthesis Report. USAID, 2013.

¹⁷ Guillaume Lacombe, pers. comm. <http://www.mrcmekong.org/assets/Publications/Events/Climate-model-2009/Climate-Change-Tech-WS-8-9-Sept-2009-G-Lacombe.pdf>

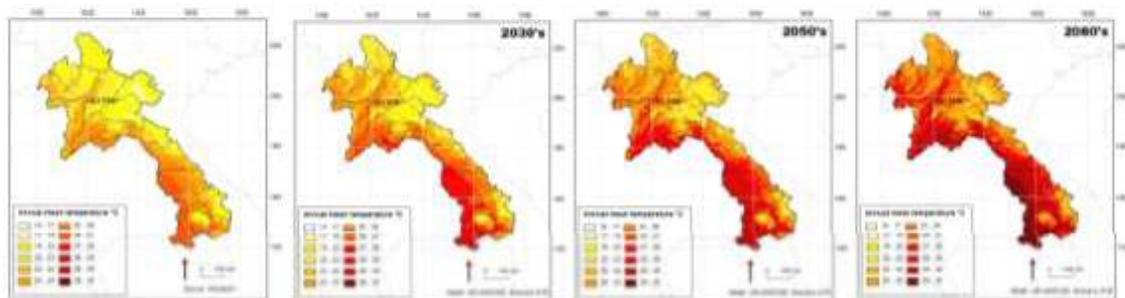
¹⁸ TKK & SEA START RC 2009. Water and Climate Change in the Lower Mekong Basin: Diagnosis & recommendations for adaptation, Water and Development Research Group, Helsinki University of Technology (TKK), and Southeast Asia START Regional Center (SEA START RC), Chulalongkorn University. Water & Development Publications, Helsinki University of Technology, Espoo, Finland.

¹⁹ TKK & SEA START RC 2009. Water and Climate Change in the Lower Mekong Basin: Diagnosis & recommendations for adaptation, Water and Development Research Group, Helsinki University of Technology (TKK), and Southeast Asia START Regional Center (SEA START RC), Chulalongkorn University. Water & Development Publications, Helsinki University of Technology, Espoo, Finland. Available online at: <http://users.tkk.fi/u/mkummu/water&cc>.

Figure 6: Average daily maximum temperature (top) and future change in maximum temperature compared to the baseline decade of 1980s (bottom) under A2 climate scenario²⁰.

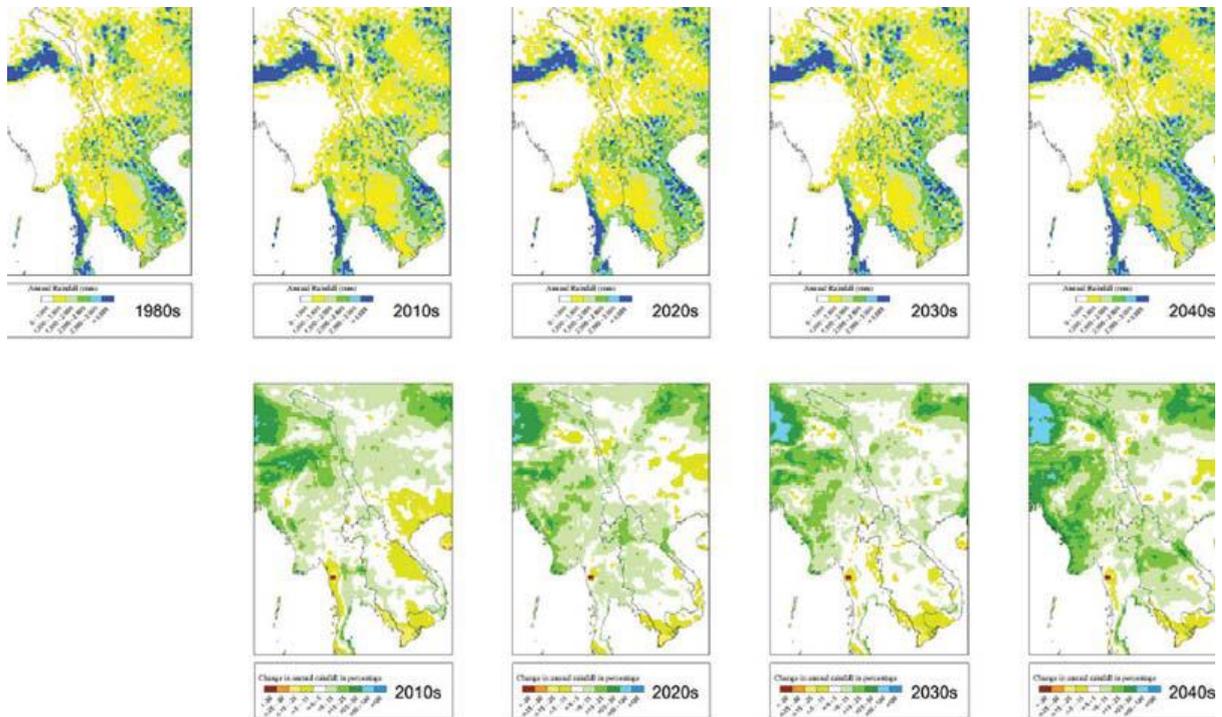


Model -HADCM3, Scenario -A1B, Parameter - Annual Tmean



²⁰ TKK & SEA START RC 2009. Water and Climate Change in the Lower Mekong Basin: Diagnosis & recommendations for adaptation, Water and Development Research Group, Helsinki University of Technology (TKK), and Southeast Asia START Regional Center (SEA START RC), Chulalongkorn University. Water & Development Publications, Helsinki University of Technology, Espoo, Finland. Available online at: <http://users.tkk.fi/u/mkummu/water&cc>

Figure 7: Average annual rainfall i.e. precipitation (top) and future change in the annual rainfall compared to the baseline decade of 1980s (bottom) under A2 climate scenario.



SLM Vulnerability to Climate Change

31. The changing rainfall and temperature patterns suggest increased evapotranspiration, changes in soil moisture and structural patterns, and hence increasing biotic stress (drought) for plants, livestock, and NTFPs (a critical success factor in general being soil moisture). Perhaps the biggest threat in Laos is the combination of drought and extended dry periods/sloping lands with limited vegetation or fallows on large single-crop areas/sudden intense rainfall events.
32. The risk of the sequence of drought-land degradation (which have ultimately led to desertification), as rainfall events become more intense, and fall on dryer soils (extended dry seasons), allowing soil particles to be dislodged and erode down hillsides (sheet, rill and gully erosion). This poses danger over future reforestation attempts. Examples from other areas in the Asia-Pacific region, such as in the Aravalli Mountains in India, where agriculture, agroforestry and forestry alternate as land uses in sloping lands, suggest future reforestation attempts become increasingly difficult as resilient but invasive species remain the few if not only solutions to reforest hillsides. There, *Prosopis juliflora* has become invasive as their root structures invade irrigation pipes. *Jatropha curcas* has become invasive in areas of Timor-Leste after it was used to reforest barren sloping lands. This calls for effective land use planning and community

monitoring to prevent potential economically expensive methods of removing plants that have become invasive.

33. Laos is a geographically diverse, predominantly mountainous country, with 80% of the total surface covered by steep or hilly terrain, with 34.9% of the terrain having slopes of 30% or more, and 35.8% having slopes between 20 and 30%ⁱ. The north is especially rugged with acidic or leached soils and mountain valleys with limited irrigation capacity. Only some stretches of the Mekong and its tributaries' riverbed floodplains are cultivated. Agriculture is mostly dependant on rainwater for irrigation with limited amounts of water pumped from rivers in the close vicinity of waterways for irrigation.

This would indicate that innovative rural financing and integrated land management options and techniques that build on traditional practices while modernizing them, and are tailored to the different topographies, microclimatic requirements, soil conditions, specific needs of the different ethnic groups, gender disaggregated, also considering the history and dynamics of land and resource uses of the area.

34. Laos is also vulnerable to extreme events. Ministry of Agriculture figures from 2006 show that the areas of rain-fed rice fields destroyed as caused by an increased frequency of flooding were 65,937 ha in 1995, 67,500 ha in 1996, 42,900 ha in 2000, 42,223 ha in 2001 and 57,300 ha in 2005²¹.
35. Soil types and conditions vary greatly between locations as well as within locations, which makes species composition, crop interaction, crop/fallow interaction and water management techniques complex. Yields for crops on limestone soils are much higher than on acrisols.
36. The population density in Lao PDR is very low although there are high concentrations in urban areas and in rural fertile river valleys. The availability of workforce is low, which adds another layer of challenge in terms of diversification of livelihoods in the AFOLU sector difficult. Extension efforts especially in Technical Service Centers (TSCs) need adaptation and mitigation support.
37. Gaps for technical and project extension support include increase in numbers of human resources, financial incentives (salaries and performance based incentives), training needs for new approaches, technology upgrade needs, and improved climate proof storage facilities and buildings. Furthermore, importantly, diversification in the agriculture and forestry sectors for new approaches need special attention: conservation agriculture, agroforestry, assisted natural

²¹ Department of Planning, MAF 2006, and Climate Change Adaptation Technology Needs Assessment, MoNRE

regeneration, as well as development of agricultural waste into renewable energy, biochar, etc. Regarding a food security safety net from natural resources, NTFP management, sustainable harvesting, and domestication are areas in need of strengthening.

38. The interlinkages of climate change and sustainable land management – in short Climate Resilient Land Management (CRLM) – are best mainstreamed into national policies, programmes and plans to show donors and other investors that climate change is a priority, and written inclusions are indeed a requirement in many funds in order to access financing. Besides policy, climate change has also to be mainstreamed into the minds of the people, the private sector, extension workers, and cross-sectorally into projects and initiatives. Climate change is not a sector but a factor that affects all sectors.
39. Economic evaluations of land can help in estimating the financial costs of leaving land degradation and climate change unchecked. The effects of climate change and vulnerability to disasters can also affect migration trends and lead to social unrest and migration. Similarly, agricultural trade patterns can be affected and value chains disrupted.

