



Promoting Climate Resilient Food Systems for Improved Food and Nutrition Security among the Most Vulnerable Communities in Lao PDR

Environmental and Social Management Framework

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EXECUTIVE SUMMARY

This Environmental and Social Management Framework (ESMF) has been prepared in support of a project proposal entitled “*Promoting Climate Resilient Systems for Improved Food and Nutrition Security among the Most Vulnerable Communities in Lao PDR*” (the project) by the Government of Lao PDR (GoL PDR) to the Green Climate Fund (GCF). As this project is supported by the United Nations Development Programme (UNDP) in its role as a GCF Accredited Entity, the project has been screened against the UNDP’s Social and Environmental Standards Procedure and deemed a Moderate Risk (World Bank/International Finance Corporation Category B) project. As such, an ESMF has been prepared for the project.

The Department of Disaster Management and Climate Change (DDMCC) within the Ministry of Natural Resources and Environment (MONRE) as the National Designated Authority and the Ministry of Agriculture and Forestry (MAF) as the implementing agency are mandated to assume a function of “secretariat body to the Government with regard the macro-management of agriculture and forestry development will lead the project. The MONRE and MAF will be supported by a Project Management Unit (PMU) for the implementation of the project and compliance with this ESMF.

The project will target 200,000 direct and 400,000 indirect people in six selected provinces of Lao PDR that highly vulnerable to climate change induced extreme events. The project will improve the resilience of six provinces, through comprehensive water management that accounts for human and agricultural use that will also act to serve as a buffer to reduce the impacts of extreme events, improved water quality, the provision of climate resilient crops; training and significant gender based activities. This would allow communities to manage flood and prolonged dry season threats and by reducing vulnerability of communities, people and their assets.

The project has the potential to cause moderate environmental and social impacts. These include impacts to water quality through sediment movement during mechanical water retention ponds restoration and improvement. This is likely to have a beneficial Noise and air quality may also be impacted during these works. Appropriate actions are proposed to deal with these issues. Minor impacts include increased waste. There project will also result in the development of a seed bank and the project will ensure there are no genetically modified seeds/crops used and moreover, only local provenance will be used.

The project does not require any land acquisition and/or resettlement. There are ethnic groups located within the project provinces. Free, Prior and Informed Consent was undertaken in all consultations with both Ethnic Groups and non-Ethnic Peoples. A separate Ethnic Groups Peoples’ Framework has been prepared and is Annex VI (c) of the project documentations.

The project has developed a Grievance Redress Mechanism to deal with any complaints and issues that may arise as a result of the project. This Grievance Redress Mechanism complies with Lao PDR and UNDP Safeguard procedures.

Appropriate and relevant avoidance and mitigation options have been proposed in the ESMF, which if put in place, will significantly reduce the potential impacts of the project to an acceptable level. Moreover, the project will have significant environmental and social benefits that will be achieved more generally.

Budgeting for environmental interventions and the application of mitigation measures to enhance positive impacts for the six provinces in Lao PDR is an investment in the future as it will reduce the environmental and social liability at local, provincial and national levels. The end result of this budget will be that there will be clean water, more productive soils with less chemicals, more resilient crops to the impacts of climate change, healthy ecosystems, knowledgeable communities and overall improvement in the quality of life of the population as an investment in the future of the six provinces, which if implemented as per the project proposal, will be repaid many times over through reduced long-term operating costs of implementing the project.



1 INTRODUCTION

1. This Environmental and Social Management Framework (ESMF) has been prepared in support of a project proposal for “Promoting Climate Resilient Systems for Improved Food and Nutrition Security among the Most Vulnerable Communities in Lao PDR” (the project) by the Government of Lo People’s Democratic Republic (GoL PDR) to the Green Climate Fund (GCF). As this project is supported by UNDP in its role as a GCF Accredited Entity, the project has been screened against United Nations Development Programme’s (UNDP) Social and Environmental Standards Procedure and deemed a Moderate Risk (World Bank/International Finance Corporation Category B) project. As such, an ESMF has been prepared for the project.

1.1 BACKGROUND

2. The GoL PDR with support from the UNDP is formulating the project on adaptation to climate change impacts, for submission to the GCF. The project will improve the resilience of vulnerable communities (200,000 direct and 400,000 indirect people) to climate change impacts in six provinces of Lao PDR, these being Houaphanh, Luang Namtha Oudomxay and Phongsaly in the north and Saravan and Savannakhet in the south of Lao PDR.
3. Lao PDR is a small landlocked country in Southeast Asia bordered by Cambodia, China, Myanmar, Thailand, and Vietnam. Figure 1 shows the location of Lao PDR relative to other South East Asian nations.



Figure 1: Map of Lao PDR in relation to other South East Asian nations



4. Despite steady economic growth, the country remains a least developed and a low-income food-deficit country, ranking 141th out of 188 countries on the 2014 Human Development Index. The 2015 Global Hunger Index for Lao PDR is 28.5 which place the country at the serious level of food insecurity. Significant challenges remain with respect to food security and nutrition, with an estimated 44% of under-five children stunted and 27% severely underweight.
5. Approximately 80% of the total population live in rural areas, where agriculture continues to employ over 75% of the population. Despite recent progress and rapid economic growth nationally, disparities exist among the provinces, with the northern upland provinces remaining among the poorest and most vulnerable in the country. Country wide, the proportion of people living in poverty (below \$1.25 per day) was 28% in 2013, down from 41% in 2003. Lao PDR has recorded some significant progress against most social and economic indicators over the past decade, despite a few recurrent setbacks owing to a global economic slowdown and natural disasters. Indeed, according to the 2015 Human development Report 30.3% of the Lao PDR population live below the income poverty line. Moreover, 65% of the population earn less than \$2/day and 36.8% of the population live in multidimensional poverty. GDP growth was estimated at nearly 8% in 2014-2015.

1.2 OVERVIEW OF THE PROJECT

6. The “Promoting Climate Resilient Systems for Improved Food and Nutrition Security among the Most Vulnerable Communities in Lao PDR” project will make substantive investments in climate resilience of food systems through a value-chain approach, while strengthening agricultural support climate services and ensuring the continuity of ecosystem services. This will include upscaling proven successful approaches and technologies in the agriculture-based rural livelihoods in six of the most vulnerable provinces of Lao PDR: Oudomxay, Houaphanh, Luangnamtha, Phongsaly, Savannakhet and Saravan. Figure 2 shows the locations of the six provinces in Lao PDR.

Target Provinces and Districts

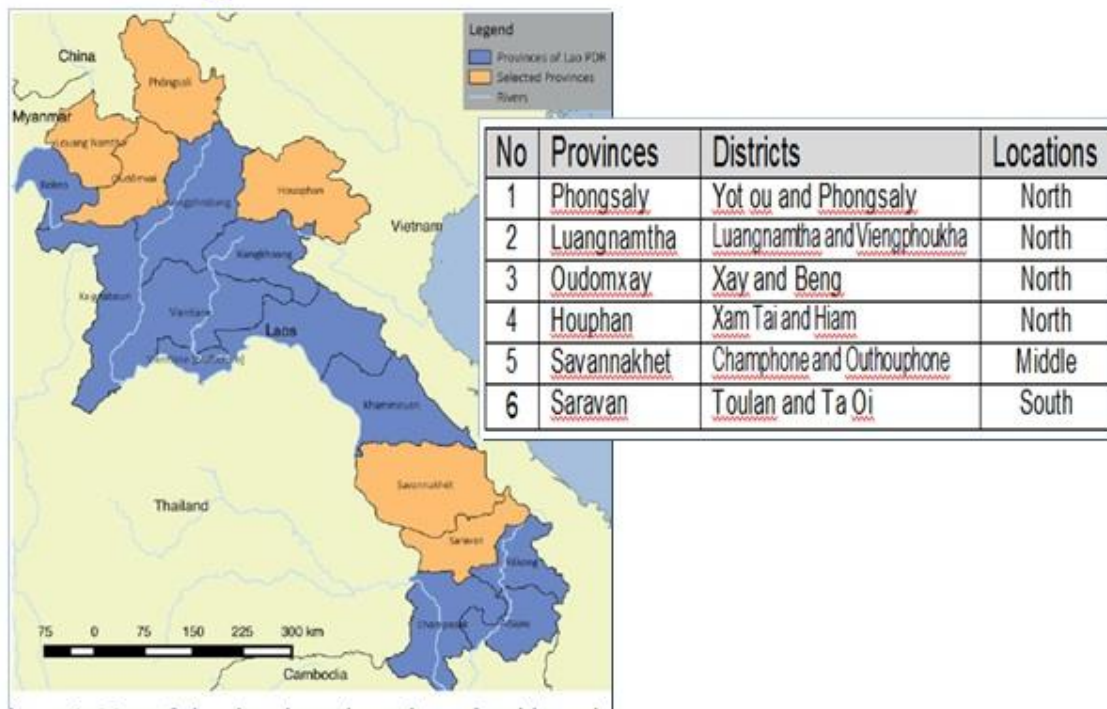


Figure 2 Location in Lao PDR of the six provinces



7. The six provinces are highly susceptible to hydro meteorological disasters, such as floods and prolonged dry periods due to their topography, notwithstanding that four of the provinces are in the highlands and two provinces are on lower elevations on relatively flat land. As an example, the northern areas of Lao PDR received snow and prolonged frosts (up to 15 days) in recent years, the first time this has ever occurred and/or been reported. The frosts themselves killed the majority of crops as well as livestock as they were unable to cope with the impacts of these climatic events.
8. Ethnic groups living in the uplands are usually non-Lao-Tai ethnic groups, which are found to be more vulnerable, as they are engaged in upland farming on steep slopes and live in remote villages with very little infrastructure and limited access to resources.

1.3 OBJECTIVES OF PROJECT

9. The objective of the project is to enhance climate resilience of smallholder farming communities in the most vulnerable areas of Lao PDR to achieve lasting food and nutrition security. The proposed project will have the following activities:
 - a. Output 1: Institutions strengthened to deliver gender-responsive climate services to village communities to improve their risk preparedness and adaptive capacity. The activities proposed under Output 1 include:
 - (i) production and dissemination of climate information services and advisories on cost-effective adaptation solutions for food and nutrition security at national and provincial levels. Under this activity, the project will use tested methods for gender-disaggregated household surveys and participatory vulnerability assessments so that local communities can participate in determining gender-responsive climate risk reduction solutions; and
 - (ii) strengthening gender-responsive community services to enable climate-smart livelihood development. This activity will focus on the dissemination of relevant and accessible information to local level producers and key stakeholders, and extension services to ensure all beneficiaries have up to date climate information to increase their livelihoods.
 - b. Output 2: Investment in climate-resilient and sustainable agriculture value chains delivered to support food and nutrition security. The activities proposed under Output 2 include:
 - (i) introduction of climate-smart agricultural input management practices into food production systems. The project will work with stakeholders to support seed multiplication systems using local farmers and producers' seeds in order to improve the supply chain for a diversity of climate resistant crops as well as increase agro-biodiversity. Seed multiplication systems will be set up using Farmer Field Schools. Villages and districts will self-identify those producers who wish to focus on seed production and to ensure that they benefit from Farmer Field Schools training;
 - (ii) diversification and integration of farming systems in order to increase productivity and incomes in the vulnerable provinces. The activity will work within existing food value chains, in particular rice and maize, while also promoting new ones through the Farmer Field Schools approach, for diversification of income and nutrition sources within integrated crop-livestock systems, upon local market feasibility analysis and farmers' interests. This activity will scaled up existing successful projects in Lao PDR and include for example crop-tree-livestock, aquaculture, the promotion of fish culture in flooded rice areas, frog rearing and pond culture of fish as well as commercial agroforestry for increased income and soil stabilisation; and
 - (iii) strengthening mechanisms to enable local finance for multiplication of integrated farming practices. This activity focuses on establishing long-term viability and sustainability of resilient food systems by supporting access to rural finance as a means of further up-scaling integrated farming practices. There are approximately 5,000 village funds in Lao PDR; however the majority have no appropriate legal status. Basic financial services are provided



through an ecosystem of 501 village banks to more than 50,000 remote rural households. The project will support the development of these services.

- c. Output 3: Watershed management practices to sustain land productivity in the face of climate change. The activities proposed under Output 3 include:
 - (i) participatory and climate resilient land use planning at the watershed/micro-catchment level, introduced as part of the decentralized adaptive land use decisions. Under this activity, for each selected watershed in the six districts, a watershed level multi-stakeholder committee will be created in order for all relevant stakeholders, including village community members, producer groups representatives, private sector organizations involved in the area and local government staff to manage access to natural resources, plan and implement land use decisions. As more than one village usually rely on the same watershed, watershed committees will be established to serve as a platform for villages to better govern shared resources and resolve potential conflicts over resources;
 - (ii) drainage and water supply mechanisms in the areas of high rainfall variability established at a micro-watershed level. This activity will develop water retention ponds and drainage mechanisms. As part of the watershed and drainage control measures to minimise the hydrological risks of climate change, the project will improve water infiltration and increase in agricultural water availability in the dry season to secure the farm production. This will include setting up water retention earth ponds through landscaping methods in the areas of natural depression at the target micro-watersheds, which will also function as means to prevent flooding during rainy season. These water retention earth ponds will be protected with vegetation and connected gravitational drainage canals that will be used for irrigation purposes and will be established based on an analysis of needs and feasibility at the local level, considering potential impacts on downstream users. Capacity of such ponds will be 3,000-4,000 m³. Siting for the reservoirs will be conducted by the Department of Water;
 - (iii) engaging village communities in forest management and planning including in degraded landscapes through clear benefits and incentives. Work to increase water availability will be complemented by efforts targeted at the broader landscape (i.e. around agricultural lands) to restore soil fertility in the most productive, resilient and sustainable manner. This will include mobilising communities to implement terracing where relevant, using crops and fruit trees, to reduce erosion, sediment runoff and siltation of water bodies and irrigation canals as well as to create sustainable carbon stocks. An estimated 40,000 ha (or 4% of the deforested land in the selected districts) will be restored through assisted natural regeneration and agroforestry as part of anti-erosion measures. Work will be delivered through community groups and village forestry groups, brought up at the watershed level, under the supervision of MONRE and MAF.
10. These interventions include predominantly soft interventions although some include mechanical restorations works. Importantly, the project is designed on the implementation of interventions that will have positive impacts through the development of programs that will increase livelihoods and prepare the beneficiaries to be climate resilient.

1.4 ENVIRONMENTAL AND SOCIAL RISK ASSESSMENT

11. As this project is supported by the UNDP in its role as a GCF Accredited Entity, the project has been screened against the UNDP's Social and Environmental Standards Procedure. The Social and Environmental Screening Template was prepared and the project deemed to be a Moderate Risk (World Bank/International Finance Corporation Category B) project. Discussions on the impact assessment are provided in the Social and Environmental Screening Template, which provided the rationale for the project being classified as a moderate risk. This ESMF provides further discussion below.



12. An impact risk assessment was undertaken using the UNDP Social and Environmental Screening Procedure to assess the probability (expected, highly likely, moderately likely, not likely) and the impact of the risk (critical, severe, moderate, minor, negligible). From this, a significance value was attributed to the potential impact (negligible, low, medium, high and extreme).

Score	Rating
5	Expected
4	Highly Likely
3	Moderately likely
2	Not Likely
1	Slight

Table 1 Rating of Probability of Risk

Score	Rating	Definition
5	Critical	Significant adverse impacts on human populations and/or environment. Adverse impacts high in magnitude and/or spatial extent (e.g. large geographic area, large number of people, transboundary impacts, cumulative impacts) and duration (e.g. long-term, permanent and/or irreversible); areas impacted include areas of high value and sensitivity (e.g. valuable ecosystems, critical habitats); adverse impacts to rights, lands, resources and territories of indigenous peoples; involve significant displacement or resettlement; generates significant quantities of greenhouse gas emissions; impacts may give rise to significant social conflict
4	Severe	Adverse impacts on people and/or environment of medium to large magnitude, spatial extent and duration more limited than critical (e.g. predictable, mostly temporary, reversible). The potential risk impacts of projects that may affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples are to be considered at a minimum potentially severe.
3	Moderate	Impacts of low magnitude, limited in scale (site-specific) and duration (temporary), can be avoided, managed and/or mitigated with relatively uncomplicated accepted measures
2	Minor	Very limited impacts in terms of magnitude (e.g. small affected area, very low number of people affected) and duration (short), may be easily avoided, managed, mitigated
1	Negligible	Negligible or no adverse impacts on communities, individuals, and/or environment

Table 2 Rating of Impact of Risk



Impact	5	Red	Red	Red	Red	Red
	4	Yellow	Yellow	Red	Red	Red
	3	Green	Yellow	Yellow	Yellow	Yellow
	2	Green	Green	Yellow	Yellow	Yellow
	1	Green	Green	Green	Green	Green
		1	2	3	4	5
	Probability					
Green = Low, Yellow = Moderate, Red = High						

Table 3 UNDP Social and Environmental Screening Procedure Risk matrix

- When undertaking the risk assessment, all activities were assessed, including, hard/soft infrastructure and livelihood interventions. Specific measures for each matter eg water; erosion, noise etc are discussed along mitigation measures later in this ESMF.

