

TOR for Reforestation Implementation Activities of Nam Theun 1 Hydropower Project

1. Introduction

1.1 Reforestation NT1

As part of the offset measures of the adverse environmental impacts of the Nam Theun 1 project, reforestation and forest management shall be implemented. These measures are expected to sustainable development and ecological quality improvement of the biodiversity of the National Protected Area (NPA). NT1PC is looking for a qualified and experienced contractor to undertake the reforestation study and implementation of reforestation in the designated Biodiversity Offset Areas (BOA).

1.2 The Project – NT1 HPP

NT1 HPP is the lowermost dam and power station in a cascade of several structures in the Nam Kading River Basin. Three more dams exist upstream of NT1, namely: Theun-Hinboun (TH), Nam Theun 2 (NT2), and Nam Gnouang (also called Nam Theun 3, NT3). These existing structures divert a considerable amount of water from the Nam Kading catchment to other river basins (see Figure 1-1).

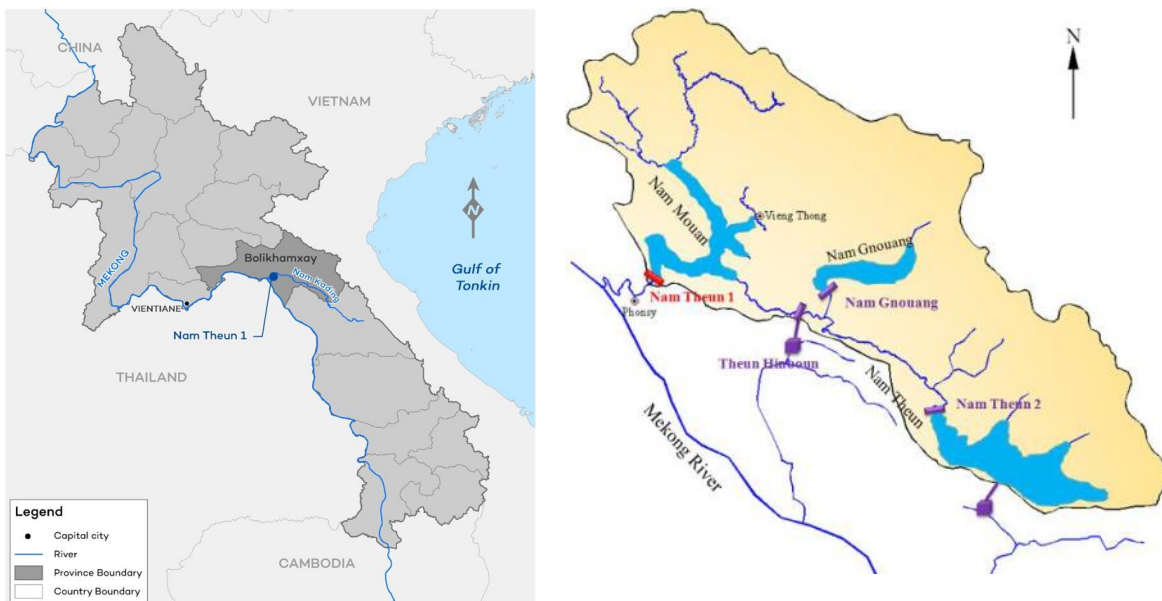


Figure 1-1: NT1 project location in Lao PDR, source: (Pöyry Energy Ltd., 2014)

The Nam Theun 1 hydropower scheme is located on the Nam Kading River, approx. 33 km upstream of its confluence with the Mekong and 220 km from Vientiane, in central Laos, in the Bolikhamxay Province and the PaKading District in central Lao PDR as shown in Figure 1-1.

The main characteristics of the project, which are of relevance for the impact on biodiversity, are shortly mentioned here as follows:

- The main structure is a 177 m high dam located on Nam Kading near the point where the river leaves the Nam Kading Protected Area (NKD NPA), with a crest elevation of 297 m asl;
- It will form a reservoir with a total volume of 3,009 million m³, a surface area of 93.6 km², full supply level 292 m asl, which is already partially impounded (water level ca. 270 m asl);

- As the dam site as such, parts the construction site are located inside of NKD NPA.

2. Project Perimeter

2.1 Location and Features

Figure 2-1 below shows the Nam Theun/ Nam Kading catchment areas with the reservoir of Nam Theun 1 HPP and the reservoirs of Theun Hinboun and Nam Theun 2 HPPs. Additionally, the location and dimension of the Nam Kading National Protected Area (NKD NPA) and of the other protected areas in the catchment area are marked.