Technical Linkages between land degradation and climate change

40. Climate change affects all sectors. In Laos, climate change causes extreme weather conditions such as extended dry seasons, heavy and concentrated rainfall events and temperature fluctuations, and lead to extreme events such as floods, droughts and landslides. For soils and land productivity, this poses severe risks and challenges. Extended dry seasons reduce soil moisture, making soil particles more easily transferable across landscapes. This leads to nutrient depletion and sandy silt accumulation in lowland farming areas. After dry spells, rainfall may create crustation of the soil surface so that subsequent rainfall can travel at higher velocities resulting in reduced soil permeation and hence increased soil erosion. Such soil erosion can manifest itself as sheet, rill and gully erosion. Plants and trees will hence have less nutrients to survive, which places their wellbeing and survival at risk. Hence, drought can lead to land degradation and ultimately to desertification.
41. The first stages of land degradation in Laos may not be evident when pioneering grass species such as *Imperata* and *Chromolaena* cover land that has been subjected to degradation. Examples of problematic situations include coffee production, which could become unprofitable in the lower altitudes such as in the Bolaven Plateau, leading to economic losses and loss of livelihoods. It could also lead to the expansion of diseases and pests, which could be further exacerbated by a reduction in the regulatory role of agricultural biodiversity. The projections also show that there will be small amounts of precipitation spread across the dry

season, which could have a range of effects on crop germination, pollination, harvesting times, and yields. Even a few percentage points decrease in rice production is expected to have serious implications on food security. Farmer interviews in the uplands have suggested earlier onset of the rainy season, or more frequent and intense “mango rains” (pre-wet season rains).

42. The projected temperature increases would have big implications on the AFOLU sector, as well as the energy, waste and transport sectors that have linkages to CRLM. An example on cross-sectoral impacts is how temperature levels and rainfall changes affect watershed hydrology patterns and hence hydropower production, which is a high level national priority. Water temperatures can also impact the types of fish that have narrow spawning niches in ponds, rice fields and waterways.
43. Traditionally sloping lands are used to grow mainly upland rice. Increasingly, maize, sesame, rubber, eucalyptus, coffee and teak have grown in importance as cash crops. These fields are the key element in the swidden fallow-cycle that communities have maintained for centuries, and allowing a sufficiently long fallow is the key to maintaining soil fertility by minimizing erosion and nutrient leaching. In the last few decades due to population pressures, the length of the fallow cycle has also shortened, in most areas from 12-13 years to 7-8 years, then to 5-6 years and, recently, to 3 years in some areas.
44. As a consequence, productivity of the sloping lands where rotations are shorter has been on the decline as a general rule, while labor inputs, especially for weeding, have increased steadily. The related declined soil fertility and soil health have made rice and other plants more susceptible to water-stress, diseases and attacks by rodents and other pests²². The combination of water stress, diseases, and attacks by rodents and other pests are all dangers that can be expected, unless mitigated, as a consequence of climate change.
45. Agroforestry and reforestation have been highlighted as options to reduce soil erosion in sloping lands and improve watershed management, and for food and nutrition security. Existing land use patterns that apply a mosaic of different land uses as opposed to large scale applications should be transformed into new approaches considering increased population pressures, respecting local and cultural differences and allowing people to adapt to and mitigate climate change.
46. Such approaches have been included in the Agricultural Development Strategy (ADS) and other relevant policy documents to reduce land degradation, food security, and the diversification of livelihoods. Potential crops for agroforestry, woodlots and other arrangements include tea, coffee, and other commercially

²² Growing Resilience. Adapting for Climate Change in Upland Laos. Sean Foley, NCA, 2009. <http://www.kirkensnodhjelp.no/en/What-we-do/Where-we-work/Asia/laos/>

viable tree crops such as teak, as well as fast growing trees (e.g. casuarina), and N-fixing trees (e.g. *Gliricidia sepium*).

47. Approaches that have proven useful include smallholder rubber, smallholder woodlots for teak and other valuable timber species. Maize has been expanding in some areas such as Huaphan Province over larger contiguous areas than the upland rice it has replaced. Rubber and other cash crops are also planted more industrially; land use changes in this respect need investment frameworks to bring their planning and management onto a sustainable level.

Land Uses and Land Use Changes

48. Land use changes occur in Laos due to various issues, including slash and burn cultivation, forest fires, land conversion for plantations, forest regeneration, and as a result of extreme events contributable to climate change such as droughts, flooding, and landslides. Most of the Lao agriculture sector is rain-fed, with limited areas suitable for irrigated rice paddy. Traditionally, the agriculture sector in Laos sees farmers practicing subsistence agriculture and supplementing their food intake and income generation by collecting non-timber forest and other products.
49. A typical farm in Lao PDR consists of two or three separate land parcels. Only 4% of farm households have more than five parcels. Land is most fragmented in the northern provinces. Typical upland and highland landscapes have a mosaic of different land uses, including farmland, fallows and secondary forests in different stages. Households in uplands practice either rotational shifting cultivation or pioneering shifting cultivation to cultivate upland rice, rotating with different stages of bush fallow and secondary forest areas. In rural upland areas one in eight farmers grow dry season rice, while in Vientiane province one in two households cultivate dry season rice.
50. A RECOFTC study made in 2012²³ suggests that smallholders and private sector companies use almost 2.5 million ha for annual and perennial agricultural crops; cultivating coffee, tea, fruit trees and small areas of smallholder tree crops and commercial rubber plantations.
51. The 2012 agricultural census discovered that after rice, maize is the most common temporary crop. The census suggests that a total of 134,500 ha of maize was planted in 2011, a five-fold increase from 1999. The area under sugar cane more than doubled and there are now 13000 sugar cane producers.

²³ Alastair Fraser and Anthony Zola (2012): Economic Evaluation of Land Use Options in Lao PDR

Table 1: Agricultural Census record of temporary crops other than rice, 1998/99 and 2010/11

Crop type	No. of growers		Area ¹ (ha)	
	1998/99	2010/11	1998/99	2010/11
Maize	149,900	187,300	25,500	134,500
Sweet potato	19,600	10,200	200	700
Cassava	71,000	47,900	7,400	18,900
Yam	8,900	3,800	200	300
Mung bean	3,100	2,600	700	600
Sugar cane	22,400	13,000	3,100	6,400
Groundnut	21,400	28,500	4,900	8,300
Soybean	4,800	6,900	800	1,900
Sesame	19,000	25,700	600	9,900
Cotton	9,300	1,100	2,500	100
Tobacco	18,400	14,800	2,700	3,400
Chinese cabbage	88,200	105,900	2,100	1,700
	11,000	7,500	1,800	2,000
	127,500	126,200	2,100	2,600

Area excludes crops planted in plots of less than 100 square meters.

52. The most common permanent crop is coffee, which had an increase of 11% in area planted in twelve years from 1999 to 2011. Fruit trees are common but are mostly scattered trees rather than plantations. The most common fruit trees are mango, banana, jack fruit and tamarind. Many, especially northern, households now plant rubber, which had only a small role in 1999 as a source of income.

Table 2: Agricultural Census on Permanent crops, 1998/99 and 2010/11

Crop type	No. of growers		Area ¹ (ha)	
	1998/99	2010/11	1998/99	2010/11
Banana	109,000	70,400	13,40	9,300
Mango	152,000	187,600	0	3,300
Papaya	23,000	14,000	3,800	200
Pineapple	25,900	12,200	500	2,100
Tamarind	68,000	76,500	2,300	1,000
Coffee	23,700	25,200	1,500	45,900
Tea	1,700	6,300	41,20	2,500
Coconut	109,100	110,700	0	900
Cardamom	6,100	13,300	500	6,400
Rubber	100	49,000	900	66,500
			5,200	
			-	

Area excludes crops planted in plots less than 100 sm.

53. The census indicates that cattle raising increased by two-thirds with 38% of households now raising cattle. Less than 1% is improved breed as of 2011. The

average cattle herd size is 5.3, up 18%²⁴. Some communities in the uplands use livestock to ameliorate soil by rotating their grazing to allow a sequence of natural fertilization and avoidance of soil erosion and/or over-grazing.

54. Agricultural diversification is highlighted in the ADS, the Agricultural Strategy, as well as the National Agro-Biodiversity Programme (NABP), which is currently being updated. Many species are underutilized either as cultivated crops or as NTFPs and Crop Wild Relatives (CWRs), which could be domesticated or collected sustainably from their natural habitat.
55. In many upland sites, soil and nutrient eroded from the hillsides ends up in the valley bottoms. The fertility of this soil is critical for paddy rice and other forms of valley bottom cultivation. Farmers have been known to facilitate hillside nutrient depletion to valley bottoms on purpose to improve yields. Nutrient depletion also occurs due to too short fallows in upland cultivation sites, as a result of increased population pressure due both to natural population growth as well as due to village consolidation.
56. Laos has a policy of attracting investment in the agriculture, forestry and land use sectors. Plantation investments can legally take place on unstocked barren forestland. Unstocked barren forestland is the type of land area that is temporarily without forest cover due to logging, fire, cultivation or other disturbances. These areas are expected to revert back to forest. However, land boundaries, maps etc. are not always up to date which has resulted in unclarity and plantations occurring also in other land areas such as forested or agricultural areas.

Deforestation and Forest Degradation

57. Deforestation and forest degradation poses a danger to SLM, climate change resilience, food security, and forest based rural livelihoods in Laos. 80% of rural Laotians rely on forest resources to supplement their food security, collecting NTFPs, firewood and other forest resources for fire wood, food security, trade, medicinal purposes for household consumption as well as for sale. The forestry sector also offers vast potential for the private and public sectors to invest in sustainable forest management, and restoring productivity in degraded areas with agroforestry, afforestation/reforestation, ecotourism, and increasing rural finance with Payment for Environmental Services (PES), REDD+, etc.
58. Rubber and commercial tree plantations should not be considered as forests from a land-use perspective because they are commercial crops that require good access, transport and infrastructure and “reasonably easy terrain to be

²⁴ Tables 1, 2 as well as livestock figures from FAO & Ministry of Agriculture and Forestry Agricultural Census, 2012.

commercially viable and therefore compete with other agricultural crops for land”. In monocrop formations they do not provide any of the environmental benefits, such as soil, water and biodiversity conservation and NTFPs that natural forests do²⁵. Smallholder rubber and other commercial tree crops, as well as other industrial wood lots can offer targeted poverty reduction pathways but should take .