Activity	Unmitigated Impacts	Probability of Impact	Avoidance and Mitigation Measures	Probability and Impact post mitigation
Production and dissemination of climate information services and advisories on cost-effective adaptation solutions for food and nutrition security at national and provincial levels	The work undertaken for this activity will rely on both existing data and the collection of data from climate information. As such, the activity is unlikely to have any significant impact. Full inclusion of all groups is necessary and where this is not undertaken, there is the potential for social discontent.	Probability: 1 Impact: 1 Risk Level: Low	The activity will require significant consultation with the local communities to ensure inclusion. If this is undertaken, it is highly unlikely that there will be any environmental and social issues.	Probability: 1 Impact: 1 Risk Level: Low
Strengthening gender-responsive community services to enable climate-smart livelihood development	This activity will involve increasing women's involvement in numerous activities proposed under the project. Women play a decisive role in agricultural labors and food safety and possess important knowledge about sustainable use of soils, water, seeds and other matters; nevertheless, women have less access than men to loans, training and land. The main impacts associated with this activity could be the reluctance of men to allow women into more leadership roles as well	Probability: 2 Impact: 1 Risk Level: Low	Prior to the activity being carried out, the project should ensure equitable participation of men and women in all project activities. Further, the project should ensure it undertakes an assessment of sex-disaggregated data and the gender analysis. Further, the project should ensure women's participation in identifying best practices in agro-productive activities and stimulate non-traditional occupations through the work programme. This should also include undertaking an assessment of the involvement of women within in livestock etc, prior to planning measures.	Probability: 1 Impact: 1 Risk Level: Low

Activity	Unmitigated Impacts	Probability of Impact	Avoidance and Mitigation Measures	Probability and Impact post mitigation
introduction of climate-smart agricultural input management practices into food production systems	<p>This activity would involve researching and providing valuable information for efficient best practices for adapted agriculture, crop rotation and livestock production adapted to the region and their market impact.</p> <p>There are a number of potential impacts associated with the activity. Firstly, it is critical to ensure that there is no genetic modified species used. Secondly, it is assumed that the activity would rely heavily on gaining knowledge from local producers including ethnic groups to understand what adaptations crops need to have to be climate resilient. The project would need to be undertaken in controlled environments, otherwise there is the potential for unwanted release of specimens. Without being undertaken in a controlled environment using local provenance, there is the potential for specimens to be released into ecosystems which could have significant impacts on a small scale in the short term.</p>	<p>Probability: 1 Impact: 3 Risk Level: Low</p>	<p>It is critical to avoid uncontrolled releases of specimens. All work should be ethics approved. Further, full community consultation on their needs should be undertaken to ensure crops produced are as per the requirement of growers</p>	<p>Probability: 1 Impact: 1 Risk Level: Low</p>
diversification and integration of farming systems to increase productivity and incomes in the	<p>This activity has similar potential environmental and social impacts as highlighted in the previous activity.</p>	<p>Probability: 1 Impact: 3 Risk Level: Low</p>	<p>As above.</p>	<p>Probability: 1 Impact: 1 Risk Level: Low</p>

Activity	Unmitigated Impacts	Probability of Impact	Avoidance and Mitigation Measures	Probability and Impact post mitigation
vulnerable provinces				
strengthening mechanisms to enable local finance for multiplication of integrated farming practices	<p>This activity focuses on establishing long-term viability and sustainability of resilient food systems by supporting access to rural finance as a means of further up-scaling integrated farming practices.</p> <p>There are unlikely to be any direct environmental impacts associated with the activity although depending on how the finances are used, there is the potential for indirect and consequential impacts such as overuse of chemicals etc.</p> <p>Socially, there is the potential for people / ethnic groups to be excluded from the activity. This could result in conflict between those that are not availed of funding</p>	<p>Probability: 2 Impact: 3 Risk Level: Moderate</p>	<p>To ensure potential indirect and consequential environmental impacts do not occur, all financing should include provisions within the contract that certain activities are prohibited when using the funds, consistent with those prohibited by international multi-lateral banks and secondly, that the funds will not be used for environmentally unsustainable activities are not undertaken.</p> <p>Socially, the use of the Grievance Redress Mechanism to ensure all potential beneficiaries are engaged will reduce the social impacts.</p>	<p>Probability: 1 Impact: 1 Risk Level: Low</p>
participatory and climate resilient land use planning at the watershed/micro-catchment level, introduced as part of the decentralized	<p>There are a number of environmental and social impacts associated with the activity. One is the overuse of water which would result in impacts on water quality and sediment loss where proper planning is not undertaken. Secondly, there is the potential to use water that is contaminated with mercury.</p> <p>The social impacts include non-inclusion in the development of the system of people and ethnic groups, where people from within the districts</p>	<p>Probability: 2 Impact: 3 Risk Level: Moderate</p>	<p>To avoid the impacts, the improved water resource management solutions should be run in small scale projects to test its success before being scaled up across different regions. The lessons learnt from other NAF projects in the region are critical to its success.</p> <p>When developing the improved water resource management solutions, consultations should be undertaken with community to understand their needs. By doing this, it is highly likely that this</p>	<p>Probability: 2 Impact: 2 Risk Level: Low</p>

Activity	Unmitigated Impacts	Probability of Impact	Avoidance and Mitigation Measures	Probability and Impact post mitigation
adaptive land use decisions	are not considered. Further, there is the potential for exclusion in being provided assistance.		will result in a solution that is owned by stakeholders and therefore will be taken up in use.	
drainage and water supply mechanisms in the areas of high rainfall variability established at a micro-watershed level	<p>This activity will require the development of water retention ponds and potential road closures to access the river. It will involve the removal of sediment from these environments. There is the potential that it may require the relocation of services.</p> <p>The activity will not impact on greenfield locations as the water retention ponds are disturbed both natural and anthropogenic.</p> <p>There are a number of potential impacts associated with the works including but not limited to the potential erosion and sediment movement during rainfall events and as a result of dust, all of which could have impacts on water quality, noise impacts from the use of trucks and excavators, the potential leakage of chemicals and oils, and other potential impacts. The construction activities could also result in changes to people's ability to move within the region.</p>	<p>Probability: 5 Impact: 3 Risk Level: Moderate</p>	<p>The ESMF sets out appropriate mitigation measures for the impacts of the activity. The most appropriate mitigation measure is to ensure activities do not occur during periods of rainfall which could significantly increase sediment discharges and erosion. All works should comply with the Erosion, Drainage and Sediment Control Plan (EDSCP). Further, prior to any works, sediments should be tested for contamination. Where any sediment is found to contain any contaminants, work should stop and appropriate remediation should be undertaken to reduce the release of these metals etc into the environment. Any additional sediment should be made available to the community, including but not limited to home gardens. All areas should be revegetated as soon as possible to reduce erosion and sediment loss.</p>	<p>Probability: 3 Impact: 2 Risk Level: Moderate</p>
engaging village communities in forest management and planning	This activity will involve undertaking replanting and other livelihood interventions. It will not require any acquisition or resettlement.	<p>Probability: 3 Impact: 3 Risk Level: Moderate</p>	If the appropriate mitigation measures as identified in the ESMF including the EDSCP are undertaken, and the development of a Livelihood Plan, then the impacts should be significantly mitigated. Full training should be	<p>Probability: 2 Impact: 2 Risk Level: Low</p>

Activity	Unmitigated Impacts	Probability of Impact	Avoidance and Mitigation Measures	Probability and Impact post mitigation
<p>including in degraded landscapes through clear benefits and incentives</p>	<p>Previous work by NAF as highlighted the significant environmental and social benefits of these activities. However there is the potential, if not properly conducted to have both environmental and social impacts.</p> <p>Environmentally, the impacts include the potential erosion and sediment movement during rainfall events and as a result of dust, all of which could have impacts on water quality, noise impacts from the use of any machinery, the potential leakage of chemicals and fertilisers, and other potential impacts.</p> <p>Social, the activity could result in changes to livelihoods through the removal of access to wetlands and the normal day to day activities. It is critical that due diligence be properly undertaken prior to the undertaking the activity including the development of a Livelihood Plan where it may be necessary to have people adapt their lives to undertake alternative activities.</p>		<p>provided to those undertaking the rehabilitation and monitoring. All rehabilitation and monitoring should be undertaken consistent with good international industry practice.</p>	

1.4.1 Assumptions Underpinning the Development of the Environmental and Social Management Framework

14. The following assumptions have been made in the preparation of this ESMF:
- a. none of the interventions will require the displacement of people and/or the need for land acquisition;
 - b. all consultations during the development of the project proposal were undertaken consistent with Free, Prior and Informed Consent (FPIC);
 - c. based on FPIC consultations, all ethnic groups are fully accepting of the project;
 - d. no genetically modified organisms/seeds and/or other crops that are not of local provenance will be used as part of the project;
 - e. only local provenance will be used for livelihood interventions;
 - f. all material removed from the works will be remediated as required to ensure limited impact on the surrounding environment;
 - g. all material removed from the works for example, the water retention ponds will be made available (beneficial reuse) for the use in agricultural systems following any necessary remediation;
 - h. none of the interventions will be conducted in protected areas or sensitive locations;
 - i. none of the interventions will be in proximity to any archaeological and/or culturally sensitive location;
 - j. appropriate erosion and sediment control will be undertaken during all stages of the project; and
 - k. there will be no release of pollution and/or chemicals as a result of the project.

1.4.2 Purpose and Objectives of the Environmental and Social Management Framework

15. An EMSF is a management tool used to assist in minimising the impact to the environment and socially; and establish a set of environmental and social objectives. To ensure the environmental and social objectives of the project are met, this EMSF will be used by the project implementers to structure and control the environmental and social management safeguards that are required to avoid or mitigate adverse effects on the environment and communities.
16. The environmental and social objectives of the project is to:
- a. improve the availability of water in the targeted areas and introduce water conservation measures;
 - b. provide alternative crops and seed banks from local provenance;
 - c. provide an early warning system that ensures adequate measures are undertaken prior to any event/s to ensure adequate planning measures can be undertaken in the short to medium term;
 - d. encourage good management practices through planning, commitment and continuous improvement of environmental and social practices and the impacts of climate change;
 - e. minimise or prevent the pollution of land, air and water pollution through reduced chemical use;
 - f. protect native flora, fauna and important ecosystems;
 - g. protect all archaeological and/or culturally sensitive sites;
 - h. ensure gender equality and inclusion across all facets of the project;
 - i. comply with applicable Lao PDR laws, regulations and standards for the protection of the environment;
 - j. adopt the best practicable means available to prevent or minimise environmental and social impact;



- k. describe monitoring procedures required to identify impacts on the environment; and
 - l. provide an overview of the obligations of Department of Disaster Management and Climate Change (DDMCC) within the Ministry of Natural Resources and Environment (MONRE) as the National Designated Authority and the Ministry of Agriculture and Forestry (MAF) as the implementing agency and UNDP staff and contractors in regard to environmental obligations.
17. The EMSF will be updated from time to time by the implementing Project Management Unit (PMU)/contractor in consultation with the the UNDP staff, MONRE and MAF to incorporate changes in the detailed design phase of the projects.

1.4.3 Land Issues

18. Many of the project activities will be undertaken on GoL PDR land including the upgrading of existing water retention ponds.
19. A number of activities including but not limited to the use of alternative seeds will occur on private land and/or land granted to for example, ethnic groups by the GoL PDR. While specific agreements have not been developed at this time, consultations with all potential beneficiaries will be undertaken to ensure there is voluntary agreement to undertake project activities on their land. Where consent is not granted, no activities will be undertaken. Given the nature of the interventions, it is not anticipated that any compensation will need to be paid.

1.4.4 Indigenous Peoples and Ethnic Groups

20. As part of due diligence, an analysis and consultations were undertaken as to the probability of any of the project's activities involving indigenous people and/or ethnic peoples. GoL PDR classifies Indigenous Peoples as Ethnic Groups.
21. Lao PDR is one of South-East Asia's most ethnically diverse countries. The numerous ethnic groups are often distinguished into three categories according to the geographic areas they occupy: the lowland ethnic groups known as Lao Loum, the midland groups known collectively as the Lao Theung, and the highland groups, the Lao Sung. A more accurate classification is to divide them according to the four different language families to which they belong: Lao Tai, Mon-Khmer, Chinese-Tibetan and Hmong-Mien.
22. Officially, the GoL PDR only recognises 49 ethnic groups. The actual number is thought to be as many as 237 according to a UNDP report, or up to 240 on the basis of the distinct languages within the four language families. According to the Ministry of Culture and Information, ethnic Lao (estimates as to their actual share of the population vary significantly, from 30% to 60%) and other smaller groups speaking Tai-Kadai languages represent together approximately 69% of the total population and tend to be concentrated in the lowlands and valleys. Most people from this group are Theravada Buddhists. The second major group; making up approximately 25% of the population are the Lao Theung. Lao Theung inhabit mid-level slopes and speak Mon-Khmer languages. While some tribes are Buddhists, most remain animists.
23. The Lao Sung live mainly in the mountainous regions of Lao PDR and are divided between numerous groups, mainly though not exclusively belonging to the Chinese-Tibetan and Hmong-Mien language families, and include the Hmong (Miao), Yao (Mien), Tai dumm, Dao, Shan, Lua and Khammu. Together they make up about 10% of Lao PDR's population.
24. In terms of religious groups, animism is still common among many of the mountainous ethnic groups, while a small Christian minority is present in Vientiane, as well as some Muslims in the border region near Myanmar. There are also very small Chinese and Vietnamese minorities, numbering probably only a few thousand.
25. An Ethnic Groups' Planning Framework has been prepared for the project as a separate document (see Annex VI (c) of the GCF Submission).



1.5 OVERVIEW OF INSTITUTIONAL ARRANGEMENTS FOR THE ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK PLAN

26. The EMSF will be assessed for each sub-project by the MONRE, MAF and UNDP prior to any works being undertaken. The EMSF identifies potential risks to the environment and social matters from the project and outlines strategies for managing those risks and minimising undesirable environmental and social impacts. Further, the EMSF provides a Grievance Redress Mechanism for those that may be impacted by the projects that do not consider their views have been heard.
27. The MONRE and MAF will be responsible for the supervision of the EMSF. The UNDP will gain the endorsement of the MONRE and MAF and will ensure the EMSF is adequate and followed. The PMU will ensure timely remedial actions are taken by the contractor where necessary. Details of the responsible entities are provided below.

1.5.1 Ministry of Natural Resources and Environment

28. The Ministry of Natural Resources and Environment (MONRE) is the primary ministry responsible for management, protection, rehabilitation and use of natural resources and the environment. MONRE is responsible for the management of the environment, land, water, air, biodiversity, and minerals. MONRE also has responsibility for the management of natural disasters, climate change, meteorology and hydrology throughout the country. The Department of Environmental Quality Promotion is responsible for the development of the national policies and criteria related to Strategic Environmental Assessments, pollution control and waste management. The Department of Disaster Management and Climate Change has the mandate to formulate policies and specific plans of actions in the areas of climate change and disaster risk reduction, including the integration of natural disaster and climate change management issues into the national social and economic development plans. The Department of Disaster Management and Climate Change's mandate on natural disasters relates to policy, prevention and mitigation, while relief and recovery are within the mandate of the Ministry of Labour and Social Welfare.
29. DDMCC is the focal point for the Sendai Framework on Disaster Risk Reduction, the United Nations Framework Convention on Climate Change and is the National Designated Authority for the Green Climate Fund. MONRE works through decentralised offices, the Provincial Office of Natural Resources and Environment (PONRE) and the District Office of Natural Resources and Environment (DONRE).
30. The Department of Environmental and Social Impact Assessment is responsible for the review and approval of projects that trigger the need for an environmental and social impact assessment in Lao PDR.
31. The Department of Land Allocation and Land Development is responsible for land allocation and development in Lao PDR. The department is responsible for among other things
 - a. conducting research and development policies, strategies, relevant regulations on land allocation and development;
 - b. managing, inventory and developing plan for land allocation, categorization of land use, identifying land concession site/area;
 - c. developing the master plan for all levels;
 - d. issuing the result of land inventory, land use certificate and land development certificate;
 - e. monitoring and evaluation the implementation of land use planning; and
 - f. providing comment on technical aspects and participating in solving the land allocation issues, management and protection in close coordination with concerned sectors and etc.
32. The Department of Land Management & Development is responsible for the development, dissemination and implementation of policy, regulations and strategy on land management. More specifically, the department is responsible for
 - a. supporting land management plans throughout the country;



- b. creating the National Land Policy and the National Land Master Plan;
- c. monitoring and managing the land inventory for issuing land concessions, generating maps, and collecting service fees according to regulations; and
- d. issuing land use powers and contracts for transferring use of government land into private land or concessions, as well as coordinating with concerned sectors and local authority to advertise publicly on land registration, land issuing and land value evaluation.

1.5.2 Ministry of Agriculture and Forestry

33. The Ministry of Agriculture and Forestry (MAF) will be the main implementing partner for the project. MAF executes all land use decisions in the sector of agriculture and all types of forests including but not limited to the conservation and protection of forests and production forests. The MAF, as the Implementing Partner will provide project management support, to project implementation through its technical staff and institutional system.
34. Within MAF, the key department that will be involved in implementing this project is the National Agriculture and Forestry Research Institute (NAFRI). NAFRI, was established in 1999 pulling together several research fields in crops, livestock, fisheries and forestry. NAFRI consists of three primary research divisions including:
 - a. Administrative Planning and Cooperation;
 - b. Research and Database Management; and
 - c. Strategy Development.
35. NAFRI was the implementing partner for the UNDP GEF Project entitled Improving the Resilience of the Agriculture Sector to Climate Change Impacts. The IRAS Project ended in 2015 with a number of success and strong implementing capacity demonstrated by NAFRI. Importantly, upscaling of that project is incorporated in this GCF Project. NAFRI also includes nine research centres for agriculture and forestry sector.
36. The Provincial and District Agriculture and Forest Offices (PAFOs and DAFOs) are primarily focused on the management of all types of forests and agricultural activities. The PAFO offices of Oudomxay and Savannakhet will act a northern and southern hub, particularly for coordinating the provincial activities.
37. The Ministry of Planning and Investment is the main planning body in Lao PDR, responsible for socio-economic planning through its Department of Planning. The Department of Planning develops planning guidelines, instructs other ministries how to prepare their respective five year and annual plans (including investment programmes), issues templates and detailed criteria, and carries out monitoring and evaluation for all planning processes in the country. The Department of International Coordination also within Ministry of Planning and Investment is responsible for coordination of all development assistance in Lao PDR.

1.5.3 Departments, municipalities etc

38. Under the Three Build Policy or Sam Sang, the national or central level ministries such as MONRE and MAF have provincial and district offices PONRE, DONRE, PAFO and DAFO already described above. PAFO and DAFO offices in the six target provinces have been fully engaged in the process of concept note development, project formulation, stakeholder engagements and capacity assessments. At the village level, Village Chiefs or Naibans have also been engaged and they have oversight of village-level structures such as Village Mediation Units and Village Disaster Committees

1.5.4 Lao Women's and Lao Youth Unions

39. There are a number of civil society organisations, including the Lao Women's Union (LWU) and Lao Youth's Union that are critical to the implementation of the project. In addition to supporting formal government activities, LWU have been involved in the preparation of the project by carrying out participatory planning activities using their networks throughout Lao PDR from central to local level.



40. The LWU will play a vital role in the implementation of the ESMF by continuing to provide recommendations and advice on the gender-sensitive interventions, facilitates stakeholder consultations with women's groups, engage in capacity development and awareness raising on climate change and women; support the dissemination of information, awareness creation on climate smart agriculture, draw on its long term experience to help set up village banks, work with Bank of Lao to support microfinance for farmers to invest in new value chains, support commercial agroforestry by setting up self-sustained seedling nurseries.

1.5.5 Implementation Capacity and Capacity Building

41. MAF has implemented several projects with overseas development assistance, grant funding and loans. MAF is currently implementing the GAFSP Project (Global Agriculture and Food Security Programme) with IFAD (USD \$30 million). MAF has demonstrated capacity for project implementation. MAF, has recently implemented two GEF projects, the IRAS Project w and the Agrobiodiversity Project. Both projects having a joint financial envelop of approximately USD \$7 million.
42. A Harmonized Approach to Cash Transfers (HACT Micro-Assessment) was conducted for NAFRI in 2015. Out of four possible risk ratings; these being Low, Moderate, Significant and High, the average risk rating assigned across nine areas was Moderate. A recent HACT Assessment was also conducted in January to March 2017, specifically for this GCF Project.

2 LEGAL AND INSTITUTIONAL FRAMEWORK FOR ENVIRONMENTAL AND SOCIAL MATTERS

2.1 LEGISLATION, POLICIES AND REGULATIONS

43. The following legislation is relevant to the project:

- a. *Aquatic Animal and Wildlife Law 2007;*
- b. *Decree on Establishing National Protected Areas 1993;*
- c. *Decree on the Environment Protection Fund 2005;*
- d. *Decree on the Establishment and Activities of the National Environment Committee 2009;*
- e. *Decree on the Control of the Movement of Animal and Animal Products 2012;*
- f. *Decree on the Preservation of Cultural, Historical, and Natural Heritage 1997;*
- g. *Decree on the Protection Forest 2010;*
- h. *Decree on the Rights of Persons with Disabilities 2001;*
- i. *Decree on a Social Security Scheme for Government Workers 1993;*
- j. *Decree on Social Security Scheme for Corporate Employees 2000;*
- k. *Forestry Law 2007 and Decree on the Implementation of the Forestry Law;*
- l. *Labour Law 2006;*
- m. *Land Law 2003 and Decree on the Implementation of the Land Law;*
- n. *Law on Agriculture 1999;*
- o. *Law on Development and Protection of Women 2004;*
- p. *Law on Environmental Protection 2012;*
- q. *Law on Hygiene, Disease Prevention, and Health Promotion 2001;*
- r. *Law on National Heritage 2005;*
- s. *Law on the Protection of the Rights and Interests of Children 2007;*
- t. *Law on Water and Water Resources 2001 and Decree on the Implementation of the Water and Water Resources Law 2001;*
- u. *Prime Minister Order on Establishing Village Management Unit Committee, January 2016 and Decision of Minister of Justice on Implementation of the VMU Committee, June 2016*
- v. *National Heritage Law;*
- w. *Regulation on Management of the National Biodiversity Conservation Areas; and*
- x. *Regulation on the approval procedure for proposed Clean Development Mechanism 2007.*

44. The main pieces of legislation are discussed below.

2.1.1 Constitution

45. The Constitution of Lao PDR was passed in 1991 as a consolidation of the rights and responsibilities of the State and the people. The Constitution states that all citizens have rights in education, health, land use and ownership, domicile of choice, and economic development regardless of sex, religion, social status, education, or ethnicity; as well as freedom of religion, freedom of speech; freedom to peacefully assemble and to protest. All citizens have the right to work and carry out their chosen



livelihoods. Articles 8 and 22 guarantee that there will be no discrimination on the basis of ethnicity or gender.