59. At the local level rural poverty is one of the biggest reasons of forest degradation as people sell trees to create cash buffers needed for special events such as weddings, hospital fees and other unexpected or sudden expenses. Alternative and innovative livelihood developments sustainably using and conserving forest resources offer solutions for poverty reduction and creation of livelihoods as alternatives to subsistence farming.
60. There is also a push-and-pull effect from abroad to develop production forest areas further, as Lao forests have considerable timber resources in the form of a few sought after species (such as rosewood species) for the furniture industry.
61. The new forestry law under development is expected to answer many of the existing loopholes. To support these developments other innovative programs financing solutions are needed to improve forest financing, such as develop PES in Laos, and improving the capacities of the low numbers of field forestry staff and their skills in enforcing legislature. PES can offer solutions as it is a contractual agreement where payments are made for a specific performance. The new government program of increasing salaries is a step in the right direction but more financing such as in the form of climate change funds and other financing sources are needed and could offer a part of the solution. REDD+ financing should include payment structures arrangements that reward forest managers whose actions lead to reduced emissions.
62. Rural people collect timber, firewood, and other timber and non-timber forest products from forested areas for many different household and income generation purposes. Certain hardwood species are particularly valuable. NTFPs such as orchids are collected for foreign markets, as are bamboo and rattan species for both food security, income generation and for the handicrafts and furniture industry.
63. Forests have traditionally acted as a source of food, medicine and income. Population growth combined with the rise in value of Laos’ natural resources has led to increased pressure on biodiversity and ecosystem services. This has resulted in decreases in forest and fallow resources as a security buffer that the rural poor have usually relied on in times of drought or other disasters. This has

²⁵ Alastair Fraser and Anthony Zola (2012): Economic Evaluation of Land Use Options in Lao PDR

resulted in making communities more vulnerable. The loss of biodiversity also means that the remaining patches of forest are now more vulnerable to drought and less resilient to the increases in average temperature and changes in rainfall patterns that climate change is expected to bring.

64. The 2012 RECOFTC study recorded that about 9.6 million ha are classed as forest. This is based on a density of trees that is sufficient for the crowns to cover more than 20% of the land surface, which is the Lao definition of forest. The study found about 10.2 million ha to be described as “potential forest.” This area is former forest but have become so degraded that the crowns cover less than 20% of the land surface. “It includes land covered with bamboo, fallow land formerly used for shifting cultivation, scrub land and very open forest.”
65. The study suggested that to reach the figure of 70% of the national land area having forest cover under the current Lao technical definition of forest (having more than 20% crown closure), requires protecting the current 9.5 million ha of forest from encroachment, illegal logging, and free grazing. This protected area would need to be supplemented by an additional 7 million ha, to reach a total of about 16.6 million ha. FAO statistics indicate a forest cover of 68% in Lao PDR; the FAO statistics apply a 10% crown closure as a definition of forest.

Vulnerable Groups and Climate Change

66. The human aspect in managing natural resources is not separate from the physical, soil engineering and crop management aspects. Local (district, village cluster, village) stakeholders are key in managing any resources and their capacities have to be increased when creating new activities. This includes creating ownership and incentives.
67. Amongst local stakeholders disabled people and other vulnerable groups are especially at risk of suffering from the effects of climate change and changes in landscape. Many farmers are affected by UXO remnants as a legacy of the 2nd Indochina War. UXO injuries often result in loss of eyesight and/or limbs, and hence reduced ability to farm and collect NTFPs, and contribute to the household economy. Women and men typically have different roles in society, depending also on the ethnic background, and in managing their agro-ecosystems and natural resources and these differences need special approaches.
68. Different ethnic groups have different forms of Traditional Knowledge (TK) that should be tapped into. This TK can be lost although it may contain essential ethnically and gender-specific information on NTFP management, management techniques, types of NTFPs, etc. related to particular patterns of rainfall or other weather events.

Renewable Energies

69. Laos has potential in harvesting more of its renewable energy sources. Sunlight patterns suggest photovoltaic would be suited for Lao conditions with the amount of sunlight hours being at least 4 h/day even during the rainy season. Pico-hydropower units can cover some of the household needs in rural areas with difficult access to grid networks.
70. Agricultural waste has potential to be harvested for renewable energy generation, and processed into e.g. biogas, biochar and energy pellets. Residue from NTFP harvesting and processing as well as residue from production forestry operations could be used to create renewable energies. Jatropha plantations and jatropha agroforestry are in operation in selected areas.
71. Hydropower has been highlighted as a national priority. Some of the existing hydropower operations such as Nam Lik 1-2 in Feuang District, Vientiane Province, are accredited to trade Certified Emission Reductions (CERs) for reduction GHG emissions as a CDM project. The project replaces grid electricity with clean hydropower production. There is also an energy (fuel) efficiency CDM project at the LBC.

Trade and SLM

72. Trade linkages to neighboring countries are frequent with large amounts of both official and unofficial border trade occurring across to the neighboring countries of Cambodia, China, Myanmar, Thailand and Vietnam. These include many types of NTFPs, agricultural products, and hence form an important part of rural livelihoods. Agroforestry and other rotational systems could offer solutions to mitigate the danger of overharvesting from natural environments. Agroforestry also offers potential to create renewable energy from the agricultural residue that are created in agroforestry projects.
73. Climate change financing related to diversification of the AFOLU sector and innovative financing schemes such as PES are likely to increase in importance in Laos due to increasing donor interest in climate change funds, and private sector interest in being involved in climate financing, microfinancing, PES, etc. Fair Trade and organic certification offer great potential for Laos to add value for agricultural diversification. Aid4Trade (A4T) schemes as well as microfinancing equally are sectors that are likely to increase in importance, combined with economic growth and increased capacities in Lao PDR.
74. Many products obtained from agriculture, forest resources and rural areas are currently sold in local markets, with some exported over long distances. The further the distance and the lower the value is, however, the less of the benefit

remains at the local level. This is keeping many raw material prices low, which might lead to overexploitation of the resources. It can also lead people to resort to other forest degrading activities to obtain their income or support their food security, medicinal and other products obtainable from forests and adjacent agricultural and water resources.

75. The Lao government's central strategies are geared to diversify value chains, diversify traditional livelihoods and modernize the agriculture and forestry sectors, as well as to create alternative livelihoods and other sectors. There are many underutilized species that have importance for food security purposes and could provide significant income for rural populations some of which have potential of becoming flagship Lao products. The development of geographical indicators (GIs), supported by FAO, could be an important milestone in this regard.
76. Over 700 species of wild plants are utilized for food, medicine, fodder and many other uses. Plants used for food include wild vegetables, bamboo shoots, rattan shoots, tubers, wild fruits, sugar palm and mushrooms. Over 1,400 species of wild animals have been identified in the country, and it is estimated that as many as 90% of them are used in some way by local people. This includes numerous species of fish, frogs, snakes, shrimp, soft-shelled fresh water turtles and crabs. They constitute the major source of protein in most areas of the Lao PDR. While a number of traditional practices are employed to prevent the depletion of non-timber resources, the overall sustainable use of these resources remains unclear. Information on the status of many resources is inadequate to determine appropriate levels of use. Land use changes are also affecting an unknown number of these resources. Climate change can be expected to lead to increased evapotranspiration and hence reduced soil moisture, which is a critical factor for many NTFPs. These 700 species offer potential in terms of product development from both sustainable harvesting and domestication, including agroforestry arrangements. Certification schemes, micro-financing, promotional loans and equities, as well as in the larger context climate funds offer pathways to sustainability in this respect.
77. Perhaps typical to the notion of endemism amongst Lao/Vietnamese biodiversity is the saola, discovered in 1992. The find proved to be the first large mammal new to science in more than 50 years and one of the most spectacular zoological discoveries of the 20th century. The saola could be a flagship species of Laos, and could be linked to innovative payment structures such as Payment for Ecosystem Services (PES) or REDD+ in relation to tourism and conservation efforts.
78. Regional and global markets offer specific potential for Lao farmers' products due to the exotic niche products Laos can produce. These products have notions

of wildness that are often thought to have health and other benefits amongst both Lao and foreign consumers. For example, Lao wild varieties of tea and other wild and exotic products have high consumer demand in regional and world markets but so far quality, standardization, as well as storage and other logistical issues have hampered the development of the sector.

79. The difficulties in adding value relate to a range of different factors. For example, storage facilities can be a problem in many locations especially with regards to rodent outbreaks and other pest and disease outbreaks, which are considered to be emerging threats due to the growing effects of unpredictable weather conditions. Packaging, preservation methods, marketing skills and other value adding elements could be developed to reduce post-harvest losses, hence preserving existing natural stocks from overharvesting.
80. These products could be developed with innovative marketing mechanisms such as Market Analysis and Development (MA&D) as well as with other value chain development activities. MA&D does not predetermine an individual business format and a cooperative format. A cooperative or a local group could work with existing business structures, in a way that creates additional wealth that supports the development of Lao PDR according to its development priorities enshrined in its policy framework. Individual farmers may be also assisted with such mechanisms to specialize in niche products that were not tapped into previously.
81. Without innovative trade development, overharvesting is a concern. Considering law enforcement, some of the revenues created by NTFPs and other agricultural biodiversity product development could be channeled into a village, district, environmental etc funds that function as incentives for facilitating ecosystem services for forest managers.
82. The NAFRI Handbook of NTFPs contains examples of several different potential products that could be harnessed for their market and income generation potential, soil management, and food and nutrition security potential. Some of these potential products include these mentioned in Table 3 underneath. There are also existing programmes such as the ADB-IFAD Sustainable Natural Resource Management and Productivity Enhancement Programme (SNRMPEP), as well subprojects under the FAO UNDP GEF project Mainstreaming Biodiversity into Lao PDR's Agricultural and Land Management Policies, Programmes and Plans (ABP Project).

Table 3: Potential non-timber forest products that could support SLM, sustainable trade development, Aid for Trade, Fair Trade, and agro- and ecotourism.

Product	Description / remarks
Wild tea varieties	Many DPs have been interested and some have (had) activities
Rice varieties	Small scale trade to neighboring countries
Lao indigenous pig	Four Lao phenotypes of “ <i>moo lat</i> ” exist in Laos. They yield lower performances than exotics, but require <i>lower production inputs</i> and have excellent <i>adaptation traits</i> . Management systems range from extensive free-ranging systems, semi-extensive, semi-intensive to intensive management systems, depending on the pig variety and ethnic habits. If fed stylosanthes, the average daily gain (ADG) can be doubled from 107g to 207g ²⁶ .
Elephant foot yam	Over 20 indigenous yam species in Laos; drought resistant
Cardamom	Red cardamom suitable for agroforestry
Sesame	Important export crop; agroforestry
Job’s Tears	Potential to expand; agroforestry
River weed	Collected from rivers, then dried in thin sheets, sprinkled with tamarind and ginger juice and other aromatics such as sesame seeds, tomato and garlic. The dry sheets are cut into small squares and flash shallow fried for a tasty drinks snack. “ <i>Kai paen</i> ” can also be toasted over a fire or in a microwave oven.
Fruits	Potential of planting in agroforestry, and in various garden and orchard arrangements, good source of micronutrients generally lacking in the Lao diet.
Orchids	Need healthy ecosystem, potential for PES, REDD+
Broom grass	Abundant, no fear of overharvesting, value adding potential in Laos
Indigenous (wild) honey	Potential for smallholder income generation as yields lower than introduced varieties. Potential for Fair Trade and organic certification.

Product	Description	Price
Bong bark	Bong bark contains a gum and aromatic oils used to make incense. As harvesting is generally damaging, plantations are encouraged with new trees maturing in 4-5	Farmers in Udomxay get USD10/day when collecting 350

²⁶ Keonouchanh S., Egerszegi I. & Ratky J. Native pigs (Moo Lat) production in Lao PDR.

	years. Farmers often leave single trees in rice fields (type of agroforestry).	kg/year
Benzoin tree	Incense, aromatic oil.	Top quality oil in Europe USD 15-20/kg
Agarwood	Agarwood is an umbrella term and is a commodity found in different trees attacked by insects. The ensuing resin is used in religious ceremonies and in wealthy families in the Middle East.	Seeds and seedlings sold at very high prices of USD 200-500/kg
Vetiver	Essential oil from roots used in perfumes, soaps cosmetics for its fixative effect and fragrance, used in traditional medicine for muscular and joint pains, as well as rheumatism. Used also extensively in erosion control.	
Rattans	Several rattan species offer potential for agroforestry domestication. The materials obtained can be used in village handicraft industries for making of furniture and household items.	
Paper mulberry	Bark used in making paper. Often planted as a permanent crop with fruit, teak and coffee. On fallow land adds organic matter to and improves the soil and controls weeds. Grows well almost anywhere.	Pulp exported often raw to Thailand
Bamboo	Soil binding properties, soil conservation, early maturing, young shoots eaten. Flexible material; can be used for almost anything such as construction, handicrafts, reinforce concrete, fencing, fishing gear.	
Broom grass	Used to make brooms. Abundant.	
Strychnine, snake wood	Used as medicine and poison. Light demanding, drought tolerant.	USD600/ ton in 1992
Tavoy cardamom	Important product. Spice, medicine.	USD5/kg for dried fruit, 1999
Berberine	Important medicinal plant, " <i>Kheua haem</i> " is a creeping and climbing vine 25 m-30 m in length, with a diameter of 6 cm-7 cm. The average density in natural forest is 33 stems/ha, weighing 757 kg. <i>Kheua haem</i> can reach 10 m-15 m in length within two or three years. Potential for REDD+.	

Galangal	Spice, medicine. Found in mixed, deciduous and evergreen forest, spread out, difficult to find.	
Brown albizia	All parts are medicinal. Mostly the leaf shoots. Good soil-binding capacity, ability to rehabilitate degraded soils by nitrogen-fixing. Good shade and windbreak tree.	

Available International climate funding for adaptation

83. This chapter provides an overview of types of climate finance, finance mechanisms and their subgroups. Then main actors, intermediaries and funding channels that provide or could potentially provide finance for adaptation activities are presented²⁷.

Climate finance

84. Climate finance cuts across a broad variety of types and sources of financial flows. These flows include both new instruments to address climate change, and shifts in core development aid and private investment finance towards mitigation and adaptation in developing countries. To get a better idea of what constitutes climate finance, it is helpful to divide it into two subsets, climate-specific and -relevant finance²⁸:

- Climate-specific finance refers to capital flows to activities that have as key outcomes and/or objectives GHG mitigation and **climate adaptation**. This includes investments in renewable energy, energy efficiency and sustainable forestry or agriculture or other activities.
- Climate-relevant finance encompasses a much broader set of capital flows that will influence emissions and/or vulnerability to climate change. This includes flows supporting development and economic growth in key emitting sectors (e.g. power production and other energy supply, industry, agriculture and forestry, transport, water) or to sectors affecting **vulnerability to climate change** (e.g. water, health, energy, forestry and agriculture).

²⁷ Assessing Barriers and Solutions in Bridging Climate Change Finance with Adaptation Projects and Research in Africa ; CRDI/ Climatekos , 2012

²⁸ Buchner, Brown and Corfee-Morlot 2011. Monitoring and Tracking Long term Climate Finance. www.oecd.org/env/cc/48073739.pdf

Types of finance, finance mechanisms and their subgroups relevant to climate change investments

85. The following types of finance and finance mechanisms are analyzed and assessed: grants, equity, debt, climate and carbon finance, risk reduction and finance enhancement mechanisms such as guarantees and insurances. Brief assessments with respect to their relevance to adaptation projects in the region follow.

Grants

86. The following main types of grants can be distinguished:

- Technical assistance;
- Project development (and implementation);
- Loan softening programs;
- Inducement prize contests.

87. In many cases grants are used for capacity building purposes to stimulate (early) action and activities in certain sectors. They can also help with project preparation activities, particularly with preparing small-scale activities or where small developers lack seed funding. Supporting new technology developments with an associated risk of losing the investment is another example where grants are used. Inducement prize contests provide rather limited amounts of funding, but can stimulate certain technology developments and related extraordinary pilot programs.

Equity

88. Equity investments are typically made by private sector players investing in (other) companies, but where public investors also provide equity finance. The basic question for any kind of (equity) investment is one about return on the investment. The difference between purely commercially oriented private operations and social entrepreneurs or the public sector is expectations about rates of return. The three main types are:

- Direct equity investments;
- Private equity funds;
- Venture capital funds.

Debt

89. Debt finance has already been used for financing adaptation projects, in particular by development banks. Public loans for adaptation (i.e. concessional

loans) represent the larger overall share of activities funded compared to grant finance, the former providing more than US\$2 billion²⁹. There are various loan types on offer:

- Concessional loans;
- Project loan facilities;
- Soft loan programs;
- Credit lines to Commercial Finance Institutions (CFIs) for senior and subordinated debt;
- ‘Conventional’ loan programs by commercial banks;
- Bonds;
- Emission Reduction Purchase Agreement (ERPA) loans.

Climate finance mechanisms

90. The following categories of climate finance mechanisms can be distinguished. Some of these mechanisms are fully established (i.e. the CDM or voluntary offsetting mechanisms), whereas others only exist at a conceptual level:

- Trading and offsetting mechanisms (the CDM, voluntary offsetting mechanisms, credited NAMAs, sectorial trading or crediting, bilateral mechanisms);
- Other mitigation finance mechanisms (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries, including conservation and sustainable management of forests and the enhancement of forest carbon stocks (REDD+) and supported/unilateral NAMAs);
- Technology Mechanism;
- Adaptation market mechanism.

Risk reduction and finance enhancement mechanisms

91. Risk reduction and finance enhancement mechanisms have already been applied to adaptation pilot projects. There are two basic, relevant types:

- Guarantees;
- Insurance.

Funding channels – actors and intermediaries and their criteria

92. The following section provides a high-level overview of the main multi- and bilateral funds and programs and other funders or intermediaries providing

²⁹ UNEP-RISOE/GEF, 2012: Accessing International Funding for Climate Change Adaptation. A Guidebook for developing countries. TNA Guidebook Series.

finance to climate change projects. They all do or could potentially finance **adaptation projects in the region.**

93. In addition to multi- and bilateral funds and programs, Multilateral Development Banks (MDBs), conventional bilateral development aid channels, the private sector, Non-Governmental Organizations (NGO), foundations and social investors, and host country governments are considered. The funds and programs and their criteria are briefly assessed against their application in the local context.

Multilateral funds

94. *A number of multilateral funds³⁰ have been established to help finance climate change adaptation. The following are the most important:*

- Adaptation Fund (AF);
- Global Climate Change Alliance (GCCA);
- Least Developed Countries Fund (LDCF);
- Millennium Development Goals Achievement Fund (MDG-F);
- Pilot Program for Climate Resilience (PPCR);
- Special Climate Change Fund (SCCF);
- Strategic Priority on Adaptation (SPA).
- Green Climate Fund

95. Proving additionality of adaptation interventions and demonstrating incremental costs as required by the GEF or the AF, for example, is a complex matter as are the rather opaque politics of allocating funds. These aspects need to be taken into account when assessing the challenges for project developers in accessing multilateral funds.

Multilateral Development Banks

96. MDBs provide funding to adaptation projects through their own lending programs and funding channels, often providing co-finance for projects applying for GEF

³⁰ At the 16th Conference of the Parties (COP) in Cancun in 2010, it was decided to establish a Green Climate Fund (GCF) with a view to the GCF becoming the operational entity of the financial mechanism of the Convention. The GCF will support projects, programs, policies and other activities in developing country Parties, using thematic funding windows. The aim is to simplify the increasingly complicated landscape of funding mechanisms and bilateral agreements that provide climate finance. However, the GCF will only help to disburse the US\$100 billion a year by 2020 funds, but it is not designed to raise them. The funding is supposed to come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources. The GCF is not fully operational yet, therefore is not included in the list.

Although the International Fund for Agricultural Development (IFAD) is not a climate-specific fund, IFAD is another important multilateral actor providing finance to adaptation projects in Asia and Africa.

funding. The relevant major MDBs for Laos are the World Bank, and the Asian Development Bank.

97. In addition to general adaptation project guidance and criteria based on outcomes of the UNFCCC negotiations and applied by all multi- and bilateral actors, MDBs have their own underlying project selection and investment criteria. These criteria are not tailored towards supporting climate change adaptation interventions in Least Developed Countries (LDCs). Additionality of interventions or incremental costs do not, however, really play a role and MDBs seem to be less concerned about these aspects than the budget constrained multilateral funds described above.

Bilateral sources

98. Some key bilateral players have established dedicated climate initiatives to support the development and implementation of climate change mitigation and adaptation activities internationally, or integrated related sub-programs into existing dedicated climate or environmental initiatives, such as the French government. The following selection shows the main, relevant bilateral climate initiatives and programs:

- International Climate Initiative (ICI)
- French Global Environment Facility (FGEF)
- International Climate Fund (ICF)
- Hatoyama Initiative/Fast-Start Financing (FSF)

99. These dedicated bilateral programs and funds are also less concerned about issues such as incremental costs or additionality of adaptation interventions (see above). They mostly apply specific, dedicated climate change/environmental project selection and general investment criteria - looking at co-funding and expertise, management and financial capabilities of implementing organizations - mixed with traditional ODA programming and budget allocation processes (see below).