46. Article 19 of the Constitution requires all organisations and citizens must protect the environment and natural resources: land surfaces, underground [resources], forests, animals, water sources and the atmosphere. This is an important provision for environmental protection.
47. Article 70 of the Constitution requires that the government has the following rights and duties:
 - (3) To determine strategic plans on socio-economic development and annual State budgets and to submit them to the National Assembly for consideration and approval; and
 - (5) To issue decrees and resolutions on State administration, socio-economic management, [and] management in the fields of science and technology, national resources, environment, national defence and security, and foreign affairs.

2.1.2 Law on Environmental Protection Law 2012

48. The *Law on Environmental Protection* established a framework for the management of environmental resources with the objective of conserving and facilitating the sustainable use of natural resources. MONRE issues environmental compliance certificates (ECCs) for projects that have successfully completed the EIA process and coordinates with line agencies to carry out follow-up (compliance) monitoring and evaluation. Project proponents are required to submit regular monitoring reports to MONRE based on their Environmental Management and Monitoring Plans (EMMPs).
49. The *Law on Environmental Protection* specifies principles, rules and measures for managing, monitoring, restoring and protecting the environment in order to protect public, natural resources and biodiversity, and to ensure the sustainable socioeconomic development of the nation. Environmental protection includes all activities contributing to the protection of the environment, ensuring a clean and pollution-free environment, and avoiding negative impacts to human, animal, plant and ecological health. The government directs and supports environmental protection by providing relevant data and information, raising public awareness on the importance of the environment for their daily life, and supports a strict adherence to the environmental policy and legislation of the Lao PDR. All Lao people, resident aliens, stateless persons and residing foreigners, engaged in any production or service have a responsibility to protect the environment.
50. Article 30 of the Law on Environment Protection (amended in 2012) considers disturbance such as noise, light, odour, vibration and heat, which exceed the National Environmental Quality Standards or National Pollution Control Standards, as sources of environmental pollution.
51. The relevant provisions re environmental and social impact assessment are contained under the *Law on Environmental Protection* and decrees and Ministerial Directions. These are discussed below.

2.1.3 Forestry Law 2007

52. The *Forestry Law 2007* provides principles, regulations and standards for the use of forest land and resources. It defines the responsibilities and roles of authorities on various levels for forest management, control and inspection. Primary responsibility over forest resources is handed over to MAF and its line agencies at provincial and district level, but also to village organisations.

2.1.4 Land Law 2003

53. The *Land Law 2003* is an important law related to land management. Criteria for individual and collective or communal land titles are provided in the Ministerial Instruction No 564 issued which includes a new aspect in contrast to previous legislations as it provides for the issuance of land titles for collectively or communal managed lands.

2.1.5 Law on Agriculture 1999

54. The *Law on Agriculture* establishes principles, rules, and measures regarding the organisation and activities of agricultural production which is the basis of Lao PDR's economy. This includes the management and preservation of agricultural activities and production to encourage, promote, and



expand agricultural production to guarantee the food supply and commodity production, to create favourable conditions for building and expanding agro-industrial processing, to contribute to national economic growth, to make people wealthy, to strengthen the nation, and to prevent damage and danger to the environment. Individuals and organisations who have received permission to undertake agricultural activities do not have the right to backfill agricultural land or excavate agricultural lands, no matter the form or manner, causing such agricultural land to change from its original condition, without first receiving approval from the agriculture and forestry division.

2.1.6 Lao PDR Law and Policy re Surface Water

55. In November 1994, the Ministry of Industry and Handicrafts issued the Industrial Waste Discharge Regulation No. 180/MIH. Article 4 of the Regulation describe the concentration standards for some types of industries such as sugar mill, textile and garment industry, pulp mill, paper mill, slaughter house and other effluent standards (general effluent standards, specific effluent standards, electroplating and battery plants).
56. In January 2001, the National Centre for Environmental Health and Water supply within the Ministry of Public Health issued the Basic Knowledge of Water Quality Guideline. The guideline describes:
 - a. method of promotion for controlling of drinking water quality;
 - b. significant steps for controlling of water quality;
 - c. the use of natural source of water;
 - d. natural source of water and it component;
 - e. characteristic of material;
 - f. source of wastewater from industries and agriculture;
 - g. method for improving of water quality;
 - h. method for sampling of spring water; and
 - i. drinking water quality standards.
57. In October 2003, Ministry of Public Health issued the Decree for drinking water quality standard in Lao PDR and standard for checking of water resource No 953/MOH.

2.1.7 Archaeological and Cultural Heritage

58. The main policy governing the archaeological and cultural heritage of Lao PDR is the 1997 Presidential Decree on the Preservation of Cultural, Historic, and Natural Heritage. It outlines the regulations and measures for the management, conservation, preservation, and use of national heritage. It also includes the promotion of movable and immovable assets with historical, cultural, or natural value to national heritage status.
59. The 2005 Lao PDR National Heritage Law determines the principles, regulations, and measures for the administration, use, protection, conservation, restoration, and rehabilitation of the national and intangible heritage. The Law also states the rights and duties of the GoL PDR, social organisations, and individuals regarding the preservation of the national culture, and the historical and natural heritage.
60. The registration of national, cultural, and historical heritage sites that are owned by individuals or organisations is encouraged by the government. The GoL PDR conducts surveys and collects items and then evaluates, classifies, and registers them. The regulations of this registration process is as follows:
61. Local-level national heritage sites are to be registered with the information and culture divisions at the provincial or city level;
62. National-level heritage sites are to be registered with the Ministry of Information and Culture; and



63. World-level national heritage sites are to be registered with the relevant international organisations as proposed by Lao PDR.

2.2 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROCESS

64. Lao PDR has established a legal framework for considering not only, the environmental and social impacts of projects, but moreover, for the assessment of cumulative impacts. The relevant legislation includes but is not limited to the:
 - a. Law on Environmental Protection 2012;
 - b. Environmental Impact Assessment Guidelines 2012;
 - c. Ministerial Instruction on Environmental and Social Impact Assessment Process of the Investment Projects and Activities 2013;
 - d. Ministerial Instruction on Initial Environmental Examination of the Investment Projects and Activities 2013;
 - e. Ministerial Agreement on the Endorsement and Promulgation of List of Investment Projects and Activities Requiring for Conducting the Initial Environmental Examination or Environmental and Social Impact Assessment 2013;
 - f. Prime Minister's Decree on Compensation and Resettlement of People Affected by Development Projects no. 84/Government of Lao PDR 2016; and
 - g. Public Involvement Guidelines in the EIA Process 2013.
65. The Department of Environmental and Social Impact Assessment (DESIA) within MONRE is responsible for overseeing the implementation of the EIA process. Under the *Law on Environmental Protection*, there are obligation to protect the environment and the requirement to conduct EIA.
66. There have been a number of changes in the environmental assessment regime in Lao PDR over the past decade. The first EIA regulation was issued in 2000 and upgraded into Lao PDR Decree of Environmental Impact Assessment 2010 (EIA Decree 2010). It prescribed the thematic issues to be covered and the outputs expected at the different stages of the EIA process (preconstruction, construction, operation, and closure stages), and it addresses two categories of investment projects requiring environmental and social assessments:
 - a. Category 1: Investment projects, which are small or create fewer impacts on the environment and society, and require IEEs;
 - b. Category 2: Large investment projects which are complicated or create substantial impacts on the environment and society, and require EIAs.
67. The Ministerial Agreement on the Endorsement and Promulgation of List of Investment Projects and Activities Requiring for Conducting the Initial Environmental Examination or Environmental and Social Impact Assessment provides the list of projects that are in Category 1 and Category 2. In accordance with the *Prime Minister's Decree on Compensation and Resettlement of People Affected by Development Projects*, all projects that require resettlement and compensation, and hydropower projects over 15 MW require ESIA.
68. In December 2013, two Ministerial Decrees were passed to implement the provisions of Articles 21 and 22 of the Law on Environmental Protection (Amended) No. 29/NA 2012. These were *Process of Environmental and Social Impact Assessment of the Investment Projects and Activities* and the *Ministerial Instruction on the Process of Initial Environmental Examination of the Investment Projects and Activities*. These documents maintain the distinction between the initial environmental examination and environmental impact assessment processes. These decrees repealed the EIA Decree 2010.
69. The *Environmental Impact Assessment Guidelines 2012* (EIA Guidelines 2012) contain detailed provisions for the preparation of EIA and IEE reports in Lao PDR. The EIA Guidelines 2012 were



developed by MONRE in consultation with line agencies, provincial governments, project developers, and EIA consultants, and with technical assistance.

70. There are a number of definitions which include references to public participation such as:
 - a. Involvement – the process of consulting and disseminating information on an investment project to gather comments from people or groups who are likely to be affected by, gain benefits from, or have an interest in the project. The comments are to be used as references in preparing and deliberating on an initial environmental examination, environmental impact assessment report, or environmental and social management and monitoring plan. Involvement can take the form of meetings with stakeholders at all levels, or with those who are likely to be affected by the investment project during all phases of the project;
 - b. Project Affected People – a natural person, legal entity, or organisation that is directly or indirectly affected, or likely to be affected, by the investment project. The people may be affected by legal expropriation of land or real estate, changes of land category, and impacts on the ecological and environmental systems in the their settlement areas; and
 - c. Stakeholders – persons, groups or communities external to the core operations of a project who may be affected by the project or have an interest in it. This may include individuals, businesses, communities, or local government.
71. The project does not trigger the need for an initial environmental examination and/or an environmental impact assessment.

2.3 MULTILATERAL AGREEMENTS AND BIODIVERSITY PROTOCOLS

72. GoL PDR is a signatory to 105 international and regional agreements and conventions, which are related to the environment and social protection. Examples of these include:
 - a. United Nations Convention on Combat Desertification;
 - b. United Nations Framework Convention on Climate Change;
 - c. Kyoto Protocol on the United Nations Framework Convention on Climate Change;
 - d. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal;
 - e. Chemicals and Pesticides in International Trade;
 - f. Convention Concerning the Protection of the World Cultural and Natural Heritage
 - g. Convention on Biological Diversity;
 - h. Convention on the Elimination of All Forms of Discrimination against Women;
 - i. Convention on the Political Rights of Women;
 - j. Convention on the Protection and Promotion of the Diversity of Cultural Expressions;
 - k. Convention on the Rights of the Child;
 - l. Convention on the Rights of Persons with Disabilities;
 - m. Convention for the Safeguarding of the Intangible Cultural Heritage;
 - n. Convention on International Trade in Endangered Species of Wild Fauna and Flora;
 - o. Convention on Wetlands (Ramsar Convention);
 - p. International Covenant on Economic, Social, and Cultural Rights;
 - q. International Convention on the Elimination of All Forms of Racial Discrimination;
 - r. Montreal Protocol on Substances that Deplete the Ozone Layer;



- s. Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous;
- t. Stockholm Convention on Persistent Organic Pollutants; and
- u. Vienna Convention for the Protection of the Ozone Layer.

3 IMPLEMENTATION AND OPERATION

3.1 GENERAL MANAGEMENT STRUCTURE AND RESPONSIBILITIES

73. A high level PMU structure is shown in Figure 3. The key roles are discussed below. The figure below presents the project organogram, showing the relationships between the main institutions to be involved with project implementation and the bodies to be established by the project, as per UNDP project requirements:

- a. Executive (MAF): individual representing the project ownership to chair the group;
- b. Senior Supplier (UNDP): Individual or group representing the interests of the parties concerned that provides funding for specific cost sharing projects and/or technical expertise to the project. The Senior Supplier’s primary function within the Board is to provide guidance regarding the technical feasibility of the project; and
- c. Senior Beneficiary (MPI / MAF / MONRE): Individual or group of individuals representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary’s primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries.

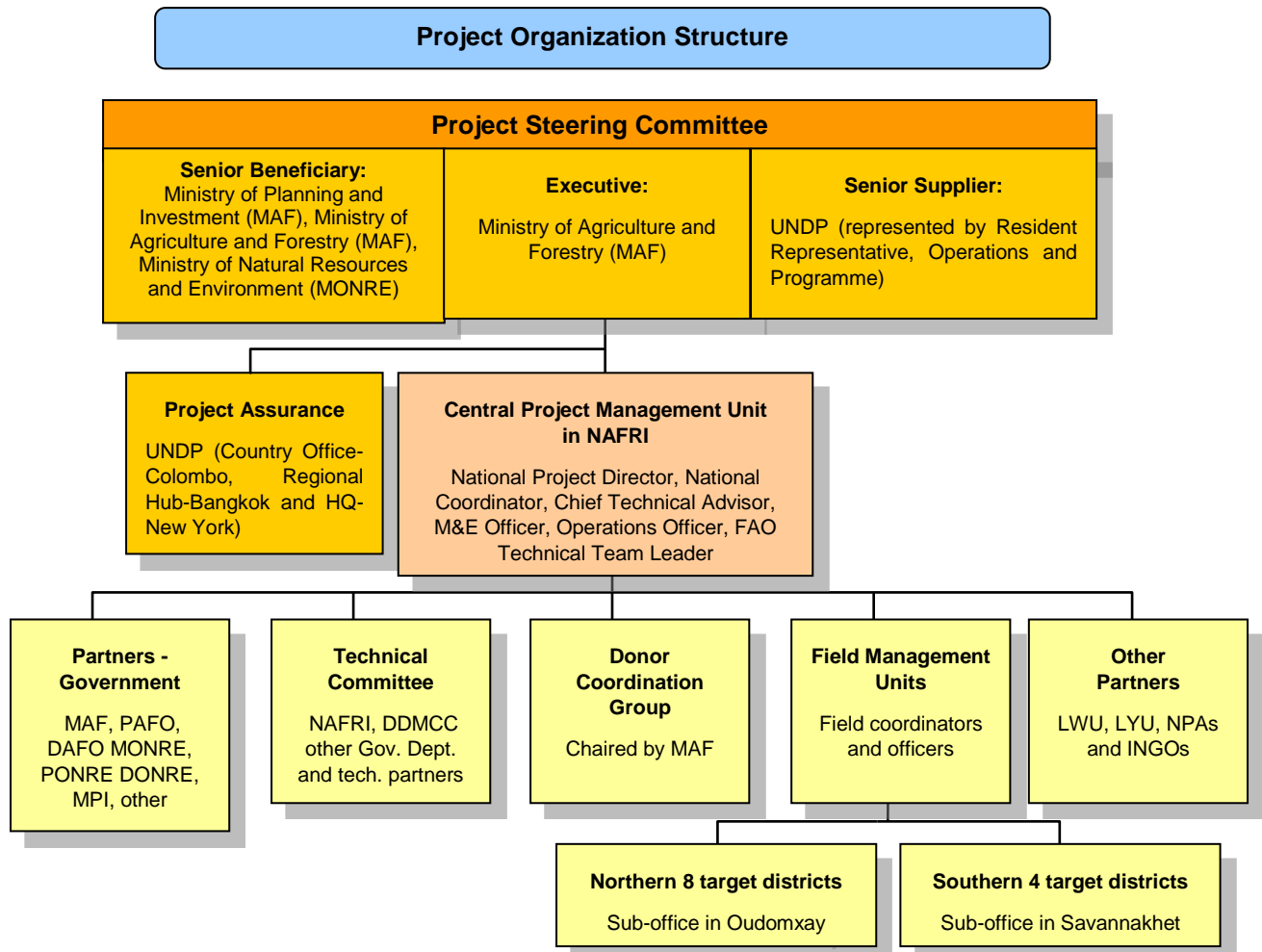


Figure 3 Project organisation structure



3.1.1 Steering Committee and Senior Beneficiaries

74. The **Project Steering Committee (PSC)** will be constituted and will be comprised of designated senior-level representatives of the MAF, MONRE, and the Local Government Authority as well as the National Designated Authority and other key stakeholders such as the Department of International Cooperation in the Ministry of Planning and Investment and UNDP Country Office.

3.1.2 National Project Management Unit

75. The PMU will be established under the MONRE and MAF. The PMU will include the key roles identified in the organisation chart, in particular the National Project Coordinator.
76. The National Project Coordinator will run the project on a day-to-day basis on behalf of the MONRE and MAF within the constraints laid down by the Project Steering Committee. The National Project Coordinator's function will end when the final project terminal evaluation report and other documentation required by the GCF and UNDP, has been completed and submitted to UNDP. The National Project Coordinator is responsible for day-to-day management and decision-making for the project. The National Project Coordinator's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.

3.1.3 Project Assurance

77. The 'project assurance' function of UNDP is to support the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. Project assurance has to be independent of the National Project Coordinator; therefore, the Steering Committee cannot delegate any of its assurance responsibilities to the National Project Coordinator. Further, as the Senior Supplier, UNDP provides quality assurance for the project; ensures adherence to the NIM guidelines and ensures compliance with GCF and UNDP policies and procedures.
78. A UNDP Programme Officer and/or Monitoring and Evaluation Officer typically holds the Project Assurance role on behalf of UNDP.

3.2 PROJECT DELIVERY AND ADMINISTRATION

3.2.1 Project Delivery

79. The project will be delivered on the ground via the MONRE and MAF through its subsidiary departments. In addition, collaboration with provincial governments, existing NGOs and local communities is expected.

3.2.2 Administration of EMSF

80. As the NDA and implementing agency, MONRE and MAF respectively will be responsible for responsible for the implementation of the EMSF via the delivery organisations.
81. The EMSF will be part of any tender documentation. The MONRE and MAF will be responsible for the revision or updates of this document during the course of work. It is the responsibility of the person to whom the document is issued to ensure it is the most up to date version.
82. The UNDP, MONRE and MAF are accountable for the provision of specialist advice on environmental and social issues to the delivery organisations (eg contractors and/or NGOs) and for environmental and social monitoring and reporting. The MONRE and MAF and/or its/their delegate will assess the environmental and social performance of the delivery organisations (eg contractors) in charge of delivering each component throughout the project and ensure compliance with the EMSF. During operations the delivery organisations will be accountable for implementation of the EMSF. Personnel working on the projects have accountability for preventing or minimising environmental and social impacts.



83. The Field Officer will be responsible for daily environmental inspections of the project/construction site. The MONRE or its delegate will cross check these inspections by undertaking monthly audits.
84. The delivery organisation eg contractor will maintain and keep all administrative and environmental records, which would include a log of complaints together with records of any measures taken to mitigate the cause of the complaints.
85. The delivery organisation will be responsible for the day to day compliance of the EMSF.

3.2.3 Environmental procedures, site and activity-specific work plans/instructions

86. Environmental procedures provide a written method describing how the management objectives for a particular environmental element are to be obtained. They contain the necessary detail to be site or activity-specific and are required to be followed for all construction works. Site and activity-specific work plans and instructions are to be issued and will follow the previously successful work undertaking similar projects by the UNDP, GoL PDR, the MONRE and MAF.

3.2.4 Environmental incident reporting

87. Any incidents, including non-conformances to the procedures of the EMSF are to be recorded using an Incident Record and the details entered into a register. For any incident that causes or has the potential to cause material or serious environmental harm, the camp officer shall notify the National Project Coordinator as soon as possible. The delivery organisation/contractor must cease work until remediation has been completed as per the approval of MONRE and MAF.

3.2.5 Daily and weekly environmental inspection checklists

88. A daily environmental checklist is to be completed at each work site by the relevant camp officer and maintained within a register. A weekly environmental checklist is to be completed and will include reference to any issues identified in the daily checklists completed by the field officers. The completed checklist is to be forwarded to MONRE and MAF for review and follow-up if any issues are identified.

3.2.6 Corrective Actions

89. Any non-conformances to the EMSF are to be noted in weekly environmental inspections and logged into the register. Depending on the severity of the non-conformance, the camp officer may specify a corrective action on the weekly site inspection report. The progress of all corrective actions will be tracked using the register. Any non-conformances and the issue of corrective actions are to be advised to MONRE and MAF.

3.2.7 Review and auditing

90. The EMSF and its procedures are to be reviewed at least every two months by UNDP staff, MONRE and MAF. The objective of the review is to update the document to reflect knowledge gained during the course of project delivery/construction and to reflect new knowledge and changed community standards (values).
91. The EMSF will be reviewed and amendments made if:
 - a. there are relevant changes to environmental conditions or generally accepted environmental practices; or
 - b. new or previously unidentified environmental risks are identified; or
 - c. information from the project monitoring and surveillance methods indicate that current control measures require amendment to be effective; or
 - d. there are changes to environmental legislation that are relevant to the project; or
 - e. there is a request made by a relevant regulatory authority; or



- f. any changes are to be developed and implemented in consultation with UNDP Staff, MONRE and MAF. When an update is made, all site personnel are to be made aware of the revision as soon as possible eg through a tool box meeting or written notification.

3.3 TRAINING

92. Delivery organisations have the responsibility for ensuring systems are in place so that relevant employees, contractors and other workers are aware of the environmental and social requirements for construction, including the EMSF.
93. All project personnel will attend an induction that covers health, safety, environment and cultural requirements.
94. All workers engaged in any activity with the potential to cause serious environmental harm (e.g. handling of hazardous materials) will receive task specific environmental training.

4 COMMUNICATION

4.1 PUBLIC CONSULTATION AND ENVIRONMENTAL AND SOCIAL DISCLOSURE

95. The EMSF includes public consultation as part of the stakeholder engagement plan. The project was discussed with a wide range of stakeholders including relevant government departments, industry groups, NGOs, and individual community members and approved by Government. Extensive on-ground consultation has been undertaken during the design of the project (as well as during the earlier projects that this project is aiming to upscale) and it is expected that consultation with any affected communities will continue. It is anticipated that based on the communities' needs, the projects will be fully accepted.
96. The UNDP, MONRE and MAF will develop and release updates on the project on a regular basis to provide interested stakeholders with information on project status. Updates may be via a range of media eg print, radio, social media or formal reports. A publicized telephone number will be maintained throughout the project to serve as a point of contact for enquiries, concerns and complaints. All enquiries, concerns and complaints will be recorded on a register and the appropriate manager will be informed. All material must be published in English and Spanish.
97. Where there is a community issue raised, the following information will be recorded:
 - a. time, date and nature of enquiry, complaint or concern;
 - b. type of communication (e.g. telephone, letter, personal contact);
 - c. name, contact address and contact number;
 - d. response and investigation undertaken as a result of the enquiry, complaint or concern; and
 - e. actions taken and name of the person taking action.
98. Some enquiries, complaints and concerns may require an extended period to address. The complainant(s) will be kept informed of progress towards rectifying the concern. All enquiries, complaints and concerns will be investigated and a response given to the complainant in a timely manner. A grievance redress mechanism has been included in the ESMF to address any complaints that may not be able to be resolved quickly.
99. Nominated PMU/contractor staff will be responsible for undertaking a review of all enquiries, complaints and concerns and ensuring progress toward resolution of each matter.

4.2 COMPLAINTS REGISTER AND GRIEVANCE REDRESS MECHANISM

100. During the construction and implementation phases of any project, a person or group of people can be adversely affected, directly or indirectly due to the project activities. The grievances that may arise can be related to social issues such as eligibility criteria and entitlements, disruption of services, temporary or permanent loss of livelihoods and other social and cultural issues. Grievances may also be related to environmental issues such as excessive dust generation, damages to infrastructure due to construction related vibrations or transportation of raw material, noise, traffic congestions, decrease in quality or quantity of private/ public surface/ ground water resources during wetland rehabilitation, damage to home gardens and agricultural lands etc.
101. Should such a situation arise, there must be a mechanism through which affected parties can resolve such issues in a cordial manner with the project personnel in an efficient, unbiased, transparent, timely and cost-effective manner. To achieve this objective, a grievance redress mechanism has been included in EMSF for this project.
102. The project allows those that have a complaint or that feel aggrieved by the project to be able to communicate their concerns and/or grievances through an appropriate process. The Complaints Register and Grievance Redress Mechanism set out in this EMSF are to be used as part of the project



and will provide an accessible, rapid, fair and effective response to concerned stakeholders, especially any vulnerable group who often lack access to formal legal regimes.

103. While recognising that many complaints may be resolved immediately, the Complaints Register and Grievance Redress Mechanism set out in this EMSF encourages mutually acceptable resolution of issues as they arise. The Complaints Register and Grievance Redress Mechanism set out in this EMSF has been designed to:
- a. be a legitimate process that allows for trust to be built between stakeholder groups and assures stakeholders that their concerns will be assessed in a fair and transparent manner;
 - b. allow simple and streamlined access to the Complaints Register and Grievance Redress Mechanism for all stakeholders and provide adequate assistance for those that may have faced barriers in the past to be able to raise their concerns;
 - c. provide clear and known procedures for each stage of the Grievance Redress Mechanism process, and provides clarity on the types of outcomes available to individuals and groups;
 - d. ensure equitable treatment to all concerned and aggrieved individuals and groups through a consistent, formal approach that, is fair, informed and respectful to a complaint and/or concern;
 - e. to provide a transparent approach, by keeping any aggrieved individual/group informed of the progress of their complaint, the information that was used when assessing their complaint and information about the mechanisms that will be used to address it; and
 - f. enable continuous learning and improvements to the Grievance Redress Mechanism. Through continued assessment, the learnings may reduce potential complaints and grievances.
104. Eligibility criteria for the Grievance Redress Mechanism include:
- a. Perceived negative economic, social or environmental impact on an individual and/or group, or concern about the potential to cause an impact;
 - b. clearly specified kind of impact that has occurred or has the potential to occur; and explanation of how the project caused or may cause such impact; and
 - c. individual and/or group filing of a complaint and/or grievance is impacted, or at risk of being impacted; or the individual and/or group filing a complaint and/or grievance demonstrates that it has authority from an individual and or group that have been or may potentially be impacted on to represent their interest.
105. Local communities and other interested stakeholders may raise a grievance/complaint at all times to the MONRE and MAF. Affected local communities should be informed about the EMSF provisions, including its grievance mechanism and how to make a complaint.

4.2.1 Complaints register

106. A complaints register will be established as part of the project to record any concerns raised by the community during construction. Any complaint will be advised to the UNDP, MONRE and MAF within 24 hours of receiving the complaint. The complaint will be screened. Following the screening, complaints regarding corrupt practices will be referred to the UNDP for commentary and/or advice along with the MONRE and MAF.
107. Wherever possible, the project team will seek to resolve the complaint as soon as possible, and thus avoid escalation of issues. However, where a complaint cannot be readily resolved, then it must be escalated.
108. A summary list of complaints received and their disposition must be published in a report produced every six months.

4.2.2 Grievance Redress Mechanism

109. The Grievance Redress Mechanism has been designed to be problem-solving mechanism with voluntary good-faith efforts. The Grievance Redress Mechanism is not a substitute for the legal



process. The Grievance Redress Mechanism will as far as practicable, try to resolve complaints and/or grievances on terms that are mutually acceptable to all parties. When making a complaint and/or grievance, all parties must act at all times, in good faith and should not attempt to delay and/or hinder any mutually acceptable resolution.

110. In order to ensure smooth implementation of the Project and timely and effectively addressing of problems that may be encountered during implementation, a robust Grievance Redress Mechanism, which will enable to the Project Authorities to address the grievances of the stakeholders of the Project has been established.
111. All complaints regarding social and environmental issues can be received either orally (to the field staff), by phone, in complaints box or in writing to the UNDP, MONRE, MAF or the Construction Contractor. A key part of the grievance redress mechanism is the requirement for the project proponent and construction contractor to maintain a register of complaints received at the respective project site offices. All complainants shall be treated respectfully, politely and with sensitivity. Every possible effort should be made by the project proponent and construction contractor to resolve the issues referred to in the complaint within their purview. However, there may be certain problems that are more complex and cannot be solved through project-level mechanisms. Such grievances will be referred to the Grievance Redress Committee. It would be responsibility of the MONRE and MAF to solve these issues through a sound / robust process.
112. The Grievance Redress Mechanism has been designed to ensure that an individual and/or group are not financially impacted by the process of making a complaint. The Grievance Redress Mechanism will cover any reasonable costs in engaging a suitably qualified person to assist in the preparation of a legitimate complaint and/or grievance. Where a complaint and/or grievance is seen to be ineligible, the Grievance Redress Mechanism will not cover these costs.
113. Information about the Grievance Redress Mechanism and how to make a complaint must be placed at prominent places for the information of the key stakeholders.
114. The Safeguards officer in the PMU will be designated as the key officer in charge of the Grievance Redress Mechanism. The Terms of Reference for these positions (as amended from time to time) will have the following key responsibilities:
 - a. coordinate formation of Grievance Redress Committees before the commencement of constructions to resolve issues;
 - b. act as the focal point at the PMU on Grievance Redress issues and facilitate the resolution of issues within the PMU;
 - c. create awareness of the Grievance Redress Mechanism amongst all the stakeholders through public awareness campaigns;
 - d. assist in redress of all grievances by coordinating with the concerned parties;
 - e. maintain information on grievances and redress;
 - f. monitor the activities of the MONRE and MAF on grievances issues; and
 - g. prepare the progress for monthly/quarterly reports.
115. A two tier Grievance Redress Mechanism structure has been developed to address all complaints in the project. The first tier redress mechanism involves the receipt of a complaint at the Village Mediation Unit. The Village Mediation Units were initially established in 1997 under Lao PDR law through a Prime Minister Order (*Prime Minister Order on Establishing Village Management Unit Committee*) and Ministry of Justice Ministerial Decision. The stakeholders are informed of various points of making complaints (if any) and the PMU collect the complaints from these points on a regular basis and record them. This is followed by coordinating with the concerned people to redress the grievances. The Safeguards Officer of the PMU will coordinate the activities at the respective village level to address the grievances and would act as the focal point in this regard. The Chairperson (Deputy Village Chief) as a representative of the Village Mediation Units or in the absence of the



Chairperson, the Deputy Chair given the responsibility of this would coordinate with the Safeguards and Gender Manager of the PMU and the Village Administration Office, UNDP, MONRE and MAF in redressing the grievances. The designated officers of the Village Mediation Unit are provided with sufficient training in the procedure of redress to continue such systems in future.

116. The complaints can be made orally (to the field staff), by phone, in complaints box or in writing to the UNDP, the MONRE, MAF or the Construction Contractor. Complainants may specifically contact the Safeguards Officer and request confidentiality if they have concerns about retaliation. In cases where confidentiality is requested (i.e. not revealing the complainant's identity to UNDP, MONRE, MAF and/or the Construction Contractor). In these cases, the Safeguards Officer will review the complaint, discuss it with the complainant, and determine how best to engage project executing entities while preserving confidentiality for the complainant.
117. As soon as a complaint is received, the Safeguards Officer would issue an acknowledgement. The Community Development Officer receiving the complaint should try to obtain relevant basic information regarding the grievance and the complainant and will immediately inform the Safeguards Officer in the PMU.
118. The PMU will maintain a Complaint / Grievance Redress register at the provincial level. Keeping records collected from relevant bodies is the responsibility of PMU.
119. After registering the complaint, the Safeguards Officer will study the complaint made in detail and forward the complaint to the concerned officer with specific dates for replying and redressing the same. The Safeguards Officer will hold meetings with the affected persons / complainant and then attempt to find a solution to the complaint received. If necessary, meetings will be held with the concerned affected persons / complainant and the concerned officer to find a solution to the problem and develop plans to redress the grievance. The deliberations of the meetings and decisions taken are recorded. All meetings in connection with the Grievance Redress Mechanism, including the meetings of the Grievance Redress Committee, must be recorded. The Safeguards Officer for the Grievances Redress Mechanism will be actively involved in all activities.
120. A Community Project Implementation Committee (Village Mediation Unit) would be formed to oversee the first tier of the Grievance Redress Mechanism. The Community Project Implementation Committee would include:
 - a. the Deputy Village Chief as a representative of the village;
 - b. a representative of the Agriculture and Forest Office in the village;
 - c. a representative of Lao Women's Union in the village;
 - d. a representative of the Local Front in the village; and
 - e. an Ethnic Representative depending on the ethnicity of the complainant.
121. The resolution at the first tier will normally be completed within 15 working days and the complaint will be notified of the proposed response through a disclosure form. The resolution process should comply with the requirements of the Grievance Redress Mechanism in that it should, as far as practicable, be informal with all parties acting in good faith. Further, the Grievance Redress Mechanism should, as far as practicable, achieve mutually acceptable outcomes for all parties.
122. Should the grievance be not resolved within this period to the satisfaction of the complainant, the grievance will be referred to the next level of Grievance Redress Mechanism. If the social safeguard and gender officer feels that adequate solutions can be established within the next five working days, the officer can decide on retaining the issue at the first level by informing the complainant accordingly. However, if the complainant requests for an immediate transfer to the next level, the matter must be referred to the next tier. In any case, where the issue is not addressed within 20 working days, the matter is referred to the next level.



123. Any grievance related to corruption or any unethical practice should be referred immediately to the GoL PDR Anti-Corruption Inspection Department, the GoL PDR State Inspection Authority and the Office of Audit and Investigation within the UNDP in New York.
124. The Grievance Redress Committee formed at every district level would address the grievance in the second tier. A Grievance Redress Committee will be constituted for every district by the circulars issued by the Municipality by the circulars issued by the representative of the Local Authority (the Major), who would also be the Chairman of the Committee.
125. The Structure of the committee would be:
 - a. District Governor as Chairman;
 - b. District Agriculture and Forest Officer;
 - c. Relevant Village Chief;
 - d. Lao Women Union's district level representative; and
 - e. Safeguards Officer.
126. The Safeguard Officer from the PMU will coordinate with the respective District Governor in getting these Committees constituted for each District/Province and get the necessary circulars issued in this regard so that they can be convened whenever required.
127. The Terms of Reference for the Grievance Redress Committee are:
 - a. providing support to the affected persons in solving their problems;
 - b. prioritize grievances and resolve them at the earliest;
 - c. provide information to the PMU, MONRE and MAF on serious cases at the earliest opportunity;
 - d. Coordinate with the aggrieved person/group and obtain proper and timely information on the solution worked out for his/her grievance; and
 - e. study the normally occurring grievances and advise PMU, National and District Steering Committee on remedial actions to avoid further occurrences.
128. The Grievance Redress Committee will hold the necessary meetings with the aggrieved party/complainant and the concerned officer and attempt to find a solution acceptable at all levels. The Grievance Redress Committee would record the minutes of the meeting.
129. Grievance Redress Committee will communicate proposed responses to the complainant formally. If the proposed response satisfies the complainant, the response will be implemented and the complaint closed. In cases where a proposed response is unsatisfactory to the complainant, the Grievance Redress Committee may choose to revise the proposed response to meet the complainant's remaining concerns, or to indicate to the complainant that no other response appears feasible to the Grievance Redress Committee. The complainant may decide to take a legal or any other recourse if s/he is not satisfied with the resolutions due to the deliberations of the three tiers of the grievance redress mechanism.
130. In addition to the project-level and national grievance redress mechanisms, complainants have the option to access UNDP's Accountability Mechanism, with both compliance and grievance functions. The Social and Environmental Compliance Unit investigates allegations that UNDP's Standards, screening procedure or other UNDP social and environmental commitments are not being implemented adequately, and that harm may result to people or the environment. The Social and Environmental Compliance Unit is housed in the Office of Audit and Investigations, and managed by a Lead Compliance Officer. A compliance review is available to any community or individual with concerns about the impacts of a UNDP programme or project. The Social and Environmental Compliance Unit is mandated to independently and impartially investigate valid requests from locally impacted people, and to report its findings and recommendations publicly.



131. The Stakeholder Response Mechanism offers locally affected people an opportunity to work with other stakeholders to resolve concerns about the social and environmental impacts of a UNDP project. Stakeholder Response Mechanism is intended to supplement the proactive stakeholder engagement that is required of UNDP and its Implementing Partners throughout the project cycle. Communities and individuals may request a Stakeholder Response Mechanism process when they have used standard channels for project management and quality assurance, and are not satisfied with the response (in this case the project level grievance redress mechanism). When a valid Stakeholder Response Mechanism request is submitted, UNDP focal points at country, regional and headquarters levels will work with concerned stakeholders and Implementing Partners to address and resolve the concerns. Visit www.undp.org/secu-srm for more details. The relevant form is attached at the end of the EMSF in Annexure Two.



5 KEY ENVIRONMENTAL AND SOCIAL INDICATORS

132. This section identifies the key environmental and social indicators identified for the project and outlines respective management objectives, potential impacts, control activities and the environmental performance criteria against which these indicators will be judged (eg. audited).
133. This section further addresses the need for monitoring and reporting of environmental performance with the aim of communicating the success and failures of control procedures, distinguish issues that require rectification and identify measures that will allow continuous improvement in the processes by which the projects are managed.

5.1 CLIMATE

134. Lao PDR has a tropical monsoon climate, with a pronounced rainy season from May through October, a cool dry season from November through February, and a hot dry season in March and April. Generally, monsoons occur at the same time across the country, although that time may vary significantly.
135. The average temperatures are the coldest in January with temperatures in Luang Prabang of 20.5°C (minimum 0.8°C), Vientiane is 20.3°C (minimum 3.9°C) and Pakse is 23.9°C (minimum 8.2°C). April is the warmest month with average temperatures in Luang Prabang of 28.1°C (maximum 44.8°C), Vientiane (39.4°C) Temperatures vary according to altitude; there is an average drop of 1.7°C/300 metres). Temperatures in the upland plateau and in the mountains are considered lower than on the plains around Vientiane.
136. In December 2013 and January 2016, snow fell in northern Lao PDR. Snow had never been observed prior to December 2013. The area has also suffered from severe frosts in recent years which resulted in the loss of crops and large numbers of livestock died as a result of the very low temperatures.
137. Rainfall varies regionally, with the highest rainfall of 3,700mm/annum recorded on the Bolovens Plateau in Champasak Province. Rainfall stations in Savannakhét have recorded an average rainfall of 1,440mm/year; Vientiane receives about 1,700mm/year while Luang Prabang receives about 1,360mm/year. Rainfall is often inadequate for rice cultivation and the relatively high average precipitation conceals years where rainfall may be only half or less of the norm, causing significant declines in rice yields.
138. Figure 4, Figure 5, Figure 7 and Figure 6 show graphical representation of annual average temperature and rainfall for Luang Namtha, Luang Prabang, Savannakhét and Pakse over the last 30 years respectively. Table 4, Table 5, Table 7 and Table 6 provide tabular data of the same locations respectively over the last 30 years.