100. Bilateral climate initiatives are placed somewhere in between the strictly climate change focused, budget constrained multilateral funds, on the one hand, and the bilateral ODA funding processes driven by bilateral negotiations and broader agendas of donor and recipient countries on the other. These funding processes rely more on policy decisions and government to government negotiations, therefore they may suit projects promoted by governmental organizations in Lao PDR much better in the current moment until Lao PDR has built its climate finance readiness. This involves creating a conducive policy

environment, institutional strengthening, and reducing investment risks for investors.

National governments – unilateral sources

120. Local governments in this region might finance adaptation and adaptation technologies, such as water supply to agricultural interventions, building of dams and suchlike, these budgets are often not given allocated to adaptation per se but are hidden as part of the government budget for the agricultural, biodiversity or forestry sectors. In a few developing countries such as South Africa dedicated climate related budget lines exist, and programs to support action on climate change are (partly) funded through national budgets.

National Governments – multilateral sources

121. Laos has several funds that are funded by donors as well as from national sources, which have been established to finance projects in different sectors. They include the Forest and Forest Resource Development Fund, the Rural Electrification Fund, the Renewable Energy Fund and Rural Electrification Fund, the Environment Protection Fund (EPF), the Public Management Trust Fund, the Multilateral Trade Fund, and the District Development Fund. There are no specialized funds to support transport or energy efficiency activities; two important sectors in the fight against climate change. However, the volume of these funds is not significant considering the implementation of Laos' climate change related policies.

Name of the Fund	Responsible Institution	Objective
Environmental Protection Fund	MONRE	Strengthen environmental management, biodiversity conservation, waste management and pollution control
The Forest and Forest Resources Development Fund	MAF	Strengthen forest management, environmental protection and sustainable development of forest resources.
Rural Electrification Fund	MEM	Support the installation of solar electricity systems in rural areas
Renewable Energy Fund	MEM	Assist the renewable energy and biofuels industry, remove barriers and build capacity
Multilateral Trade Fund	MoIC	Promote Compliance with WTO Requirements

Public Management Trust Fund	MoF	Support program reforms and build capacity at local level
District Development Fund	UNDP/UNCDF	Improve governance at the local level in areas of planning, technical inspections and procurement

122. The government is currently considering, which among the national funds should apply to the UNFCCC AF to be designated as a National Implementing Entity (NIE).

123. Two examples from the national framework have potential in building both forest finance and climate finance readiness, namely:

124. The **Forest and Forest Resource Development Fund (FFRDF)** aims to raise and re-distribute forest finance domestically. Established in 2005 by presidential decree, the FFRDF receives revenues from a benefit sharing system linked to timbers sales from production forestry, one of the three forest categories in Laos. The revenues are meant to be used for management, protection and development of Laos' forest resources. 70% of the revenue from timber sale goes to the state budget and 30% to the FFRDF. Once the funds have been given to FFRDF, 60% is deposited in the FFRDF's account and 40% is transferred directly to one of the communities that has a forest management agreement for local activities. FFRDF could be developed further into a national climate change fund for the AFOLU sector. The FRDF is based at MAF.

125. The **Environmental Protection Fund (EPF)** was developed by Prime Ministerial Decree mandate to strengthen environmental protection, sustainable natural resource management, biodiversity conservation and community development in Lao PDR. It was established in 2005 as a financially autonomous organization, supported by the World Bank (IDA), the Asian Development Bank (ADB) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). Since its inception, the EPF provided project funding of approximately 6 million USD while managing revenues of approximately 14 million USD including a sinking endowment of about 7 million USD for generating capital gains. In its present design, it stands outside of the government budgetary system and cannot receive funds from ministries. It has a successful record of small-scale project financing. The EPF is based at MoNRE.

Private sector sources of funding

126. While it is widely recognized that the private sector has an important role to play in providing finance for climate change adaptation, its involvement has been very limited to date. One centralized platform for private sector investment

into climate change adaptation was found, namely the Adaptation Private Sector Initiative (PSI). This initiative aims to catalyze the involvement of the private sector in the wider adaptation community. Activities carried out by these companies span a variety of businesses and sectors, including insurance, consultancy, environmental management, infrastructure and transportation, water and the financial sector³¹.

127. The UNCCD's Ten-Year Strategy calls for involvement of the private sector in order to achieve successful mobilization of innovative sources of funding. Investment from the private sector is widely recognized as necessary for the implementation of effective, integrated SLM practices.

128. Promoting investments that are both private (profit-oriented) and sustainable is difficult; however, there are encouraging examples of their benefits and good potential for scaling up. In land-related sectors, engaging the private sector and making sure it is involved in a sustainable way is a challenge. To do so, different approaches need to be considered so as to overcome current constraints and barriers, including policy-level interventions, good regulatory frameworks which reduce risk, investment environment, access to capital finance, public-private partnerships, valuation of natural resources, environmental legal frameworks, and the right incentives for private sector actors take up sustainable investments in non-traditional markets.

Non-governmental, philanthropic and social investors³²

129. Many national and international NGOs or civil society organizations, as well as foundations and other philanthropic organizations either apply for public adaptation funding or use resources they otherwise raised to finance adaptation projects. There are no publically available, aggregated information sources, databases or reports providing information on the amounts or scale of financial flows distributed by these organizations.

130. The investment bank J.P. Morgan has estimated that social investing from funds, foundations and social investors could supply between US\$400 billion and US\$1 trillion to the housing, water, health, education, and financial services

³¹ 33 companies have so far joined Adaptation Private Sector Initiative. They include companies such as Allianz, BASF, Caisse des Dépôts, Deutsche Bahn, Deutsche Bank, Deutsche Post, PricewaterhouseCoopers UK, Thames Water and Thomas Cook.

³² Classifying these actors as a unique or separate group is problematic as they receive their funding largely from the other groups, i.e. from the public or private sector. However, they do play a role in channelling funding to adaptation projects.

sectors over the next decade³³. However, to date the coverage of sources and recipients of philanthropic investments is non-exhaustive³⁴.

131. The attraction of these funds for developing countries is that, unlike traditional private finance, these investors may accept lower returns as a trade-off for delivering a social impact. Foundations and NGOs even provide, albeit in smaller amounts, grant funding without any expectations of returns on the investment. Some of these organizations have been instrumental in involving private sector companies in pilot climate change related projects such as mitigation or biodiversity projects, combining public and private funding, or rather leveraging private finance. The current involvement of NGOs in adaptation project development and implementation, or rather their role in distributing and managing funding is difficult to assess.
132. Philanthropic foundations are thus emerging as potential sources, still largely untapped, for the financing of SLM-related activities. Foundations can either be religious or non-religious organizations; they mostly finance civil society and private companies, but also research centers, academia and the public sector. Resources from foundations can be limited and grants generally have a smaller size than those provided by traditional bilateral/multilateral donors and development banks. However, flexibility and outreach capacity are very good, as well as the potential for engaging the private sector.
133. The following is a list of philanthropic foundations that are potentially available to finance SLM and CC activities:
134. The Blue Moon Fund is a private philanthropic foundation that makes grants to non-profit institutions and universities. The Fund embraces a landscape approach to address climate change and biodiversity conservation, supports REDD and REDD+ standards, market-based mechanisms including PES, and impact investment. The Greater Mekong Sub-region is one focus area.
135. The Conservation, Food and Health Foundation is open to providing financial assistance for field research, training and technical assistance for biodiversity conservation and food security to all developing countries.

³³ J.P. Morgan: **Impact Investments, An Emerging Asset Class** by J.P. Morgan Global Research Team, 29 November 2010. https://www.jpmorgan.com/directdoc/impact_investments_nov2010.pdf

³⁴ World Bank (2010) In: Assessing Barriers and Solutions to Financing Adaptation Projects in Africa. International Development Research Center. idl-bnc.idrc.ca/dspace/bitstream/10625/51972/1/IDL-51972.pdf

136. The Dietrich W. Botstiber Foundation for food security works with local partners and is available for co-financing with non-profit organizations and individuals. The Foundation is interested in finding partners for co-financing of present and future initiatives.
137. The Korea Green Foundation is a Korean public foundation for environmental conservation. Through its Green Asia Grant the Foundation issues small grants to NGOs and civil society organizations for education and research campaigns in the Asia-Pacific region. Proposed activities must focus on environmental issues such as climate change, water and sanitation, and conservation.
138. The Prince Albert II of Monaco Foundation has several areas of intervention relevant to SLM, including: (i) mitigation of climate change; (ii) clean and renewable energy; (iii) protection of biodiversity; (iv) sustainable water management; and (v) the fight against desertification. In the biennium 2009-2011, the foundation has granted financial support to projects focusing on: (i) preparation of post-2012 Kyoto Protocol strategies; (ii) deforestation; (iii) alternative solutions to the use of firewood; (iv) renewable energy in LDCs; (v) ocean acidification; (vi) effects of global warming on biodiversity; (vii) wetlands management; (viii) management of marine protected areas; (ix) protection of endangered species; and (x) integrated water resource management. All Least Developed Countries are eligible to receive assistance from the Foundation.
139. The Rockefeller Foundation is involved in highly relevant activities with other countries in South East Asia, including impact investment and climate change resilience, for grants ranging from USD 100 000 - 1 million. The presence of the Foundation is strong in the region, so potential exists to attract funding for sectors closer to SLM.
140. The Waterloo Foundation is an independent grant-making foundation based in Wales. It provides direct funding through medium grants (GBP 100 000 maximum per grant) to charities and organizations with a charitable purpose. The Foundation operates in different thematic areas, including world development and the environment. Its Environment programme has a sub-section for tropical forests, and focuses on deforestation and REDD projects.

Incentive and market based mechanisms (IMBMs)

141. IMBMs are defined as mechanisms that address environmental problems by using the same logic that drives traditional markets. Such mechanisms provide incentives for private land users - from small scale farmers to private sector companies and enterprises - to adopt or invest in sustainable land use practices.