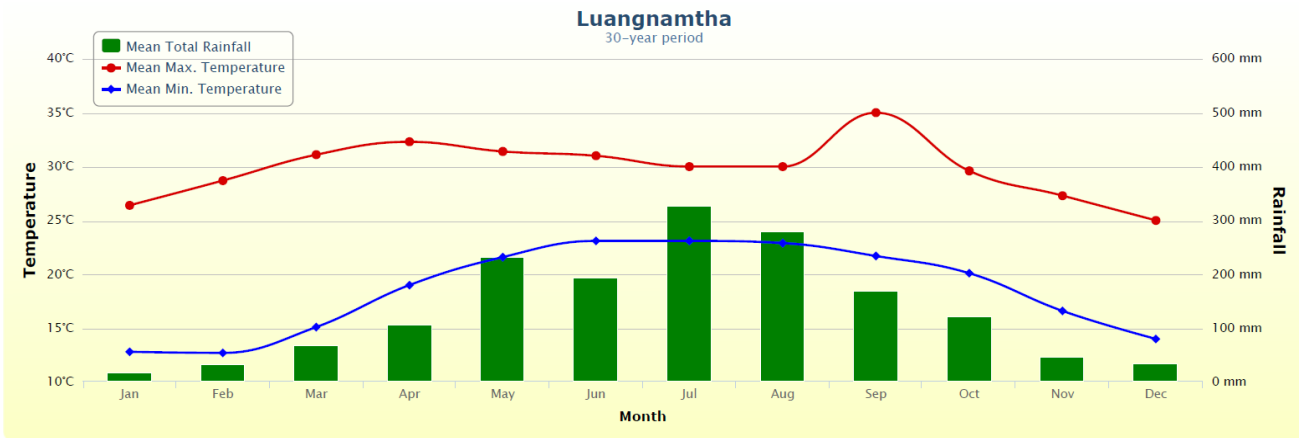


Figure 4 Graphical Data of Mean Minimum Temperature (°C), Mean Daily Maximum Temperature (°C) and Mean Total Rainfall (mm) for Luang Namtha

Table 4 Tabular Data of Mean Minimum Temperature (°C), Mean Daily Maximum Temperature (°C) and Mean Total Rainfall (mm) for Luang Namtha

Month	Mean Daily Minimum Temperature (°C)	Mean Daily Maximum Temperature (°C)	Mean Total Rainfall (mm)	Mean Number of Days of Rain
January	12.8	26.4	17	5
February	12.7	28.7	32.8	4
March	15.1	31.1	67.8	7
April	19	32.3	107	11
May	21.6	313.4	232.1	18
June	23.1	31	192.9	20
July	23.1	30	326	24
August	22.9	30	278.5	24
September	21.7	35	168.9	15
October	20.1	29.6	119.9	11
November	16.6	27.3	45.9	7
December	14	25	34.9	7

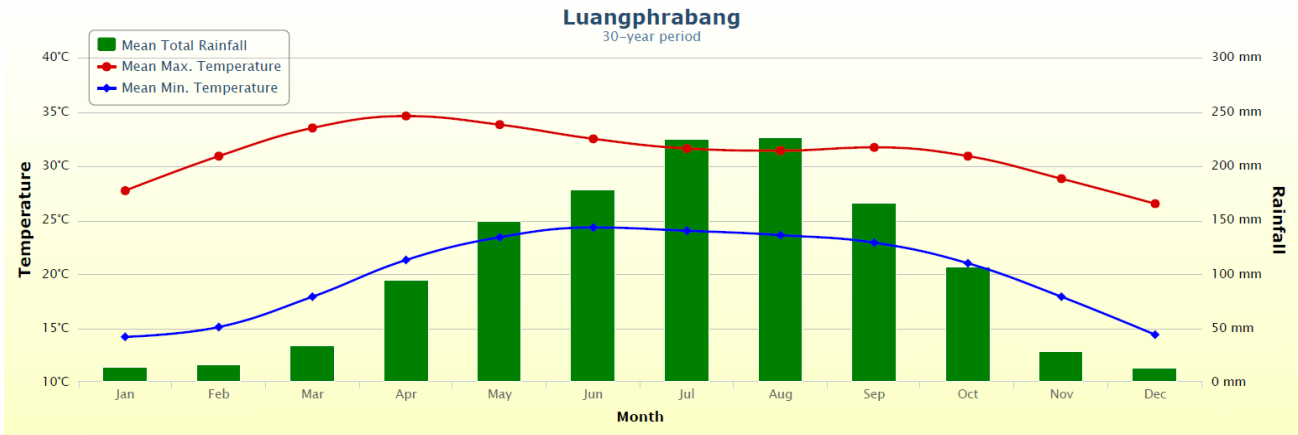


Figure 5 Graphical Data of Mean Minimum Temperature (OC), Mean Daily Maximum Temperature (OC) and Mean Total Rainfall (mm) for Luang Prabang

Table 5 Tabular Data of Mean Minimum Temperature (°C), Mean Daily Maximum Temperature (°C) and Mean Total Rainfall (mm) for Luang Prabang

Month	Mean Daily Minimum Temperature (°C)	Mean Daily Maximum Temperature (°C)	Mean Total Rainfall (mm)	Mean Number of Days of Rain
January	14.2	27.7	13.5	1
February	15.1	30.9	16.1	3
March	17.9	33.5	33.7	4
April	21.3	34.6	94.1	9
May	23.4	33.8	149.2	15
June	24.3	32.5	177.3	15
July	24	31.6	223.8	19
August	23.6	31.4	226.5	20
September	22.9	31.7	165.8	14
October	21	30.9	107	9
November	17.9	28.8	28.2	4
December	14.4	26.5	13	1

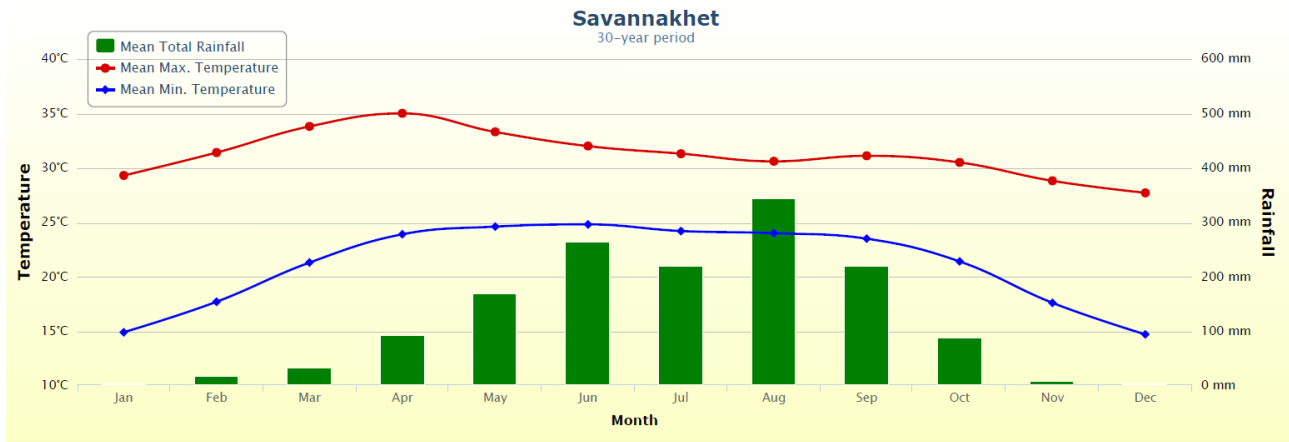


Figure 6 Graphical Data of Mean Minimum Temperature (OC), Mean Daily Maximum Temperature (OC) and Mean Total Rainfall (mm) for Savannakhet

Table 6 Tabular Data of Mean Minimum Temperature (°C), Mean Daily Maximum Temperature (°C) and Mean Total Rainfall (mm) for Savannakhet

Month	Mean Daily Minimum Temperature (°C)	Mean Daily Maximum Temperature (°C)	Mean Total Rainfall (mm)	Mean Number of Days of Rain
January	14.9	29.3	3.7	1
February	17.7	31.4	17.3	3
March	21.3	33.8	31.9	3
April	23.9	35	90.8	7
May	24.6	33.3	168.3	14
June	24.8	32	262.5	16
July	24.2	31.3	219	18
August	24	30.6	343.4	19
September	23.5	31.1	219	14
October	21.4	30.5	86.6	8
November	17.6	28.8	6.8	2
December	14.7	27.7	2.4	1

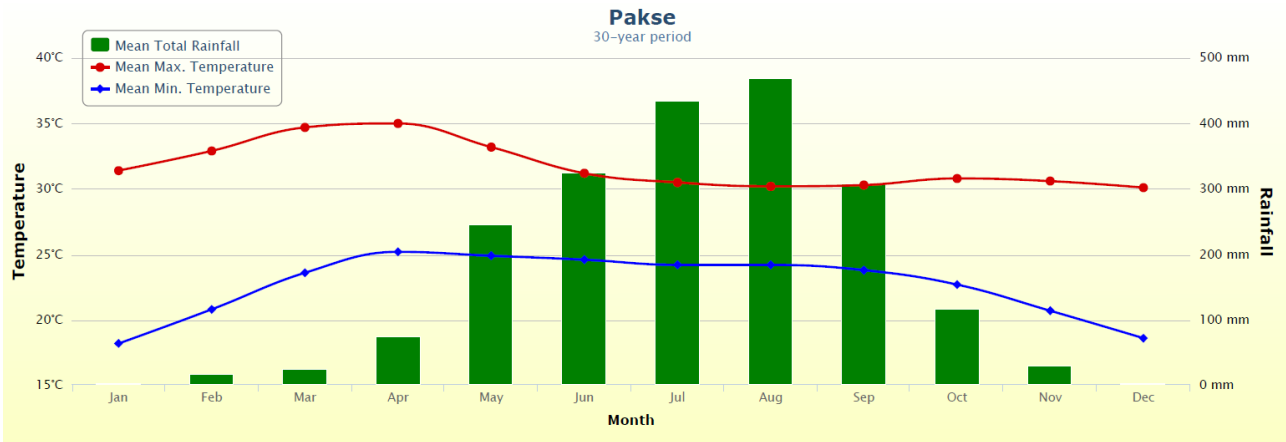


Figure 7 Graphical Data of Mean Minimum Temperature (°C), Mean Daily Maximum Temperature (°C) and Mean Total Rainfall (mm) for Pakse

Table 7 Tabular Data of Mean Minimum Temperature (°C), Mean Daily Maximum Temperature (°C) and Mean Total Rainfall (mm) for Pakse

Month	Mean Daily Minimum Temperature (°C)	Mean Daily Maximum Temperature (°C)	Mean Total Rainfall (mm)	Mean Number of Days of Rain
January	18.2	31.4	1.8	0
February	20.8	32.9	16.3	1
March	23.6	34.7	25	4
April	25.2	35	75.2	9
May	24.9	33.2	245	18
June	24.6	31.2	323.6	22
July	24.2	30.5	433.6	24
August	24.2	30.2	467.5	25
September	23.8	30.3	308.7	20
October	22.7	30.8	115.9	14
November	20.7	30.6	29.8	5
December	18.6	30.1	2	1



5.2 ECOLOGY

5.2.1 Background

139. Lao PDR has high biodiversity including World Heritage sites and RAMSAR wetlands.
140. Lao PDR's significant forests support extensive wildlife. The northern areas of Lao PDR contain tropical rain forests made up of broad leafed evergreens and monsoon forests of mixed evergreen. In the southern areas of Lao PDR, the area contains deciduous trees.
141. In the monsoon forest, the ground is covered with tall, coarse grass. The trees predominantly only reach their secondary growth. Typically there is an abundance of bamboo, scrub, and wild banana. Lao PDR is also home to hundreds of species of orchids and palms.
142. Wildlife in Lao PDR includes about 200 species of mammals, similar numbers of reptiles and amphibians, and about 700 varieties of birds. Common mammals include gaurs (wild oxen), deer, bears, and monkeys. Endangered animals include elephants, rhinoceroses, tigers, several types of wild oxen, monkeys, and gibbons (see below). Several species, such as the Asian elephant, red panda, giant Mekong catfish, tiger, and clouded leopard are at risk as more land, forests, and mines rich in resources are sold off to neighbouring countries.
143. The International Union for Conservation of Nature and Natural Resources (IUCN) Red List of indicates there are 165 species of animals and 30 species of plants in Lao PDR that are classified as critically endangered (CR), endangered (EN) or vulnerable (VU).
144. Snakes, skinks, frogs, and geckoes are abundant. Warblers, babblers, woodpeckers, thrushes, and large raptors inhabit the canopy and floor of the forest. Numerous of birds live in the lowlands. Lastly, several of Laos's birds are threaten including most hornillo, ibises, and storks.
145. Lao PDR has a relatively large population and high diversity of gibbons, second only to Indonesia, with six different species. Lao PDR is home to the highly threatened genus of crested gibbons, *Nomascus*. Among those found in Lao PDR, the western black crested gibbon *Nomascus concolor* is classified as Critically Endangered in the IUCN Redlist of Threatened Species and the southern and northern white-cheeked gibbons *Nomascus siki* and *Nomascus leucogenys* are classified as Endangered and Critically Endangered, respectively. Little information is available about the southern white-cheeked gibbon 'spopulations, habitat and distribution.

5.2.2 National Biodiversity Conservation Areas

146. National Biodiversity Conservation Areas (NBCA) are protected area in Lao PDR. There are also a number of Important Bird Area (IBAs). There are 21 different NBCAs, protecting 29,775km². Another ten NBCAs have been proposed, many of them being treated by GoL PDR as though they were already officially protected. Figure 8 shows the NBCAs and IBAs in Lao PDR.

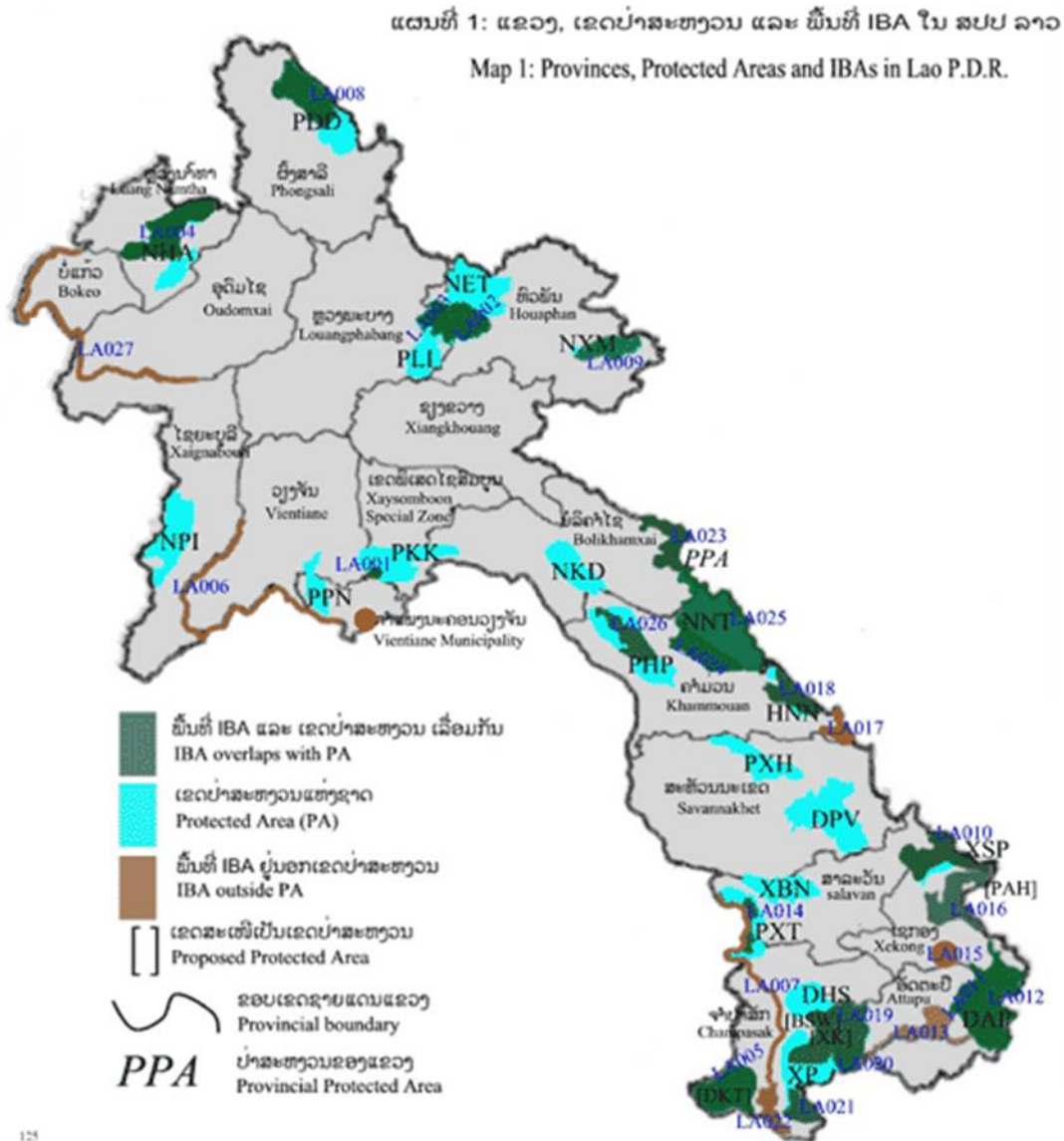


Figure 8 Protected Areas and Important Bird Area in Lao PDR

5.2.3 Oudomxay Province

147. Vegetation in Oudomxay is rich by virtue of the monsoon climate. Several kinds of bamboo and a broad range of plants (including orchids) are found in the region. Hardwoods like teak and mahogany trees grow in Oudomxay are important sources of income for the population.

148. There are a number of NBCAs and other protected areas in Oudomxay. These include for example the Upper Lao Mekong Important Bird Area (IBA). The IBA is 10,980 hectares² and spans the provinces of Oudomxai, Bokeo, and Sainyabuli. The IBA is located between 300–400 metres above sea level. Within the IBA, are river channels with exposed beds, sandbars, sand and gravel bars during the dry season. The geology of the OBA includes rock outcrops covered with vegetation. Avian species observed in the IBA include Black-bellied Tern *Sterna acuticauda*, Great Cormorant *Phalacrocorax carbo*, Grey-headed Lapwing *Vanellus cinereus*, Jerdon's Bushchat *Saxicola jerdoni*, Plain Martin



Riparia paludicola, River Lapwing *Vanellus duvaucelii*, Small Pratincole *Glareola lactea*, and Swan Goose *Anser cygnoides*.

5.2.4 Houaphanh Province

149. The Nam Et-Phou Louey NBCA and the Nam Xam NBCA are located in Houaphanh province. There are also a number of IBAs within the province.
150. The Nam Neun IBA area of Nam Et is adjacent to the NBCA. Nam Neun NBCA is 85,450 hectare², and is located at an altitude of 800–1,500 metres above sea level. The habitat is characterised as mixed deciduous and dry evergreen forest, with stands of bamboo and conifers. Cleared areas have been replaced by secondary grassland. Key avifauna include great hornbill *Buceros bicornis* and Blyth's kingfisher *Alcedo hercules*.
151. The Phou Louey Massif IBA is within the Nam Et-Phou Louey NBCA and adjacent to the Nam Neun IBA. The Phou Louey IBA stretches beyond Houaphanh Province into Luang Prabang Province. It is 60,070 hectares², and situated at an altitude of 700–1,800 metres above sea level. The habitat is characterised as mixed deciduous forest, semi-evergreen forest, with lower and upper montane evergreen forest and secondary grassland. Key avifauna includes beautiful nuthatch *Sitta formosa*, rufous-necked hornbill *Aceros nipalensis*, Blyth's kingfisher *Alcedo hercules*, and yellow-vented warbler *Phylloscopus cantator*. There are four confirmed species of turtles and two confirmed species of ungulate.
152. The Nam Xam IBA is within the 70,000 hectares² Nam Xam NBCA. The IBA's altitude varies between 300–1,800 metres above sea level. The topography is characterised by hills and low mountains. The habitat includes dry evergreen forest, Fokienia forest, mixed deciduous forest, and stunted, mossy upper montane forest. Key avifauna includes beautiful nuthatch *Sitta formosa*, brown hornbill *Anorrhinus tickelli*, great hornbill *Buceros bicornis*, red-collared woodpecker *Picus rabieri*, and rufous-necked hornbill *Aceros nipalensis*.

5.2.5 Savannekhet

153. Savannekhet province has a number of important protected areas including two RAMSAR wetlands, these being:
154. Beung Kiat Ngong Wetlands; and
155. Xe Champhone Wetlands.
156. Figure 9 shows the location of the RAMSAR Wetlands in Lao PDR.



Figure 9 RAMSAR Wetlands in Lao PDR

157. Important protected areas within Savannekhet province include the Xe Bang Nouan NBCA in the south, Dong Phou Vieng National Protected Area to the southeast, and Phou Xang He National Protected Area to the north. Phou Xang He has rocky mountain ranges, and is known for the local Puthai culture. The Dong Phou Vieng is known for its ancient forest with tall vegetation, a sacred lake and That Ing Hang Stupa. The area is also known for endangered Eld's deer, silver langurs and hornbills which are rarely found in other reserves.

5.2.6 Salavan province

158. There are a number of important protected areas in Salavan Province. A brief discussion of these is provided below.

159. The Xe Sap IBA is situated within the Xe Xap NBCA. The IBA covers an area of 113,000 hectares² across two provinces, Salavan and Sekong. The IBA is located at an altitude of 400–2,100 metres above sea level. The habitat includes dry evergreen forest, pine forest, semi-evergreen forest, upper montane forest, and grassland. Two species of gymnosperm are known to occur, these being *Fokienia hodginsii* and *Pinus dalatensis*. Its avifauna includes Blyth's kingfisher *Alcedo hercules*, yellow-billed nuthatch *Sitta solangiae*, and crested argus *Rheinardia ocellata*. There are several mammal species including two primates. One turtle species has also been observed in the NBCA.