142. The rationale behind IMBMs is that the users of natural resources (i.e. the sellers of ecosystem services) receive some form of compensation, ranging from payment to technical assistance to preferential market access, for managing the resource in a sustainable way. The cost of such incentives is borne by those who use the resources and benefit from the cessation of unsustainable management (i.e. the buyers of ecosystem services). The potential of such mechanisms is demonstrated by the fact that these can be endorsed by governments, mainstreamed into national policies and may provide solid ground for private sector engagement in sustainability issues.
143. There are a number of suitable IMBMs for addressing land degradation issues. These relate to the following categories: public payments; trading between buyers and sellers under a regulatory scheme; self-organized direct PES; and eco-labelling and certifications. The applicability of each mechanism depends on the national and international context, as well as on the specific supply and demand of ecosystem services. IMBMs promote and reward stewardship of land and all natural resources, including forests and dry zones.

Climate change funds and mechanisms

144. The UNFCCC recognizes the necessity of providing additional financial resources to developing countries in order to help them mitigate and manage the challenges of a changing climate. Institutions such as the GEF and the World Bank have been assigned with coordinating a number of these financial resources. The GEF administers funds which provide grants to various types of projects ranging from several thousand dollars to several million dollars. As mentioned, the main ones are: the Special Climate Change Fund (SCCF), the Least Developed Countries Fund (LDCF), and the AF.
145. The following is a more detailed list of specific climate change-related funds and mechanisms available for Laos to finance CC and SLM activities:
146. The Adaptation Fund, established by parties to the UNFCCC is a special fund for adaptation initiatives. Applications are reviewed by the Fund's Board during its meetings (usually on a quarterly basis). The Fund targets all developing countries that are particularly vulnerable to climate change.
147. The LDCF was established under the UNFCCC and is managed by the GEF with the objective of assisting LDCs, as the most vulnerable to the adverse effects of climate change, in tackling their high vulnerability to climate change and help them implement respective action plans. The main objective of this initiative is to support climate change-related initiatives through the creation and implementation of adequate National Adaptation Programmes of Action (NAPAs) so that climate change and its consequences are mainstreamed into

each country's national agenda. LDCs in Non-Annex I countries that have implemented or are in the process of implementing their NAPAs are eligible for this fund. Food security and agriculture; water resources; coastal management; early warning and disaster risk reduction; capacity building; energy; health; and ecosystems are the macro areas included in this fund, while the implementation of NAPAs is the transversal focus of the whole initiative. Capacity-building is another important focus area, including technology transfer; training; and the promotion of public awareness.

148. The SCCF was established by the GEF and its action is complementary to that of the other GEF-administered funds. The main focus is the funding of long-term projects for resilience to climate change in the macro areas of agriculture, health, infrastructure, and water. Its objective is to implement long-term adaptation measures that increase the resilience of national development sectors to the impacts of climate change. Non-Annex I countries are eligible for funding through a GEF implementing agency; however, geographical emphasis is given to the most vulnerable countries in Africa, Asia, and the Small Island Developing States (SIDS). The four main project categories that can be considered are: health; agriculture; water; and infrastructure. However, public health; education systems; infrastructure for rural development; and water sanitation are not eligible project topics.
149. The Climate Investment Funds (CIF), approved by the World Bank Group and implemented by the multilateral development banks, are another set of financing instruments that support developing country efforts to mitigate and manage the challenges of climate change. The CIFs comprise four funding windows that help developing countries pilot low-emissions and climate-resilient development by providing grants, concessional funds, and risk mitigation instruments which leverage significant financing from the private sector, MDBs, and other sources.
150. The Climate Finance Innovation Facility is a facility supported by a set of multilateral and bilateral agencies and its objective is to support financial institutions operating in developing countries in the Asia-Pacific region. Technical assistance and grants (up to 50% of the total cost) are offered for climate mitigation, low-carbon and renewable energy/energy efficiency projects.
151. The Critical Ecosystem Partnership Fund (CEPF) is a global programme for biodiversity and ecosystems conservation, operating in a set of identified hotspots where biodiversity is threatened. These include a funding hotspot for the Indo-Burma region.
152. The Energy and Environment Partnership with the Mekong Region (EEP Mekong) initiative, funded by the Ministry for Foreign Affairs of Finland and the

Nordic Development Fund, seeks to support renewable energy-related activities and improve technology transfer in the Mekong region. Its objective is to combat the negative impact of climate change by reducing greenhouse gas emissions and facilitating access to clean energy in the Mekong region; to pool resources towards sustainable practices in the field of renewable energy services. Recipients for the funds are: public and private sector actors; service providers; NGOs; cooperatives; universities; and research institutes. To receive finance, initiatives must also include one or more of the following technologies: biofuels; biogas; biomass; energy efficiency and conservation; geothermal; hydropower; solar; and waste-to-energy. The geographical focus is on the Mekong countries of Cambodia, Laos, Thailand, and Vietnam.

153. The International Climate Initiative (ICI) is a fund administered by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. It finances CC mitigation and adaptation as well as biodiversity projects with climate relevance in developing and newly industrialised countries and those in transition economies. The ICI promotes a climate-friendly economy through, for instance, the preservation and sustainable use of carbon reservoirs. A sum of 120 million euros is available for use by the initiative annually. The Energy and Climate Fund (EKF) launched by the German Government in 2011 is a further source of finance for international climate and biodiversity projects, part of which is deployed through the ICI. That Fund is replenished from the auctioning of emission allowances.
154. The Clean Technology Fund (CTF) is one of four multi-donor funds under the Climate Investment Fund and was designed to promote scaled-up financing for demonstration, deployment and transfer of low-carbon technologies with significant potential for long-term GHG emissions savings.
155. The GCF is a fund within the framework of the UNFCCC founded as a mechanism to transfer money from the developed to the developing world, in order to assist the developing countries in adaptation and mitigation practices to counter climate change. The GCF will support projects, programmes, policies and other activities in developing country Parties. How much funding will actually be available is still to be determined. Parties decided to provide initial guidance to the GCF at COP 19 and requested the GCF Board to expeditiously implement its 2013 work plan, with a view to making the GCF operational as soon as possible.
156. The Japan Fund for Global Environment represents a potential source of funding for all countries considered developing as defined by the Organization for Economic Co-Operation and Development (OECD). The Fund channels its grants to NGOs for activities addressing all types of environmental issues, including global warming and forest degradation.

157. The Nordic Environment Finance Corporation (NEFCO) Carbon Fund has South East Asia among its priority target markets. This mechanism has a public-private partnership model and works as a carbon fund primarily appealing to the private sector, but also to governments and local authorities. It provides financing to renewable energy, energy efficiency and fuel switching activities.
158. The Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet), proposed by China and co-sponsored by Australia and the United States, was agreed by the 15th APEC Economic Leaders' Meeting in September 2007 in Sydney, Australia and was incorporated in the Sydney APEC Leaders' Declaration on Climate Change, Energy Security and Clean Development. The Mission of APFNet is to promote and improve sustainable forest management and rehabilitation in the Asia-Pacific region through capacity-building, information-sharing, regional policy dialogues and demonstration projects. Eligible applicants are encouraged to submit concept notes and proposals when calls for proposals are announced.
159. The Renewable Energy and Energy Efficiency Partnership (REEEP) is a not-for-profit partnership of governments, international organizations and private sector companies engaged in the field of clean energy. It has the objective to expand the market by supporting policy-making and capacity building in the field of renewable energy and energy efficiency, and to fund projects for the creation of enabling regulatory frameworks and the promotion of innovative business models for the private sector. Indonesia is currently a top geographic focus on the Partnership's agenda and is the only country in South East Asia with already implemented initiatives. However, the Partnership has a South East Asia and Pacific Secretariat.
160. Considering Laos' forest wealth, its potential to benefit under the REDD+ mechanism is also great. REDD is a financing mechanism, again under the UNFCCC, which consists of an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. REDD+ goes beyond deforestation and forest degradation and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks. It is predicted that financial flows for greenhouse gas emission reductions from REDD+ could reach up to USD 30 billion a year. REDD+ has been adopted in a selection of countries through different pilot projects implemented by special funds and organisations such as the UN-REDD Programme.

161. In addition to UN-REDD, Laos could also potentially access the SFM/REDD+ Programme, focused on efforts to prevent, control and reverse desertification and land degradation, administered by the GEF; the Forest Carbon Partnership Facility (FCPF), administered by the WB; and other REDD related mechanisms, including the World Bank's new Carbon Initiative for Development to support access of LDCs to low-carbon investments.

Current climate finance flows to Lao PDR

162. The main available source of information for current climate change flows into Lao PDR is a 2013 World Resources Institute and GIZ report³⁵. Hence paragraphs 163 to 171 analyses and quotes this information.

163. Global financing flows for climate change from both public and private sources in 2010/2011 was between USD 343-385 billion annually. The portion of private finance out of this total was in the range of USD 230 billion according to the Climate Policy Institute (CPI)³⁶. Total Multilateral Development Bank finance for adaptation in 2011 was USD 4.5 billion and USD 19.6 billion for mitigation. "The OECD estimates that overall bilateral commitments for 2010 for adaptation was approximately USD 4-9 billion and for mitigation in the range of USD 13-18 billion for a total of between USD 15-23 billion."³⁷ Carbon finance still plays only a small role. However, "private finance has been focused on developed countries and China and most public financing is directed toward mitigation". Hence, both mitigation and adaptation sectors in Laos is a growth sector.

164. The OECD Rio Marker dataset tracks mitigation and adaptation aid commitments from OECD countries since 2010, which provides a picture of the volume of climate finance to Laos. According to that data, "OECD countries committed 107.95 million USD of climate finance for Laos to receive in 2011" (see tables below). "The commitments are divided up in 53.375 million USD for adaptation and 54.575 million USD for mitigation activities."

165. However, the OECD dataset does not cover all relevant climate finance flows (such as the Clean Development Mechanism). Furthermore, the dataset contains *commitment data* and hence does not give a picture of the funds *already dispersed* to Laos.

³⁵ Final Steps for Making Climate Change Work in Lao PDR. Roman Roehrl and

³⁶ The Current Landscape of Climate Finance, Presentation by Barbara Buchner of the Climate Policy Institute (Venice), WRI Seminar, April 2013.

³⁷ Financing Climate Change Action, OECD report prepared for the UN conference in Doha (COP18).