160. The Mekong Channel from Phou Xiang Thong to Siphandon IBA is 34,200 hectares². Approximately 10,000 hectares² overlap with the Phou Xiangthong NBCA, an area of 120,000 hectares². The IBA encompasses two provinces, Salavan and Champasak. The IBA's altitude is 40–50 metres above sea level. Its topography is characterised by earth banks, rocky banks, rocky islands, seasonally flooded sandbars, low vegetated islands, rocky islets, sandy beaches, and sand bars. Avifauna includes the last known nesting site of little terns *Sternula albifrons*; small pratincoles *Glareola lactea*, river lapwings *Vanellus duvaucelii*, wire-tailed swallows *Hirundo smithii*, and river terns *Sterna aurantia*.



161. The Phou Xiang Thong IBA (36,650 hectare²) is situated within the Phou Xiengthong NBCA. The IBA encompasses two provinces, Salavan and Champasak. The IBA is located at an altitude of 40–500 metres above sea level. Its topography is characterised by low hills, lowlands, rivers, and seasonal streams. Its habitat contains dry deciduous tropical forest, moist deciduous tropical forest, semi-evergreen tropical rain forest, mixed deciduous forest, dry dipterocarp forest, and open rocky savanna. Important avifauna includes Siamese fireback *Lophura diardi*, red-collared woodpecker *Picus rabieri*, green peafowl *Pavo muticus*, and grey-faced tit babbler *Macronous kelleyi*.
162. The Xe Bang Nouan Protected Area covers an area of 1260 km², and extending over Salavan and Savanakheth provinces. The topography of the reserve lies in the elevation range of 200-1000 metres above sea level. The area has flat to gently rolling terrain below 400 metre elevation in the north and south of the Bang Nouan River; the central part the river flows through gorges; and to the east of the hills is the wide valley of the river. The forests found are the evergreen, dry dipterocarp, mixed deciduous and other natural forest types, and about 87% of the area of the reserve is forested. Forest products of damar, fish and sticklac are exploited by the ethnic population living in the reserve for economic sustenance; they also have livestock and shifting cultivation practices.
163. It is not anticipated that any of the project will be undertaken in any of these sensitive locations.

5.2.7 Performance Criteria

164. The following performance criteria are set for the works undertaken as part of the project:
- no clearance of vegetation outside of the designated clearing boundaries;
 - revegetate areas as soon as practicable after all works;
 - no death to native fauna as a result of clearing and rehabilitation activities;
 - no deleterious impacts on aquatic environments and terrestrial habitats;
 - no introduction of new weed species as a result of project activities; and
 - no increase in existing weeds and/or proliferation within or outside of any project footprint as a result of construction activities.

5.2.8 Monitoring

165. A flora and fauna monitoring program will be implemented (Table 8).
166. Weed monitoring will be undertaken and appropriate action taken in the event of alien or noxious species being identified.
167. The delivery organisation will when undertaking works, compile a weekly report to MONRE and MAF outlining:
- any non-conformances to this EMSF;
 - the areas that have been rehabilitated during the preceding week; and
 - details of the corrective action undertaken.

5.2.9 Reporting

168. All flora and fauna monitoring results and/or incidents will be tabulated and reported as outlined in the EMSF. The MONRE and MAF must be notified in the event of any suspected instances of death to native fauna and where vegetation is detrimentally impacted.

Table 8 Flora and Fauna Management Measures

Issue	Control Activity (and Source)	Action Timing	Responsibility	Monitoring and Reporting
FF1. Habitat loss and disturbance of fauna	FF1.1 Limit vegetation clearing and minimise habitat disturbance through adequate protection and management of retained vegetation.	During construction	Camp officer	Daily and maintain records
	FF1.2: Minimise noise levels and lighting intrusion throughout works in the vicinity of any sensitive locations.	During construction	Camp officer	Daily and maintain records
	FF1.3: Ensure that all site personnel are made aware of sensitive fauna/habitat areas and the requirements for the protection of these areas.	During construction	Contractor	Daily and maintain records
	FF1.4 Minimise disturbance to on-site fauna and recover and rescue any injured or orphaned fauna during the project.	During construction	Contractor	Daily and maintain records, report
	FF1.5 Where necessary and practicable, relocate native fauna where works are being undertaken to the closest protected area	During construction	Contractor	Daily and maintain records, report
	FF1.6 Where earthworks are undertaken, rehabilitate the site with local provenance vegetation that provides habitat for fauna	During and post construction	Contractor	Daily and maintain records, report
FF2. Introduced flora and weed species	FF2.1: Implement an EDSCP to reduce the spread of weeds through erosion and sediment entering any waterways and therefore spreading.	Pre and during construction	Contractor	Maintain records
	FF2.2: Revegetate disturbed areas using native and locally endemic species that have high habitat value.	During construction	Camp officer	As required and maintain records
	FF2.3: Minimise disturbance to mature remnant vegetation, particularly canopy trees.	During construction	Camp officer	Daily and maintain records
	FF2.4: Seed is to be weed free	Operation	Camp Officer	Maintain records

Issue	Control Activity (and Source)	Action Timing	Responsibility	Monitoring and Reporting
FF2. Introduced flora and weed species	FF2.5: Small trees and shrubs shall be removed in preference to large trees.	During construction	Site Supervisor	Daily and maintain records
	FF2.6: Environmental weeds and noxious weeds within the project footprints shall be controlled.	During and post construction	Camp officer	Weekly and maintain records

5.3 GROUNDWATER

5.3.1 Background

169. Groundwater is considered a generally untapped resource in Lao PDR; however, there is very little understanding and/or monitoring of groundwater quality and quantity, even though it is the main source of rural water supply. There is no systematic or national approach to defining the ground water resource which means using groundwater for water supply is often a high risk option.
170. A number of studies have been undertaken in relation to groundwater including by the Interim Mekong Committee (1986) which observed that Lao PDR was divided into two geological areas: the Annamian Strata
171. Within these areas, there are three different aquifer systems:
172. The Annamian aquifers occur randomly. These are systems that discharge locally to the river or its tributaries. The aquifers are not part of the regional flow system and will not carry pollution into the regional groundwater system. Water quality is reasonably good and for the most part potable; however it is known to be iron rich. Yields are up to 5 litres/second;
173. The Indosinian group of aquifers, which have regional flow, includes rock of the Indonesian Moyennes and Superieures. These systems are relatively young. They are mostly freshwater sediments, although there are horizons of brackish water, and one major zone of saline water. Yields are up to 12-24 litres/second; and
174. The alluvial aquifers associated with the sedimentary deposits of the Mekong River are not rated highly as aquifers.
175. One of the only regional assessments of groundwater potential is a study in Champassack and Saravane provinces funded by JICA. There are, however, studies and use of groundwater at specific locations for urban water supply purposes, and several hundred wells have been drilled throughout the country mainly for rural supply. Information relating to drilled wells for rural water supply generally includes a location sketch, depth of the wells, type of pump and ground water level. Geological logging and yields tests are only occasionally undertaken, and where they are, they are often not reliable.
176. It is unlikely that the project will interact with groundwater given the project will not extract any groundwater and moreover, any earthworks will be to a maximum depth of four (4) metres.

5.3.2 Performance Criteria

177. The following performance criteria are set for the project:
- no significant decrease in the quality and quantity of groundwater as a result of construction and operational activities in proximity to the project; and
 - effective implementation of site-specific EDSCPs and other measures to protect groundwater.
178. By following the management measures set out in the EMSF the project will not have a significant impact on water quality across the broader area.

5.3.3 Monitoring

179. Refer to Table 9 for the monitoring requirements for groundwater.
180. During the project, groundwater quality should be assessed initially and then at least every two months. Initial assessment should cover a wide range of parameters (eg depth to water, pH, DO, conductivity, nitrates, phosphates, faecal coliforms, heavy metals, turbidity, hydrocarbons) to provide a baseline and to confirm suitability for intended use. Subsequent monitoring parameters will be determined on need.
181. Ongoing monitoring should form part of the operation of the boreholes.

5.3.4 Reporting

182. All groundwater quality monitoring results and/or incidents will be tabulated and reported as outlined in the EMSF. The MONRE and MAF must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to water quality is exceeded.

Table 9 Groundwater management measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring reporting	&
GW 1: Increase of gross pollutants, hydrocarbons, metals and other chemical pollutants into the groundwater environment.	GW1.1: Conduct regular surface and groundwater quality monitoring in locations where the groundwater has the potential to be impacted, including assessing the changes to groundwater quality.	All phase	Camp officer	,	
	GW1.2: Prevent contaminated surface water from entering aquifers via boreholes and wells, particularly during works on the boreholes and associated infrastructure - protect from runoff and flooding and keep surrounds clean.	All phases	All Personnel	Weekly	
	GW1.3: Designated areas for storage of fuels, oils, chemicals or other hazardous liquids should have compacted impermeable bases and be surrounded by a bund to contain any spillage. Refuelling to be undertaken in areas away from water systems.	All phase	All Personnel	Weekly with reporting to MONRE, MAF UNDP	
	GW1.4: Check all vehicles, equipment and material storage areas daily for possible fuel, oil and chemical leaks. Undertake refuelling at designated places away from water systems.	All phases	All Personnel	Daily and maintain records	
	GW1.5: Minimise the use of herbicides, pesticides and other chemicals and use only biodegradable herbicides that have minimal impact on water quality and fauna. Use only as per directions	All phases	All Personnel	Weekly reporting to MONRE, MAF and UNDP	

5.4 SURFACE WATER

5.4.1 Background

183. Lao PDR has rich surface/fresh water resources of good quality. Water is an essential part of the life and culture of Lao people, and contributes to the socio-economic development goals of the country. The welfare of Lao PDR is bound up with water and all development plans will depend on water resources in some way. The contribution of the water sector has been examined through water sub-sectors including but not limited to irrigation, hydro-power, navigation, fisheries, urban and rural water supply which are major users and the amount of water uses by these sub-sectors are being significantly increased.
184. The total of annual water flow in Lao PDR is estimated at 270 billion metres³, equivalent to 35% of the average annual flow of the whole Mekong Basin. The monthly distribution of the flow of the rivers in Lao PDR closely follows the pattern of rainfall. About 80% of rain occurs during the rainy season (May-October) and 20% in the dry season, from November to April. For some rivers in the central and southern parts of the country (particularly Se Bang Fai, Se Bang Hieng and Se Done) the flow in the dry season is less: around 10 - 15% of the annual flow. The rivers outside the Mekong Basin flow through Viet Nam into the South China Sea. These rivers are Nam Ma, Nam Sam, and Nam Neune. The limited information on these rivers restricts assessment of their potential.
185. Average annual rainfall ranges from 1,300mm/year in the northern valleys up to 3,700mm/year at higher elevations in the south. This corresponds to an annual rainfall of 434 billion m³, of which less than half is estimated to be runoff. Annual national supply of renewable fresh water is 270 billion m³, or about 600,000m³/person, while current demand is only 259m³/person. About 60% of urban population and 51% of rural population has access to clean water.
186. Water usage is predominantly agricultural 82%, followed by industrial 10%, and domestic 8%. Usages of other sectors are negligible. Water use in the agricultural sector includes irrigation, fisheries, plantations and livestock watering. In addition the water is used for hydro-power; Lao PDR has the potential to produce 26,500 megawatts of electricity. Currently only 5% of that capacity has been exploited.
187. The significant supply of water in Lao PDR, especially in the rainy season, provides good condition for water transport, industrial development and water supply.

5.4.2 Major Rivers

188. Besides the Mekong which makes up the border of Lao PDR with the other nations, the Nam Ou River is the longest in the northern region of Lao PDR. It originates at Ban Lantoug Gnai Village near the Lao-China border and flow to the south. It has a total length of 390 km to the confluent point with the Mekong River. The total drainage area is 25,000 km² covering Phongsaly province, one third of Udomxay province, and one haft of Loang Prabang province. The annual discharge is 12,276,964,800m³.
189. Nam Suang River is 150 km long and has its source near Ban Sopkok Village at 1,482 metres above sea level. The river flows in a south-west direction for about 50km; then turns west and finally south-west to enter the Mekong River. The drainage area is 5,800 km² with 76.4% of the catchment classified as mountainous, and 22.9% as hilly. The annual discharge is 3,654,076,320m³.
190. The Sebanghieng River is situated in the southern part of Lao PDR, and adjoins the Sebangfay basin which extends immediately to the north. The two basins are the largest basins of Lao PDR. The Sebanghieng originates in the Lao-Viet Nam borders at the elevations of 1,000 – 2,000 metres, flows westward with nine major tributaries, and then flows into the Mekong River at a point about 90km downstream of Savannaket Province. It has a length of about 3,442km. The total catchment area at the confluence with the Mekong is 21,516 km², and annual discharge is 15,673,392,000 m³.



191. Figure 10 shows the major rivers in Lao PDR.



Figure 10 Major Rivers in Lao PDR

5.4.3 Water Quality Issues

192. GoL PDR has already identified a number of issues related to waste and water pollution in major urban areas (residential density, hotels, hospitals and entertainments centres). In addition, water pollution from agricultural and industrial sectors, including mineral exploitation is of concern. This issue is becoming more obvious with the increase in these activities. However, the major concern is the degradation of natural water and water catchments from sedimentation, land erosion, and vegetation clearing. Additionally, the use of unregulated chemicals has had a significant impact on water ways.
193. In urban areas, pollutants from roads, commercial and industrial areas and private properties wash into drains and watercourses. Litter, dust and dirt, oil and grease, particles of rubber compounds from tyres, particles of metal, glass and plastic from vehicles and lead are common pollutants. Residential properties and open spaces contribute sediments and nutrients. Urban drains also act as secondary sewers carrying industrial discharges, septic tank seepage and overflows during wet weather.
194. Generally, there is a lack of environmental water data in Lao PDR. However, recent research, mostly in the larger cities have been enlarged due to the increasing number of rural people immigrate to the cities,



couple with a lack of sufficient drainage system, the volume of domestic wastewater has been increased which drained to artificial and natural canals and to the low elevated areas such as wetlands without pre-treatment. As a result, some water bodies in and nearby cities have been polluted.

195. In general, the water quality of rivers within the Lao PDR, and the Mekong is considered to be good, based on international standards. The level of oxygen is high and the nutrient concentration is low. Sediment is the primary pollutant source affecting rivers. Sedimentation loads in tributaries vary considerably from 41 tonnes/km²/year to 345 tonnes/km²/year. Tributaries and river reaches with high sedimentation are the Sebanghieng, Sedone, Nam Ou, and the upper and lower stretches of the Mekong.
196. No specific baseline data has been collected for the specific districts where work is proposed; however, prior to the commencement of any works, baseline data will be collected to develop a suitable monitoring regime.

5.4.4 Performance Criteria

197. The following performance criteria are set for the construction of the projects:
- no significant decrease in water quality as a result of construction and operational activities;
 - water quality shall conform to any approval conditions stipulated by UNDP, MONRE, MAF and/or other government departments, or in the absence of such conditions follow a 'no worsening' methodology;
 - no offsite impact will occur; and
 - effective implementation of site-specific EDSCPs.

5.4.5 Monitoring

198. Having water of a quality that is fit for purpose is important. Water quality can affect plant growth, livestock health, soil quality, farm equipment and domestic use. The quality of a water source is also variable depending upon weather and external inputs.
199. Evaporation increases the concentrations of salts while a flush of water dilutes salts but may increase sediment and fertilisers, and manure or nutrient runoff. Further, there is the potential for impacts of mercury from soils.
200. Monitoring should be done regularly and more frequently in summer or in periods of prolonged moisture stress.
201. Table 10 outlines the monitoring required.

5.4.6 Reporting

202. All water quality monitoring results and/or incidents will be tabulated and reported as outlined in the EMSF. The MONRE, MAF must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to water quality is exceeded.

Table 10 Water Quality Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
W1: Elevated suspended solids and other contaminants in surface water systems.	W1.1: Develop and implement a site specific EDSCP to address drainage control, sediment and erosion controls and stockpiling of materials including soil during construction of all components of the projects. EDSCP measures to be inspected regularly to ensure all devices are functioning effectively.	Pre Earthworks	Camp officer	Initial set up and then as required with reporting to MONRE, MAF and UNDP
	W1.2: Designated areas for storage of fuels, oils, chemicals or other hazardous liquids should have compacted impermeable bases and be surrounded by a bund to contain any spillage. Refuelling to be undertaken in areas away from water systems.	All phases	All Personnel	Weekly with reporting to MONRE, MAF and UNDP
	W1.3: Conduct regular surface water quality monitoring in location where the surface water is likely to be impacted including assessing the changes to surface water quality.	All phases	Camp officer	Weekly and as required with reporting to MONRE, MAF and UNDP
	W1.4: Schedule works in stages to ensure that disturbed areas are revegetated and stabilised progressively and as soon as practicable after completion of works.	Avoid undertaking bulk earthworks during wet season	Camp officer MONRE and MAF	Maintain records
	W1.5: Construction materials will not be stockpiled in proximity to aquatic environment that may allow for release into the environment. Construction equipment will be removed from in proximity to the aquatic environment at the end of each working day or if heavy rainfall is predicted	All phases	Camp officer	Maintain daily records
	W1.6: Ensure all residual contaminated sediment is not released into the environment.	All phases	Camp officer	Maintain daily records

5.5 AIR QUALITY

5.5.1 Background

203. No specific air quality assessment has been undertaken in the development of this ESMF. Due to the limited urban development and heavy industry, it is assumed that environmental air quality is relatively good. The project areas are predominantly village or rural in character. Existing air quality reflects those environments, with dust being the main air quality nuisance. This is based on site observations during a number of field visits.

204. Any construction activities have the potential to cause air quality nuisance. There is limited construction except for the works being undertaken for the water retention ponds.

205. Workers involved in construction and operation activities should be familiar with methods minimising the impacts of deleterious air quality and alternative construction procedures as contained in GoL PDR laws, decrees or good international industry practice.

5.5.2 Performance Criteria

206. The following performance criteria are set for the construction of the projects:

- a. release of dust/particle matter must not cause an environmental nuisance;
- b. undertake measures at all times to assist in minimising the air quality impacts associated with construction and operation activities; and
- c. corrective action to respond to complaints is to occur within 48 hours.

5.5.3 Monitoring

207. A standardised air monitoring program has been developed for the projects (Table 11). The program is subject to review and update at least every two months from the date of issue. Importantly:

- a. the requirement for dust suppression will be visually observed by site personnel daily and by MONRE, MAF and UNDP staff when undertaking routine site inspections; and
- b. Vehicles and machinery emissions – visual monitoring and measured when deemed excessive.

5.5.4 Reporting

208. All air quality monitoring results and/or incidents will be tabulated and reported as outlined in the EMSF. The MONRE and MAF must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to air quality is exceeded.