166. At the time of writing, Laos had no means to verify the international commitments as reported to the OECD. It is therefore recommended that these financial flows should flow into national UNFCCC, as well as UNCCD reporting.
167. As there is currently no domestically verified data specifically on climate finance, one can look at aid flows that are related to climate financing (such as in the sectors of agriculture, forestry, land use and transportation) to get a picture of the type of support and investments made. Climate finance in Laos today is mostly delivered by international implementing partners, such as the Global Environmental Facility (GEF) and the Forest Investment Programme (FIP) under the Climate Investment Funds (CIF). INGOs such as Care, IUCN, and Cirad have just started implementing projects in northern Laos with funds received from the GCCA. GoL has also approved 10 Clean Development Mechanism (CDM) projects with a total mitigation potential of 1,450 Gg of CO₂ per year. Of these, six projects are hydropower, with the remainder comprising one each from agro-forestry, biogas, energy efficiency and alternative fuel. Out of the 10 projects, two – have been approved by the CDM Executive Board – the Beer Brewery Energy Efficiency Project and the Xekaman 3 Hydropower Project. Showing additionality has proven to be difficult in Lao PDR so far outside of the energy sector.
168. Other international partners (bilateral development agencies and multilateral banks) are providing support, too. They include GIZ, JICA, and FAO who are supporting work on forestry; the IFC which is providing consultant and technical support to MONRE to improve water laws and regulations, their enforcement, and implementation of integrated water resources management; and the ADB which is supporting work on adaptation.
169. Foreign direct investment in mining, the energy sector (e.g. hydropower), urban development, agriculture and farmed trees has grown considerably over the last 10 years. According to a report from the Ministry of Planning and Investment, from 1989 to 2012 Vietnam invested about USD 4.9 billion, becoming the largest foreign investor in the country. The second largest foreign investor in Laos is Thailand. From 1989 to 2012, it invested in 742 projects with a combined value of about USD 4 billion. The third largest foreign investor is China with a combined investment value of about USD 3.9 billion. In the same time period, among the other top 10 foreign investors in Laos was the Republic of Korea, which conducted projects with a combined investment value of about USD 748 million.
170. The future effects of these investment projects on GHG emissions and the ability of Laos to adapt to climate change are not known. However, domestic investment is 5.3 percent of GNP or 3 times less than foreign investment.

Moreover not all sectors are benefiting, as investment in the non-resource sector decreased relative to the natural resource sector in recent years.

171. For adaptation, it is hoped that funds such as the GCF, as well as climate funds such as IKI, FGEF, the ICF, and the NDF, could serve as some of the financial mechanisms for the country's adaptation (as well as mitigation with adaptation cobenefits) needs.

Adaptation Project development cycles and requirements

172. As outlined above, a large number of bilateral and multilateral donors are currently active in the area of adaptation financing, each of which applies its own unique set of criteria and procedures. Navigating the multitude of templates, eligibility criteria and technical terms can be a time consuming and confusing task for the project developer trying to match a TAP adaptation project idea with the right funding source. Now that many of the funding sources for adaptation have been active for a number of years, some common fundamental concepts and criteria are starting to become apparent across the funds³⁸.

173. This section will present common concepts and criteria, and provide a generic adaptation concept 'template' elaborated by UNEP-RISO/GEF 2012. These can be used as a guide by Palestine project developers as they consider the various eligibility elements of their project ideas and strive to 'translate' project ideas into a format that will be acceptable and conducive for bilateral and multilateral funding.

174. Based on official guidance and practical experience from e.g. the LDCF, SCCF, AF and PPCR, the following seven fundamental eligibility criteria can be distilled:

1. Adaptation rationale and additional cost argument;
2. Urgency and prioritization;
3. Weighting of project activities;
4. Sustainability of intervention;
5. Cost-effectiveness;
6. Institutional setup and comparative advantage of implementing institution;
7. Results-based management and logical framework.

³⁸ UNEP-RISOE/GEF, 2012: Accessing International Funding for Climate Change Adaptation. A Guidebook for Developing countries. TNA Guidebook Series.

175. Below, these criteria are developed in two sections: The first one precise the Preparatory work for Identification and feasibility assessment and the second one summarise the General review criteria for project concepts.

Preparatory work - Identification and feasibility assessment

176. In the preparatory work, we must answer the followings questions:

➤ ***Which kind of activity does the project entail and what approach does it follow?***

Depending on the project activity, different approaches to implementation may therefore be chosen (e.g. land management strategies to respond to disasters, plantation of trees to protect against certain vulnerabilities, assess in more detail a climate risk, for example to forestry or agricultural production). A “typical” adaptation activity should be identified and the approach to implementation should be clear and transparent.

➤ ***How does the project enhance adaptive capacity, and how realistic is its implementation?***

It is crucial to the realization of the project that the definition of the project objective is clear - How is resilience enhanced or how is the current level of resilience at least maintained? - and realistic in the face of any given constraints:

- Can the project be financed?
- In what timeframe can the project be completed?
- Is there a buy in and support from the stakeholders?
- The aim of the project as well as its positive and negative impacts should be clearly defined.

➤ ***How can the success and impact of the project be determined?***

In order to prove the impact the project actually had, it is important to establish a baseline scenario that describes what would have happened if the project did not exist (the establishment of the baseline scenario can at this stage be qualitative rather than quantitative). This baseline scenario provides information about the existing vulnerability, the climate risk, the existing policy and adaptive capacity. From this information it can be extrapolated what would happen without the adaptation project measure, and therefore which impact the project activity can make. The project situation is compared to the baseline situation in order to determine and, if possible, quantify the achievements of the project, typically a reduction in vulnerability to climate change and / or an increase in adaptive capacity.

➤ ***Who are the project stakeholders?***

Developing and implementing an adaptation measure should draw interest from a number of stakeholders. It is crucial not only to identify these stakeholders but also to engage in communication with them: they are likely to make the most valuable contribution on what the priorities for an adaptation are, how it should be developed and how it can be implemented. Stakeholders for projects on the local (e.g. farmers affected by vulnerability), regional (e.g. farmer's co-operatives or business groups), national (e.g. Ministry of Agriculture, Environment) and global level (e.g. UN organizations) should be considered. A selection of stakeholders could provide input to help understand the most relevant and pressing issues.

➤ ***Is the project consistent with the national adaptation priorities and needs?***

Depending on the adaptation measure, be it a sector-wide policy or a specific agricultural project for a certain region, different political decision-making processes will be required to make the implementation happen. At the same time, it is also crucial to ensure that these processes are aligned with host country policy on adaptation. To ensure the project will be supported from the wider political community the appropriate decision-makers will have to be identified at the local, regional and national levels. By working with these individuals it needs to be determined if and how the adaptation can be integrated into existing frameworks for the long-run. In this, it is important to consider the work done on existing adaptation plans such as the National Adaptation Programs of Action (NAPA) or National Communications to the UNFCCC and the UNCCD. NAPAs for example specify priority regions or activities for national adaptation, and projects within these priority categories are very likely to gain political or even financial support by public institutions. The backing of a public institution or the government can also help to access adaptation funding at international level.

➤ ***Formulate a clear, overall objective and specific objectives and related activities and outcomes which should be measurable as well as budgets can be allocated to them accordingly***

➤ ***Consider which fund(s)/funding sources you are going to target and whether your project will address the respective priorities and objectives***

- Multilateral funds (LDCF, SCCF, AF, ...);
- Multilateral Development Banks (MDBs);
- Bilateral funds;
- Conventional bilateral development aid channels;
- The private sector;
- Non-governmental organizations (NGO), foundations and social investors;
- National governments.

➤ ***Analyse financial needs, potential sources and their requirements***

- **Do you require funding for the further preparation of the project/programme?** A well-prepared first concept is still required to ask for a (small) grant for further preparation. An accurate budget estimate needs to be prepared to the extent possible, distinguishing between project/programme development costs (incl. transaction costs) and implementation costs (incl. monitoring); clear budget breakdown ratios (i.e. proportion of funding going to technical assistance components, vs. investment, vs. project management, etc.);
 - **Can the new project build on an existing project/programme infrastructure with secured funding or will the project need to look for funding this as well?** This is related to full adaptation cost finance offered by multilaterals and whether further co-finance is required to implement the project. In the case of scarce resources which need to be distributed globally such as it is the case for the SCCF, LDCF or the AF, for example, investments constitute the co-financing; beyond that, the full cost of adaptation is the so-called additional cost. However, standalone projects are also funded provided that what is being financed is shown to be exclusively adaptation interventions, which are not linked to Business-As-Usual (BAU) development.
 - **The mobilisation and use of national resources should be considered** from the beginning as it will also help with getting international support as well as better determine where such support is most needed and required. Negotiating in parallel and on different elements of the project/programme is not unusual – including the development costs – as they may be funded by different sources. Blending of various different financial sources such as government budget lines, NGO and community groups contributions, in cash/grants, loans/soft-loans, or in-kind form next to development assistance and climate finance (bilateral or multilateral) may be required to get a project/programme off the ground. Furthermore, innovative finance mechanisms should be investigated and be brought into play, if possible, such as REDD or other carbon finance, microfinance, concessions, bonds, further environmental/conservation/forestry or trust funds, or payments for environmental services. Any chance to engage the private sector with regards to bringing equity or debt funding to the project through profitable activities of the project.
 - **Distinguish between baseline development (and related costs) and additional adaptation costs.**
- ***Bring all necessary partners on board and agree who is responsible for which activities or parts of the project/programme***
- Written agreements and contracts should be in place or the basics clarified in writing so that agreements can be made as soon as funding is made available, depending on the particular situation of the project;

- Organizations and entities implementing projects on the ground include government bodies, national institutions, international organisations, local communities, non-governmental organisations, academic and research institutions and private sector entities.
- ***Inform and involve or rather prepare for appropriate stakeholder engagement and consider potential benefit sharing***
 - Government agencies, NGOs, communities, associations, etc. are examples of stakeholders. Extensive consultations with the stakeholder groups are advised, starting with the project planning stage.
 - ***Check consistency with national sustainable development strategies***, including, where appropriate, national development plans, poverty reduction strategies, national communications and national adaptation programmes of action and other relevant instruments, where they exist
 - ***Check monitoring and reporting requirements against capabilities among project partners***
 - How will the project/programme comply with expected regular monitoring and reporting requirements (incl. detailed mid-term reviews and final evaluations)?
 - Which organization or project partner will take care of the monitoring?
 - ***Select and approach appropriate implementation agency/entity (not required for bilateral funding) (see list in Annex II)***
 - ***Approach and inform national GEF Operational Focal Point or rather designated authority in the case of GEF fundings.***
 - ***See checklists (Annex III) to double-check preparatory work has been completed*** to proceed to preparation of full-fledged project concept note.
 - ***All necessary information should be available to approach funding organisations*** (first contacts may already be made during the preparation process though), being able to respond to requests for further information timely and efficiently

General review criteria for project concepts

177. This section summarise all the elements presented above in four axes to consider by the project developers in order to prepare an adaptation project proposal for research funding:

➤ **Basic project idea (adaptation benefit and additional cost argument for adaptation projects):**

- What is the likely BAU development for the targeted sector, in the absence of climate change?
- What are the climate change vulnerabilities?
- With the investment, what are the specific adaptation activities to be implemented to increase the climate resilience of the baseline or BAU development activity?