Table 11 Air Quality Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
A.1 Increase in dust levels at sensitive receptors	A1.1: Implement effective dust management measures in all areas during design, construction and operation.	Pre and during construction	All Personnel	Daily and maintain records
	A1.2: Restrict speeds on roads and access tracks.	During construction	Camp officer	Daily and maintain records
	A1.3: Manage dust/particulate matter generating activities to ensure that emissions do not cause an environmental nuisance at any sensitive locations	During construction	Camp officer	Daily and maintain records
	A1.4: Construction activities should minimise risks associated with climatic events (check forecasts).	During construction	Camp officer	Daily and maintain records
	A1.5: Implement scheduling/staging of proposed works to ensure major vegetation disturbance and earthworks are minimised.	Entire construction	Contractor	Daily and maintain records
	A1.6: Locate material stockpile areas as far as practicable from sensitive receptors. Cover if appropriate.	During construction	Camp officer	Daily and maintain records
	A1.7: Source sufficient water of a suitable quality for dust suppression activities complying with any water restrictions.	During construction	Camp officer	Daily and maintain records
	A1.8: Schedule revegetation activities to ensure optimum survival of vegetation species.	During construction	Camp officer	Maintain records
	A1.9: Rubbish receptacles should be covered and located as far as practicable from sensitive locations	During construction	Camp officer	Maintain records

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
A2. Increase in vehicle / machinery emissions	A2.1 Ensure vehicles/machines are switched off when not in use.	During construction	Camp officer	Daily and maintain records
	A2.2 Ensure only vehicles required to undertake works are operated onsite.	During construction	Camp officer	Daily and maintain records
	A2.3 Ensure all construction vehicles, plant and machinery are maintained and operated in accordance with design standards and specifications.	During construction	Camp officer	Daily and maintain records
	A2.4 Develop and implement an induction program for all site personnel, which includes as a minimum an outline of the minimum requirements for environmental management relating to the site.	Pre and during construction	Contractor	Daily and maintain records
	A2.5 Locate construction vehicle/plant/equipment storage areas as far as practicable from sensitive locations.	During construction	Camp officer	Daily and maintain records
	A2.6 Direct exhaust emissions of mobile plant away from the ground.	During construction	Camp officer	Daily and maintain records

5.6 NOISE AND VIBRATION

5.6.1 Background

209. No specific noise assessment has been undertaken in the development of this ESMF. Due to the limited urban development and heavy industry, it is assumed that environmental noise is relatively low.
210. All construction and operation activities have the potential to cause noise nuisance. Vibration disturbance to nearby residents and sensitive habitats is likely to be caused through the use of vibrating equipment. Blasting is not required to be undertaken as part of this project.
211. The use of machinery or introduction of noise generating facilities could have an adverse effect on the environment and residents if not appropriately managed.
212. Contractors involved in construction activities should be familiar with methods of controlling noisy machines and alternative construction procedures as contained within specific GoL PDR legislation or in its absence, good international industry practice may be used if the legislation has not been enacted.
213. The detail, typical equipment sound power levels, provides advice on project supervision and gives guidance noise reduction. Potential noise sources during construction may include:
- excavation equipment for the removal of sediment and rehabilitation of water retention ponds;
 - delivery vehicles;
 - pumps; and
 - power tools and compressors.

5.6.2 Performance Criteria

214. The following performance criteria are set for the construction of the projects:
- noise from construction and operational activities must not cause an environmental nuisance at any noise sensitive place;
 - undertake measures at all times to assist in minimising the noise associated with construction activities;
 - no damage to off-site property caused by vibration from construction and operation activities; and
 - corrective action to respond to complaints is to occur within 48 hours.

5.6.3 Monitoring

215. A standardised noise monitoring program has been developed for the project (Table 12). The program is subject to review and update at least every two months from the date of issue. Importantly, the site supervisor will:
- ensure equipment and machinery is regularly maintained and appropriately operated; and
 - carry out potentially noisy construction activities during 'daytime' hours only.

5.6.4 Reporting

216. All noise monitoring results and/or incidents will be tabulated and reported as outlined in the EMSF. The MONRE and MAF must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to noise is exceeded

Table 12 Noise and Vibration Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring reporting &
N1: Increased noise levels	N1.1: Select plant and equipment and specific design work practices to ensure that noise emissions are minimised during construction and operation including all pumping equipment.	All phases	Contractor	Maintain records
	N1.2: Specific noise reduction devices such as silencers and mufflers shall be installed as appropriate to site plant and equipment.	Pre and during construction	Contractor	Maintain records
	N1.3 Minimise the need for and limit the emissions as far as practicable if noise generating construction works are to be carried out outside of the hours: 7am-5.30pm	Construction phase	All Personnel	Daily and maintain records
	N1.4: Consultation with nearby residents in advance of construction activities particularly if noise generating construction activities are to be carried out outside of 'daytime' hours: 7am-5.30pm.	Construction phase	All Personnel	Daily and maintain records
	N1.5 The use of substitution control strategies shall be implemented, whereby excessive noise generating equipment items onsite are replaced with other alternatives.	Construction phase	All Personnel	Daily and maintain records
	N1.6 Provide temporary construction noise barriers in the form of solid hoardings where there may be an impact on specific residents.	Construction phase	Camp officer	Daily and maintain records
	N1.7 All incidents complaints and non-compliances related to noise shall be reported in accordance with the site incident reporting procedures and summarised in the register.	Construction phase	Camp officer	Maintain records
	N1.8 The contractor should conduct employee and operator training to improve awareness of the need to minimise excessive noise in work practices through implementation of measures.	Pre and during construction	Contractor	Maintain records

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
N2. Vibration due to construction	N2.1: Identify properties, structures and habitat locations that will be sensitive to vibration impacts resulting from construction and operation of the project.	Pre and during construction	Contractor	Maintain records
	N2.2: Design to give due regard to temporary and permanent mitigation measures for noise and vibration from construction and operational vibration impacts.	Pre-construction	Contractor	Maintain records
	N2.3: All incidents, complaints and con-compliances related to vibration shall be reported in accordance with the site incident reporting procedures and summarised in the register.	Construction phase	Camp officer	Maintain records
	N2.4: During construction, standard measure shall be taken to locate and protect underground services from construction and operational vibration impacts.	Construction phase	Camp officer	Maintain records

5.7 EROSION, DRAINAGE AND SEDIMENT CONTROL

5.7.1 Topography, Geology and Soils

217. Lao PDR has the areas of 236,800km², the major part being mountainous and forested. Around 70% of its terrain is mountainous, 46% of total areas covers by forest. The Mekong River flows through 1,865km of Lao PDR territory and forms the major portion of the border with Thailand (1,835km).
218. The topography of Lao PDR is largely mountainous, with the Annamite Range in the northeast and east and the Luang Prabang Range in the northwest, among other ranges which are typically characterised by steep terrain. Elevations are typically above 500 metres with narrow river valleys and many areas of low agricultural potential. This mountainous landscape extends across most of northern Lao PDR, except for the plain of Vientiane and the Plain of Jars in the Xiangkhoang Plateau.
219. The southern "panhandle" of Lao PDR contains large fairly flat areas in Savannakhét and Champasak Provinces that is well suited for paddy rice cultivation and livestock raising. Much of Khammouan Province and the eastern part of all the southern provinces are mountainous. Together, the alluvial plains and terraces of the Mekong and its tributaries cover only about 20% of the land area.
220. The topography of Oudomxay for example, is very mountainous. Altitudes vary between 300–1,800 metres above sea level. Approximately 60 rivers flow through Oudomxay Province, including the Nam Phak, Nam Sae, Nam Beng, Nam Kor and Nam Nga. The Nam Kor flows through the province capital Muang Xay.
221. Only about 4% of the total land area of Lao PDR is classified as arable. The forested land area has declined significantly since the 1970s as a result of commercial logging and expanded swidden, or slash-and-burn, farming.
222. There are 3 agro-climatic zones based on topography, geology and soils in Lao PDR, these being:
223. the Mountainous North is a zone dominated by mountains over 1,000 metres and steep slopes with a moist to dry sub-tropical climate. The zone has an annual rainfall ranging between 1,500 - 2,500mm with a cooler dry season. The soils tend to be weak with generally low fertility because of heavy leaching and high acidic content. The soils have low water retention capacity and as a result are not well-suited to intensive cultivation practices. Shifting agriculture is characterised by "slash and burn" methods with fallow cycle;
224. the Hilly to Mountainous Regions in the Central and South exhibit elevations from between 500 - 1,000 metres, with some peaks over 2,000 metres. The region generally has more moderate slopes than those found in the north. The area is dominated by the southwest monsoon climate with bring heavy seasonal rainfall averaging annually 2,500 to 3,500mm. The soils are similar to those in the north except on the localised area of the Bolevens Plateau in the far south that has deep, well-structured and less acidic soils with the ability for good water retention and drainage; and
225. the Alluvial River Plains along the Mekong and its tributaries in the central and southern parts of Lao PDR where more than 50% of the population lives. These include the Vientiane Plain, a narrow plain in Bolikhamsay and Northern Khammouane Provinces, a larger plain of southern Khammouane and much of Savannakhét Provinces, and smaller plains located in the southern provinces of Champasak, Saravan and Attapeu. These are the most productive areas of Lao PDR, dominated by a moist tropical climate which brings an annual average rainfall ranging from 1,500 to 2,000mm.
226. The project will undertake activities across six provinces in Lao PDR. The project is unlikely to change the topography of the greater landscape. However, it has the potential to create very small spatial changes including the movement of sediment and soils for the works associated with the water retention ponds.

5.7.2 Performance Criteria

227. The following performance criteria are set for the project:
- no build-up of sediment in the aquatic environments and/or surface and/or groundwater as a result of construction and operation activities;
 - no degradation of water quality on or off site of all project;
 - all water exiting the project site and/or into groundwater systems is to have passed through best practice erosion, drainage and sediment controls;



- d. no soil to be moved off site that is contaminated; and
- e. effective implementation of site-specific EDSCP.

228. By following the management measures set out in the EMSF, construction and operation activities of the projects will not have a significant impact as a result of sedimentation across the broader area.

5.7.3 Monitoring

229. A standardised sediment control monitoring program has been developed for the projects (Table 13). The program is subject to review and update at least every two months from the date of issue. The camp officer will be required to:

- a. conduct site inspections on a weekly basis or after rainfall events exceeding 20mm in a 24 hour period;
- b. continually sample soils for potential contamination;
- c. develop a site-specific checklist to document non-conformances to this EMSF or any applicable EDSCPs; and
- d. communicate the results of inspections and/or water quality testing and ensure that any issues associated with control failures are rapidly rectified and processes are put in place to ensure that similar failures are not repeated.

5.7.4 Reporting

230. All sediment and erosion control monitoring results and/or incidents will be tabulated and reported as outlined in the EMSF. The MONRE and MAF must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to erosion and sediment control is exceeded.

Table 13 Erosion, Drainage and Sediment Control Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring reporting	&
E1: Loss of soil material and sedimentation to the surface and/or groundwater systems from site due to earthwork activities	E1.1: Develop and implement an EDSCP for any surface works, embankments and mechanical restoration work, water crossings and stormwater pathways.	Construction phase	All Personnel	Maintain records	
	E1.2: Ensure that erosion and sediment control devices are installed, inspected and maintained as required.	Construction phase	All Personnel	Maintain records	
	E1.3: Schedule/stage works to minimise cleared areas and exposed soils at all times.	Pre and during construction	Camp officer	Maintain records	
	E1.4: Incorporate the design and location of temporary and permanent EDSC measures for all exposed areas and drainage lines. These shall be implemented prior to pre-construction activities and shall remain onsite during work	Pre and during construction	Camp officer	Maintain records	
	E1.5: Schedule/stage proposed works to ensure that major vegetation disturbance and earthworks are carried out during periods of lower rainfall and wind speeds.	Pre and during construction	Camp officer	Maintain records	
	E1.6: Strip and stockpile topsoil for use during revegetation and/or place removed soils back on to agricultural lands.	Pre and during construction	Camp officer	Maintain records	
	E1.7: Schedule/stage works to minimise the duration of stockpiling topsoil material. Vegetate stockpiles if storage required for long periods.	During construction	All Personnel	Maintain records	
	E1.8: Locate stockpile areas away from drainage pathways, waterways and sensitive locations.	Pre and during construction	Camp officer	Maintain records	

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
E1: Loss of soil material and sedimentation to the surface and/or groundwater systems from site due to earthwork activities	E1.9: Design stormwater management measures to reduce flow velocities and avoid concentrating runoff.	All phases	Camp officer	Maintain records
	E1.10: Include check dams in drainage lines where necessary to reduce flow velocities and provide some filtration of sediment. Regularly inspect and maintain check dams.	Pre and during construction	Camp officer	Maintain records
	E1.11: Mulching shall be used as a form of erosion and sediment control and where used on any slopes (dependent on site selection), include extra sediment fencing during high rainfall.	During construction	All Personnel	Maintain records
	E1.12: Bunding shall be used either within wetlands or stream channels or around sensitive/dangerous goods as necessary.	During construction	All Personnel	Maintain records
	E1.13: Grassed buffer strips shall be incorporated where necessary during construction to reduce water velocity.	During construction	Camp officer	Maintain records
	E1.14: Silt fences or similar structures to be installed to protect from increased sediment loads.	During construction	Contractors	Maintain records
	E1.15: Excess sediment in all erosion and sediment control structures (eg. sediment basins, check dams) shall be removed when necessary to allow for adequate holding capacity.	During construction	Contractors	Maintain records
E2: Soil Contamination	E2.1: If contamination is uncovered or suspected including outside of the project footprints, undertake the relevant testing and conduct a Stage 1 preliminary site contamination investigation. The contractor should cease work if previously unidentified contamination is encountered and activate management procedures and obtain advice/permits/approval (as required).	Construction phase	All Personnel	Daily and maintain records

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
E2: Soil Contamination	E2.2: Adherence to best practice for the removal and disposal of contaminated soil/material from site (if required), including contaminated soil within the project footprints.	Construction phase	All Personnel	Daily and maintain records
	E2.3: Drainage control measures to ensure runoff does not contact contaminated areas (including contaminated material within the project footprints) and is directed/diverted to stable areas for release.	Construction phase	All Personnel	Daily and maintain records
	E2.4: Avoid importing fill that may result in site contamination and lacks accompanying certification/documentation. Where fill is not available through on site cut, it must be tested in accordance with geotechnical specifications.	Construction phase	All Personnel	Daily and maintain records
E3: Disposal of excess soil/silt	E3.4: Soil and silt removed from ponds during rehabilitation/maintenance is to be beneficially reused eg composted, returned to farm land for home gardens etc. Soil and silt should be tested to confirm suitability for proposed use	Construction and operation phases		Maintain records

5.8 WASTE MANAGEMENT

5.8.1 Background

231. As the NDA and implementing agency, the MONRE and MAF respectively, advocate good waste management practice. The preferred waste management hierarchy and principles for achieving good waste management is as follows:
- a. waste avoidance (avoid using unnecessary material on the projects);
 - b. waste re-use (re-use material and reduce disposing) including sediment from the rehabilitation of the wetlands and stream channels;
 - c. waste recycling (recycle material such as cans, bottles, etc.); and
 - d. waste disposal (all petruscible and/or contaminated waste to be dumped at approved landfills).
232. The key waste streams generated during project's activities are likely to include residual sediment, potential contaminated sediment and construction wastes such as:
- a. the excavated wastes unsuitable for reuse during earthworks;
 - b. any vegetation that might require remove to undertake earthworks;
 - c. wastes from construction equipment maintenance. Various heavy vehicles and construction equipment will be utilised for the duration of the project. Liquid hazardous wastes from cleaning, repairing and maintenance of this equipment may be generated. Likewise leakage or spillage of fuels/oils within the site needs to be managed and disposed of appropriately;
 - d. non-hazardous liquid wastes will be generated through the use of workers' facilities such as toilets; and
 - e. general wastes including scrap materials and biodegradable wastes.
233. Workers involved in activities should be familiar with methods minimising the impacts of clearing vegetation to minimise the footprint to that essential for the works and rehabilitate disturbed areas. By doing these activities, the projects should minimise the impact of waste generated by the project.

5.8.2 Performance Criteria

234. The following performance criteria are set for the construction of the projects:
- a. waste generation is minimised through the implementation of the waste hierarchy (avoidance, reduce, reuse, recycle);
 - b. no litter will be observed within the project area or surrounds as a result of activities by site personnel;
 - c. no complaints received regarding waste generation and management;
 - d. any waste from on-site portable sanitary facilities will be sent off site for disposal by a waste licensed contractor; and
 - e. waste oils will be collected and disposed or recycled off-site, local oil companies or shipped for recycling.

5.8.3 Monitoring

235. A waste management monitoring program has been developed for the projects (Table 14). The program is subject to review and update at least every two months from the date of issue.

5.8.4 Reporting

236. The MONRE and MAF as the NDA and implementing agency must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to waste is exceeded.

Table 14 Waste Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
WT1: Production of wastes and excessive use of resources	WT1.1: Preference shall be given to materials that can be used to construct the project that would reduce the direct and indirect waste generated.	Pre and during construction	Contractor	Maintain records
	WT1.2: Daily waste practices shall be carried out unless these are delegated to the activities of external waste management bodies.	During construction	Camp officer	Daily and maintain records
	WT1.3: The use of construction materials shall be optimised and where possible a recycling policy adopted.	During construction	Camp officer	Weekly and maintain records
	WT1.4: Separate waste streams shall be maintained at all times i.e. general domestic waste, construction and contaminated waste. Specific areas on site shall be designated for the temporary management of the various waste streams.	During construction	Camp officer	Weekly and maintain records
	WT1.5: Any contaminated waste shall be disposed of at an approved facility.	During construction	Camp officer	Weekly and maintain records
	WT1.6: Recyclable waste (including oil and some construction waste) shall be collected separately and disposed of correctly.	During construction	Camp officer	Weekly and maintain records
	WT1.7: Waste sites shall be sufficiently covered to ensure that wildlife does not have access.	During construction	Camp officer	Daily
	WT1.8: Disposal of waste shall be carried out in accordance with GoL PDR requirements.	During construction	Camp officer	Weekly and maintain records
	WT1.9: Fuel and lubricant leakages from vehicles and plant shall be immediately rectified.	During construction	Camp officer	Daily and maintain records

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
WT1: Production of wastes and excessive use of resources	WT1.10: Major maintenance and repairs shall be carried out off-site whenever practicable.	During construction	Camp officer	Weekly and maintain records
	WT1.11: Where possible, fuel and chemical storage and handling shall be undertaken at central fuel and chemical storage facilities, such as petrol stations.	During Construction	Camp officer	Daily and maintain records
	WT1.12: On-site storage of fuel and chemicals shall be kept to a minimum.	During Construction	Contractor	Daily, maintain records and report any incidents
	WT1.13: Any waste oils and lubricants are to be collected and transported to recyclers or designated disposal sites as soon as possible.	During Construction	Camp officer	Daily and maintain records
	WT1.14: Any dangerous goods stored on site shall be stored in accordance with GoL PDR regulations.	During Construction	Contractor	Daily and maintain records

5.9 SOCIAL MANAGEMENT

5.9.1 Background

237. Lao PDR is a least developed and a low-income food-deficit country, ranking 141th out of 188 countries on the 2014 Human Development Index. The 2015 Global Hunger Index for Lao PDR is 28.5, which place the country at the serious level of food insecurity. Significant challenges remain with respect to food security and nutrition, with an estimated 44% of under-five children stunted and 27% severely underweight.
238. Approximately 80% of the total population live in rural areas, where agriculture continues to employ over 75% of the population. Despite recent progress and rapid economic growth nationally, disparities exist among the provinces, with the northern upland provinces remaining among the poorest and most vulnerable. Country wide, the proportion of people living in poverty (below \$1.25/day) was 28% in 2013, down from 41% in 2003.
239. The six selected provinces present socio-economic vulnerability, directly linked to the remoteness of the geographic location, climate and topography, enhancing food insecurity. From a value chain perspective, households located in the more remote provinces use less fertilizer and the villages have more irrigation facilities, while the ones located in the lowlands rely more heavily on more fertilizers and mechanization (two-wheel tractor) with less irrigation facilities available. These input management practices are linked to the extent of road access to villages and are reflected in the rice production numbers, which are much higher in the lowland than in the upland production system, and generally complemented by a higher number and diversity of secondary crops. To compensate the lower crop diversity, households located in the uplands tend to own more livestock, such as local chickens, pigs, cattle and buffaloes.
240. In all 6 provinces, there are less than 50% of the villages that have access to credit facilities to support their livelihoods. While the percentage of stunting and underweight population is high in all six provinces, it is the highest in Phongsaly, Oudomxay and Houaphanh, where less than or close to 50% of the villages have a year-round access to markets, with 34%, 48% and 54% respectively. The poor literacy rates among women compared to men enhance women's vulnerability as they feel less comfortable to engage in the shift from subsistence agriculture to cash cropping, further increasing food insecurity.
241. Lao PDR is also one of South-East Asia's most ethnically diverse countries. The numerous ethnic groups are often distinguished into three categories according to the geographic areas they occupy: the lowland ethnic groups known as Lao Loum, the midland groups known collectively as the Lao Theung, and the highland groups, the Lao Sung. A more accurate classification is to divide them according to the four different language families to which they belong: Lao Tai, Mon-Khmer, Chinese-Tibetan and Hmong-Mien. An Ethnic Groups Planning Framework has been prepared as a separate document.
242. The project does not require involuntary resettlement and/or land acquisition although parts of the project may impact on land during construction activities which will be temporary in nature.

5.9.2 Performance Criteria

243. The following performance criteria are set for the project:
- the community has been consulted and project elements have been designed with their informed consultation and participation throughout the project;
 - all stakeholders are appropriately represented;
 - avoid adverse impacts to local community during construction and operations and where not possible, minimise, restore or compensate for these impacts;
 - cultural heritage is not adversely impacted (specific management plan provided for below);
 - community health and safety is protected and overall well-being benefits derived from the project;
 - complaint and grievance mechanisms are put in place and proactively managed; and
 - long-term social benefits are achieved.
244. Local stakeholders and community members have a key role to play in the implementation and monitoring of the project.



245. Consultation with stakeholders will continue throughout the life of the project. This will help ensure that stakeholders continue to be aware of the project, its progress and any changes in the project. It will also assist in identifying any issues as they arise.
246. MONRE and MAF will be responsible for advisory support and extensions services to local beneficiaries along with being responsible for distributing material inputs and providing technical training and backstopping in the implementation of programme activities.

5.9.3 Reporting

247. Records of all consultations are to be kept and reported on monthly basis.
248. The MONRE and MAF must be notified in the event of any individual or community complaint or dissatisfaction and ensure the Grievance Redress Mechanism is complied with.

Table 15: Social Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring reporting	&
SM1: Long-term conflict related to benefit sharing of water	SM 1.1: Carry out community consultation on the purpose and benefits of making changes to land use	Pre-construction	MONRE and MAF	Maintain records	
	SM 1.2: Get community buy-in on any change of land use	Pre-construction	MONRE and MAF E	Maintain records	
	SM 1.3: Ensure compliance with the Grievance Redress Mechanism process	All phases	MONRE and MAF	Maintain records	
SM2: Public nuisance caused by construction/operation activities (eg noise, dust etc)	SM 2.1: Carry out community consultation prior to undertaking activities	Pre-construction	MONRE and MAF	Maintain records	
	SM 2.2: Implement appropriate management plans (air, noise, EDSCP, and waste sections of the ESMF)	Construction and operation	Site supervisor, MONRE and MAF	Daily and maintain records	
	SM 2.3: Ensure compliance with the Grievance Redress Mechanism process	All phases	MONRE and MAF	Maintain records	
SM3: Water allocation conflict	SM 3.1: Carry out community consultation on agricultural water supply systems, purpose and management	Pre-construction	MONRE and MAF	Maintain records	
	SM 3.2: Develop a agricultural water supply management plan with agreed allocation sharing provisions	Pre-construction	MONRE and MAF	Maintain records	
	SM 3.3: Ensure compliance with the Grievance Redress Mechanism process	All phases	MONRE and MAF	Maintain records	

5.10 ARCHAEOLOGICAL AND CULTURAL HERITAGE

5.10.1 Background

249. Lao PDR has numerous important Archaeological and Cultural Heritage sites across the country. The below describes some of the important Archaeological and Cultural Heritage sites across the six provinces that are relevant to the project.

5.10.2 Phongsaly Province

250. There are a number of important Archaeological and Cultural Heritage sites in Phongsaly province. These include:

251. the Wat Ou-Tai Temple is in the Ban Ou- Tai village. It was built by Praya Chakkawattiraja and is about 500 years old. The Hor Thane Keo, inside the monastery, is a specific sanctum with Buddha images. This sanctum is built with mud and has numerous types of decorations retained in its original form. The wooden columns of the shrine are supported over on stone blocks; these also have been elegantly designed and painted with drawings of daggers, swords, flowers and flags, and all carved in wood. There is a shrine built in brick masonry within the monastery complex which is called “Ou Bo Sot” by the Tai Lue ethnic groups;

252. Wat Luang Ou-Neua Temple is an old and highly revered temple built about 500 years ago in Ban Ou Neua village. The temple has a double overlapping roof in the Lue architecture style and is very impressive. The temple is adorned with traditional fine art techniques and houses A large Buddha image and small Buddha statues are deified inside this temple; and

253. That Phou Xay Stupa is at the top of a hill, approached by walking up 400 steps.

5.10.3 Luang Namtha Province

254. There are a number of important Archaeological and Cultural Heritage sites in Luang Namtha province. These include:

255. Muang Sing was a garrison town in the past and a northern most outpost during the French colonial rule. Muang Sing was known as the centre of the Sipsongpana civilisation where the relics of old barracks and other colonial buildings could still be seen. The Sipsongpana people have shifted to Yunnan Province in the Southern China. There are many old temples of different styles, but a lot of them were destroyed during the war;

256. There are about 20 other temples in Muang Sing. Wat Sing Jai (or Wat Xieng Jai) is located behind the Muangsing Guest House. The monastery, painted in hues reminiscent of the Caribbean, has a museum, with items are of high local value;

257. Another major temple is the Wat Namkeo. The wihan in the town are typically multi-tiered roofed buildings typical of northern Lao PDR, but most houses have corrugated metal roofs and wooden beams, reflecting a lack of wealth in the area. The Buddhas are golden, and typically have large long earlobes, commonly seen in Xishuangbanna, China and Shan State of Myanmar; and

258. Luang Namtha Museum, also known as Luang Namtha Provincial Museum, is located in the capital city of Luang Namtha. Largely an anthropological museum, it contains numerous items related to local people such as ethnic clothing. Items include Khamu bronze drums, textiles, ceramics, tools, household utensils, hand-crafted weapons, and Buddhism-related items

5.10.4 Oudomnay Province

259. There are a number of important Archaeological and Cultural Heritage sites in Oudomnay province. These include:

260. Muang La is an important Buddhist pilgrimage for Theravada Buddhists in the province. Saymoungkhoun Rattana Stupa located here has a highly revered Buddha image, which is 400 years old and is reported to have supernatural powers; and

261. Chom Ong Cave is the longest and largest known cave in Lao PDR. It is located in Ban Chom Ong, 45km to the northwest of Oudomxay town. The cave was explored by a team of cave researchers during 2009, 2010 and 2011 and reported to be 18.4km long, the 9th longest in South East Asia. The average dimensions of the cave are 20–25 metres wide and 20–30 metres high. It has two passages, one is a stream and the other has fossils and both connect to a large hall which is 100 metres long, 30 metres



wide and of varying height of 30–50 metres. It has a stream inlet in the north and the stream outflows in the southern end. During the Indochina war, people of the village, who had till then kept the location of the cave a secret, had to use the cave as bomb shelter, and they thought that their prayers to Buddha had helped to protect them from the bombings. Hence, they named the cave as “Phachao Khamtan” or “Khamtan Buddha” Cave where 'Phachao' means "Buddha" and 'Khamtan' means "Valuable Protective Shield."

5.10.5 Houaphanh Province

262. There are a number of important Archaeological and Cultural Heritage sites in Houaphanh province. These include:
263. Viengxay is known as a "Hidden Cave City", the heart of the Pathet Lao Liberation Movement between 1964–75 where 20,000 people lived in the caves with all facilities such as offices, hospital, temples, markets, school, and entertainment centre;
264. Wat Pho Xai or Wat Pho Xaysanalam which is located on the outskirts of Sam Neua. Hintang Archaeological Park, is a UNESCO World Heritage Site. It is one of the most important pre-historic sites in northern Lao PDR. The site is about 2,000 years old with menhirs (standing stones) or megaliths. The site was found in 1931. Locals refer to it as Sao Hin Tang, meaning "Standing Stone Pillars". It is also known as the Stonehenge of Lao PDR, with many 2 metre high stones; and
265. The Nameuang Hot Springs is located amidst the valley of paddy fields on the way to Xamneua, where there is also a Houaiyad waterfall close. The springs are the source of a small river. In the Houaiyad Village, crashed aircraft parts and cans of war relics are recycled into belts.

5.10.6 Savanakhet Province

266. There are a number of important Archaeological and Cultural Heritage sites in Savanakhet province. These include:
267. The Wat Inghang Temple is located in the Ban Thad village. It was built approximately 2,000 years ago to commemorate a visit of Lord Buddha when he was the guest of King Sumitatham of the Sikhottabong Kingdom. King Saysethathirath had the temple remodelled it 1548. An annual festival is held here on the first full moon of the lunar calendar;
268. The Wat Xayaphoum temple in Xayaphoum village on the bank of the Mekong River was built in 1542 during the period. As the Buddhist centre and largest monastery in Lao PDR, its arts and architecture are dated to the earliest Savannakhet period;
269. Heuan Hin ("stone house") is a shrine in Ban Dongdokmay. It was built during the Khmer regime in honour of their Sikhottabong Kingdom. The stone house is located 15km from Xayphouthong District, and 66km from Khanthabuly; and
270. The That Phon Stupa was built between 557 to 700. The festival held here during the first full moon of the lunar calendar marks tribute to Phra Sghiva and some Hindu gods.
271. Given the nature of the project, there is unlikely to be any impact on archaeological heritage.

5.10.7 Performance Criteria

272. The following performance criteria are set for archaeological and cultural heritage issues related to the project:
- There will be no impact on any important Archaeological, Indigenous and/or Cultural Heritage sites;
 - Manage any specific sites of important Archaeological, Indigenous and/or Cultural significance (significant sites);
 - Where there is a mix of modern development and traditional areas within communities, undertake community engagement to confirm options of enabling future development as nominated by the participants and protecting culturally significant traditional areas. It is critical this include Indigenous Peoples;
 - Work with communities to differentiate between traditional areas of archaeological and cultural significance (uses and physical form) within each of the community areas during the construction phase of the project; and
 - Monitoring.



273. Local stakeholders and community members have a key role to play in the implementation and monitoring of the project.
274. Consultation with stakeholders will continue. This will help ensure that stakeholders continue to be aware of the project, its progress and any changes in the project. It will also assist in identifying any issues as they arise.
275. MONRE and MAF will be responsible for advisory support and extensions services to local beneficiaries along with being responsible for distributing material inputs and providing technical training and backstopping in the implementation of programme activities.

5.10.8 Reporting

276. Records of all consultations are to be kept and reported on monthly basis.

Table 16: Archaeological and Cultural Heritage

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
<p>CH1: Damage or disturbance to significant important Archaeological, Ethnic Groups and/or Cultural Heritage during the earth disturbances and other activities</p>	<p>CH1.1: Should any important Archaeological, Indigenous and/or Cultural Heritage sites, immediately cease work within the area that the site has been observed and consult with the relevant Museum/traditional owner groups, UNDP, MONRE, MAF and archaeologist available for implementation during construction.</p>	<p>Pre and during construction</p>	<p>Contractor</p>	<p>Daily, maintain records and immediately notify UNDP, MONRE, MAF of any find</p>

5.11 EMERGENCY MANAGEMENT MEASURES

277. In the event of actions occurring, which may result in serious health, safety and environmental (catastrophic) damage, emergency response or contingency actions will be implemented as soon as possible to limit the extent of environmental damage.

278. The delivery organisation will need to incorporate emergency responses into the project complying with the requirements under the Occupational, Health and Safety Policy of the delivery organisation and the relevant GoL PDR laws.

5.11.1 Performance Criteria

279. The following performance criteria are set for the construction of the projects:

- a. no incident of fire outbreak;
- b. no failure of water retaining structures;
- c. no major chemical or fuel spills;
- d. no preventable industrial or work related accidents;
- e. provide an immediate and effective response to incidents that represent a risk to public health, safety or the environment; and
- f. minimise environmental harm due to unforeseen incidents.

5.11.2 Monitoring

280. An emergency response monitoring program has been developed for the projects (Table 17). The program is subject to review and update at least every two months from the date of issue. Importantly, visual inspections will be conducted by camp officer daily with reporting to MONRE, MAF and UNDP staff on a weekly basis (minimum) noting any non-conformances to this EMSF.

5.11.3 Reporting

281. The MONRE, MAF and UNDP staff must be notified immediately in the event of any emergency, including fire or health related matter including those that have resulted in serious environmental harm.

Table 17 Emergency Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
E1. Fire and Emergency management and prevention strategies implemented	E1.1: Flammable and combustible liquids bunding/storage areas to be designed in accordance with appropriate international standards	Pre and during construction	Contractor	Daily and maintain records
	E1.2: Fire extinguishers are to be available on site	During construction	Contractor	Daily and maintain records
	E1.3: No open fires are permitted within the project area	During construction	Camp officer	Daily and maintain records
	E1.4: Communication equipment and emergency protocols to be established prior to commencement of construction activities.			
	E1.5: Train all staff in emergency preparedness and response (cover health and safety at the work site).	During construction	Camp officer	Daily and maintain records
	E1.6: Check and replenish First Aid Kits	During construction	Camp officer	Daily and maintain records
	E1.7: Use of Personal Protection Equipment	During construction	All Personnel	Daily and maintain records

6 BUDGET FOR ESMF IMPLEMENTATION

282. A budget has been prepared for the implementation of the ESMF as follows:

Item	Cost
ESMF Updating and Auditing	\$10,000
General ESMF Expenses	\$20,000
Ecological Monitoring (20 sites - two assessments/year over six years)	\$60,000
Water Quality Monitoring (monitoring to be undertaken over six years)	\$180,000
Water Quality Sample Laboratory Analysis (monitoring to be undertaken over six years)	\$60,000
Sediment Sample Field Testing (monitoring to be undertaken over six years)	\$90,000
Sediment Sample Laboratory Analysis (monitoring to be undertaken over six years)	\$90,000
Erosion, Drainage and Sediment Control (includes silt curtains etc)	\$60,000
Stakeholder Engagement and Ethnic Groups Workshops	\$120,000
Grievance Redress Mechanism	\$60,000
Total	\$750,000



ANNEXURE ONE: COMMUNITY CONSULTATION AND STAKEHOLDER ENGAGEMENT INFORMATION

Please see Annex VI (b-1) for Annexure One



ANNEXURE TWO: GUIDANCE FOR SUBMITTING A REQUEST TO THE SOCIAL AND ENVIRONMENTAL COMPLIANCE UNIT AND/OR THE STAKEHOLDER RESPONSE MECHANISM



*Empowered lives.
Resilient nations.*

Guidance for Submitting a Request to the Social and Environmental Compliance Unit (SECU) and/or the Stakeholder Response Mechanism (SRM)

Purpose of this form

- **If you use this form, please put your answers in bold writing to distinguish text**
- **The use of this form is recommended, but not required. It can also serve as a guide when drafting a request.**

This form is intended to assist in:

- (1) Submitting a request when you believe UNDP is not complying with its social or environmental policies or commitments and you believe you are being harmed as a result. This request could initiate a 'compliance review', which is an independent investigation conducted by the Social and Environmental Compliance Unit (SECU), within UNDP's Office of Audit and Investigations, to determine if UNDP policies or commitments have been violated and to identify measures to address these violations. SECU would interact with you during the compliance review to determine the facts of the situation. You would be kept informed about the results of the compliance review.

and/or

- (2) Submitting a request for UNDP "Stakeholder Response" when you believe a UNDP project is having or may have an adverse social or environmental impact on you and you would like to initiate a process that brings together affected communities and other stakeholders (e.g., government representatives, UNDP, etc.) to jointly address your concerns. This Stakeholder Response process would be led by the UNDP Country Office or facilitated through UNDP headquarters. UNDP staff would communicate and interact with you as part of the response, both for fact-finding and for developing solutions. Other project stakeholders may also be involved if needed.

Please note that if you have not already made an effort to resolve your concern by communicating directly with the government representatives and UNDP staff responsible for this project, you should do so before making a request to UNDP's Stakeholder Response Mechanism.

Confidentiality If you choose the Compliance Review process, you may keep your identity confidential (known only to the Compliance Review team). If you choose the Stakeholder Response Mechanism, you can choose to keep your identity confidential during the initial eligibility screening and assessment of your case. If your request is eligible and the assessment indicates that a response is appropriate, UNDP staff will discuss the proposed response with you, and will also discuss whether and how to maintain confidentiality of your identity.



Guidance

When submitting a request please provide as much information as possible. If you accidentally email an incomplete form, or have additional information you would like to provide, simply send a follow-up email explaining any changes.

Information about You

Are you...

1. A person affected by a UNDP-supported project?

Mark "X" next to the answer that applies to you: Yes: No:

2. An authorized representative of an affected person or group?

Mark "X" next to the answer that applies to you: Yes: No:

If you are an authorized representative, please provide the names of all the people whom you are representing, and documentation of their authorization for you to act on their behalf, by attaching one or more files to this form.

3. First name:

4. Last name:

5. Any other identifying information:

6. Mailing address:

7. Email address:

8. Telephone Number (with country code):

9. Your address/location:

10. Nearest city or town:

11. Any additional instructions on how to contact you:

12. Country:

What you are seeking from UNDP: Compliance Review and/or Stakeholder Response

You have four options:

- Submit a request for a Compliance Review;
- Submit a request for a Stakeholder Response;
- Submit a request for both a Compliance Review and a Stakeholder Response;
- State that you are unsure whether you would like Compliance Review or Stakeholder Response and that you desire both entities to review your case.

13. Are you concerned that UNDP's failure to meet a UNDP social and/or environmental policy or commitment is harming, or could harm, you or your community? Mark "X" next to the answer that applies to you: Yes: No:

14. Would you like your name(s) to remain confidential throughout the Compliance Review process?

Mark "X" next to the answer that applies to you: Yes: No:

If confidentiality is requested, please state why:



15. Would you like to work with other stakeholders, e.g., the government, UNDP, etc. to jointly resolve a concern about social or environmental impacts or risks you believe you are experiencing because of a UNDP project?

Mark "X" next to the answer that applies to you: Yes: No:

16. Would you like your name(s) to remain confidential during the initial assessment of your request for a response?

Mark "X" next to the answer that applies to you: Yes: No:

If confidentiality is requested, please state why:

17. Requests for Stakeholder Response will be handled through UNDP Country Offices unless you indicate that you would like your request to be handled through UNDP Headquarters. Would you like UNDP Headquarters to handle your request?

Mark "X" next to the answer that applies to you: Yes: No:

If you have indicated yes, please indicate why your request should be handled through UNDP Headquarters:

18. Are you seeking both Compliance Review and Stakeholder Response?

Mark "X" next to the answer that applies to you: Yes: No:

19. Are you unsure whether you would like to request a Compliance Review or a Stakeholder Response?

Mark "X" next to the answer that applies to you: Yes: No:

Information about the UNDP Project you are concerned about, and the nature of your concern:

20. Which UNDP-supported project are you concerned about? (if known):

21. Project name (if known):

22. Please provide a short description of your concerns about the project. If you have concerns about UNDP's failure to comply with its social or environmental policies and commitments, and can identify these policies and commitments, please do (not required). Please describe, as well, the types of environmental and social impacts that may occur, or have occurred, as a result. If more space is required, please attach any documents. You may write in any language you choose

23. Have you discussed your concerns with the government representatives and UNDP staff responsible for this project? Non-governmental organisations?

Mark "X" next to the answer that applies to you: Yes: No:

If you answered yes, please provide the name(s) of those you have discussed your concerns with

Name of Officials You have Already Contacted Regarding this Issue:

First Name	Last Name	Title/Affiliation	Estimated Date of Contact	Response of Individual	from the
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24. Are there other individuals or groups that are adversely affected by the project?



Mark “X” next to the answer that applies to you: Yes: No:

25. Please provide the names and/or description of other individuals or groups that support the request:

First Name	Last Name	Title/Affiliation	Contact Information
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Please attach to your email any documents you wish to send to SECU and/or the SRM. If all of your attachments do not fit in one email, please feel free to send multiple emails.

Submission and Support

To submit your request, or if you need assistance please email: project.concerns@undp.org