➤ **Countries priorities:**

- Does the project respond to the priorities identified in the National Communications and national and regional programs, plans such as NAPAs, Technology Needs Assessments (TNA) if applicable?
- Does the project respond to the highest priority/ies identified in the NAPA, and if not, why?
- Consistency with national sustainable development strategies, including, where appropriate, national development plans, poverty reduction strategies, national communications and national adaptation programmes of action and other relevant instruments, where they exist

➤ **Implementation setup :**

- Who will implement the project and why (including comparative advantage of Implementing Agency/ies)? Arrangements for management, including for financial and risk management
- Arrangements for monitoring and evaluation and impact assessment
- Is the project being coordinated with related projects and programs to avoid duplication of activities?
- Avoiding duplication with other funding sources for adaptation for the same project activity

➤ **Indicative budget and co-financing:**

- How will the project components be weighted in terms of budget and why?
- What levels and sources of co-financing is the project expecting?
- Cost-effectiveness of projects and programmes
- *Other*
- Economic, social and environmental benefits from the projects
- Meeting national technical standards, where applicable
- Moving towards a programmatic approach, where appropriate

Template for Presenting Adaptation Project Ideas (UNEP-RISO/GEF 2012)

178. All the key criteria presented above have been used by UNEP-RISO/GEF 2012 for the elaboration of a generic template for presenting adaptation project ideas for bilateral and multilateral funding. The Annex IV presents this template. It aims:

1. To guide the thought process of project developers in the early design phase of converting TNA project ideas into fundable proposals
2. To provide a generic format in which project ideas can be informally presented and discussed with a variety of potential donors.

In the case of the present project, we propose to use this template in order to elaborate the two planned adaptation project proposals.

Conclusion

This guide is best used as a sourcebook or reference guide that can help government officials and their implementing partners to identify, develop, and implement feasible adaptation proposals that target the nexus of SLM+CC in Lao PDR and the synergistic benefits of the three United Nations Rio Conventions, namely UNFCCC, UNCCD, and UNCBD.

The guidebook has highlighted many of the dangers that can be expected and are already seen in Lao PDR as a result of the combination of climate change, land degradation and drought. Biodiversity is an additional factor which is affected as a result of either of the two. Nutrient depletion, increased evapotranspiration, and extended dry periods are all factors of concern to UNCCD implementation.

The text and annexes are meant to be a living document, something that government counterparts can refer to when identifying, formulating, and implementing projects in the area of climate change, agriculture, forestry and land management.

The intention is that this guide will lead to increased investment flows from climate and innovative financing sources to bridge the national budget gap to meet the objectives of exiting LDC status while supporting the objectives of UNFCCC and UNCCD implementation.

Annex I - Acronyms

ADS	Agricultural Development Strategy
AF	Adaptation Fund
AFOLU	Agriculture, Forestry and Land Use
APEC	Asia-Pacific Economic Cooperation
CCAM	Cubic Conformal Atmospheric Model
CDM	Clean Development Mechanism
CRLM	Climate Resilient Land Management
DDMCC	Department of Disaster Management and Climate Change
DP	Development Partner
FAO	United Nations Food and Agriculture Organization
FFRDF	Forest and Forest Resource Development Fund
FGEF	French Global Environment Initiative
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gases
GIZ	German Society for International Cooperation
GNP	Gross National Product
ICF	International Climate Fund
IKI	International Climate Initiative
IPCC	International Panel on Climate Change
IUCN	International Union for the Conservation of Nature
JICA	Japan International Cooperation Agency
LDCs	Least Developed Countries
LDCF	Least Developed Countries Fund
MA&D	Market Analysis & Development
MAF	Ministry of Agriculture and Forestry
MDBs	Multilateral Development Banks
MEM	Ministry of Energy and Mines
MoIC	Ministry of Industry and Commerce
MoF	Ministry of Finance
MoNRE	Ministry of Natural Resources and Environment
NAFRI	National Agriculture and Forestry Research Institute
NAMA	Nationally Appropriate Mitigation Action
NAPA	National Adaptation Programs of Action
NDF	Nordic Development Fund
NTFP	Non-Timber Forest Products
ODA	Overseas Development Aid
OECD	Organisation for Economic Co-Operation and Development
PES	Payment for Environmental Services
PPP	Purchasing Power Parity
RECOFTC	RECOFTC – The Center for People and Forests
SLM	Sustainable Land Management
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme

UNEP United Nations Environment Programme
UNFCCC United Nations Framework Convention on Climate Change
UXO Unexploded Ordnance
WFP World Food Programme

Annex II Implementation agencies/entities

The GEF develops its projects through Implementing Agencies (here the relevant ones for Asia):

- the United Nations Development Programme (UNDP)
- the United Nations Food and Agricultural Organization (FAO)
- the United Nations Environment Programme (UNEP)
- the World Bank (WB)
- the Asian Development Bank (ADB)
- the International Fund for Agricultural Development (IFAD)
- the United Nations Industrial Development Organization (UNIDO)

Adaptation Fund (no national entities or relevant regional entities for the region yet):

- International Fund for Agricultural Development (IFAD)
- United Nations Development Programme (UNDP)
- United Nations Environment Programme (UNEP)
- United Nations World Food Programme (WFP)
- World Bank (International Bank for Reconstruction and Development)
- World Meteorological Organization (WMO)
- Asian Development Bank (ADB)
- United Nations Educational, Scientific, and Cultural Organization (UNESCO)

Annex III - Checklists

Making the case

1. Key stakeholders properly identified and consulted
2. Decision makers or local community leaders consulted
3. Stakeholder consultation table developed
4. Potential roles, responsibilities and contacts of key stakeholders identified
5. National Communications to the UNFCCC, UNCCD and other relevant reports referenced and consulted
6. National and sectoral, regional and local development plans consulted
7. Hard historical climate data consulted and analysed
8. Climate change problem clearly identified and stated
9. Non climate change problem identified
10. Immediate, underlying and root causes identified
11. Vulnerable groups, areas or sectors identified
12. Level of vulnerability assessed
13. The preferred situation formulated
14. Barriers to the preferred situation identified
15. Responses identified

Designing the initiative

1. Specific attitudes and priorities of key stakeholders assessed
2. One objective of the initiative identified
3. Outcomes of the initiative identified
4. Outputs of the initiative identified
5. Outcomes and outputs prioritised
1. Justifications provided (e.g., baseline and alternative scenario for the selected outcomes described)
2. Feasibility of the selected outcomes assessed
3. Logical Framework Analysis established
4. Indicators, risks and assumptions for each outcomes/ outputs identified
5. Indicators are S.M.A.R.T. (Simple, Measurable, Achievable, Realistic, Time-bound)
6. Risk Analysis Matrix developed
7. Strategy to mitigate identified risks developed
8. Cost of selected outcomes and outputs identified
9. Co-financing identified
10. Funding plan established
11. Corresponding budget established

Ownership, sectoral linkages, sustainability and replicability

1. Linkages between the initiative concept and national, sub-national, and/or local development plans, strategies, and policies established

2. Ownership assessed and stated
3. Outcomes and outputs sustainability and replicability assessed
4. Potential benefits detailed

Monitoring and evaluation

1. M&E requirements budgeted
2. Indicators clearly identified
3. Relevant and illustrative baseline information provided
4. Targets, milestones, sources of data, frequency, and
5. Responsibility/ies clearly identified
6. Types and number of reports identified
7. Evaluations identified
8. Framework for learning and knowledge sharing presented

Institutional arrangements

1. Capacity of institutions potentially involved assessed
2. Capacity development plan provided
3. Management arrangements clearly presented
4. Links between central institutions and sub-national ones stated
5. Management diagram provided

Annex IV Template for Presenting Adaptation Project Ideas (UNEP-RISO/GEF 2012)

Section A: Project overview

Project title	
Country (ies)	
Primary implementing institution ⁱ	
Other executing partners ⁱ	
Expected project duration (in months)	
Total budget requested (in US\$) ⁱ	

Section B: Logical framework

Project objectiveⁱ			
Project componentⁱ	Expected outcomesⁱ	Expected outputsⁱ	Budget (US\$)
1.	1.1. 1.2	1.1.1 1.1.2 1.1.3. 1.2.1 1.2.2.
2.	2.1 2.2
Project managementⁱ			
Total amount of financing requested by project			

Section C: Project description

C.1 Adaptation rationale

(a) What is the likely business-as-usual BAU development for the targeted sector in the absence of climate change?ⁱ (1/2 page)

(b) What are the projected physical impacts of climate change based on available climate models and scenarios and how will these impacts be manifested in terms of climate vulnerabilities to BAU development in the targeted sector and region?ⁱ (1/2 page)

(c) What are the specific adaptation activities to be implemented to reduce the climate change vulnerability compared to the BAU situation?ⁱ (2-3 pages)

C.2 Urgency and prioritisation

(a) Is the project consistent with the priorities and needs identified in national, and politically endorsed V&A assessments?ⁱ (1/2 page)

C.3 Impact and cost effectiveness of proposed project activities

(a) Will the project lead to concrete demonstrable vulnerability reduction on the ground?ⁱ (1/2 page)

(b) How is consideration for project sustainability reflected in the project design?ⁱ (1/2 page)

(c) How has cost effectiveness been taken into consideration in the project design?ⁱ (1/2 page)

C.4 Institutional setup and comparative advantage of implementing institution

(a) Who will implement the project and what is/are their comparative advantage(s) compared to other potential implementing institutions?ⁱ (1/2 page)

(b) How will the project be coordinated (and/or mainstreamed into) related ongoing initiatives in sector and region?ⁱ (1/2 page)