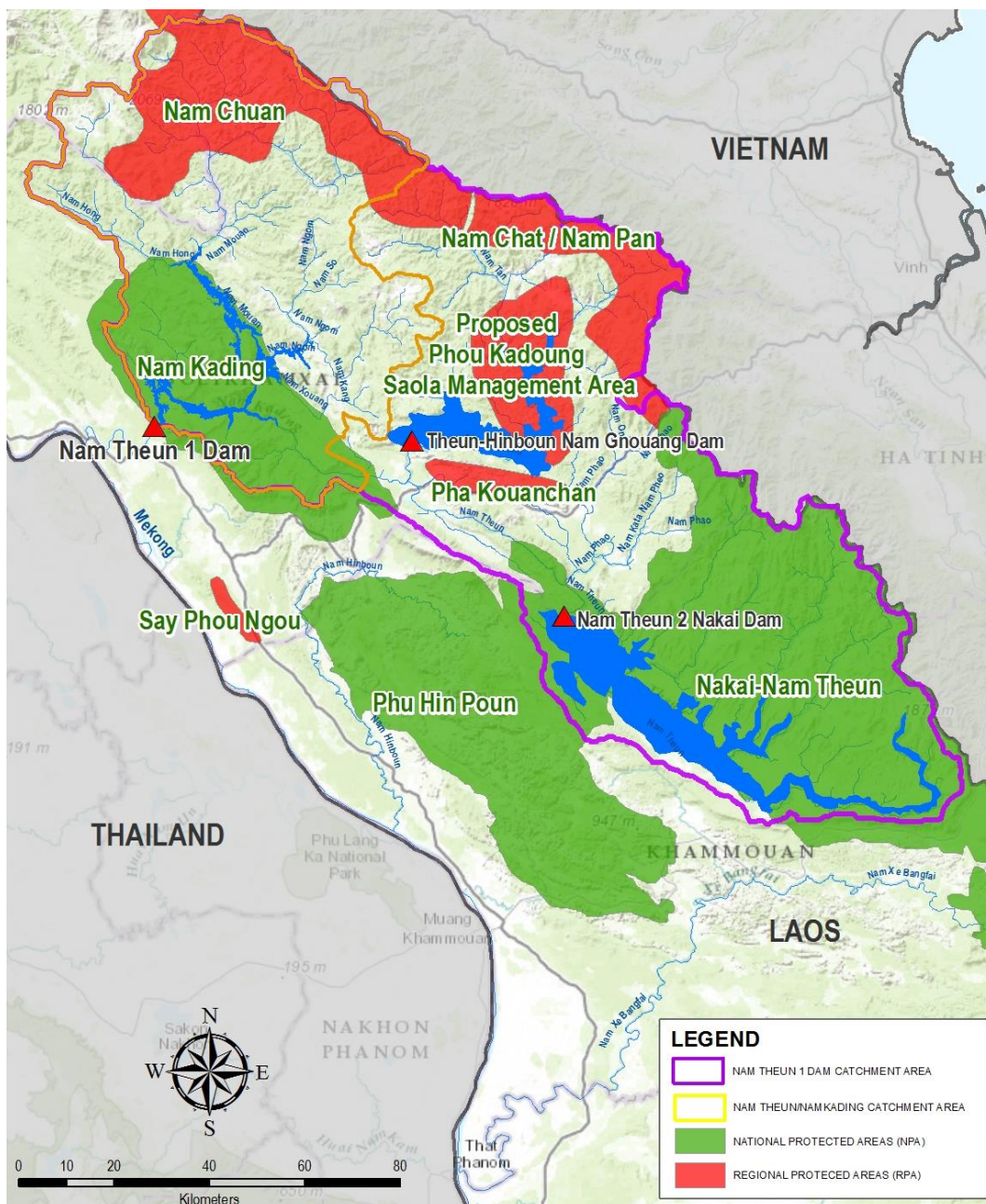


Figure 2-1: Location of the NT1 and of the NKD NPA and other protected areas

Some basic points of the NKD NPA are presented below:

a) Location

Latitude: 18° 11' – 18° 39' N

Longitude: 103° 54' – 104° 44' E

b) Area

The exact total area of the NKD NPA is not known due to unclear measurements and unclear boundaries. The following figures are cited for the total area of the NKD NPA:

- 1,690 km² (Decree 164) (Robichaud, 2001)
- 1,740 km² by Berk Müller et al., 1995 (Berk Müller, K., S. Southammakoth and V. Vongphet, 1995)
- 1,442 km² by DFRC Fact sheet, 2001 (Robichaud, 2001)
- 1,570 km² (Duckworth, J.W., et al., 1998)

d) Elevation

160 m asl – 1600 m asl

e) Physical Features

“The Main body of Nam Kading is formed from a massif of steep, densely forested hills at altitudes mostly from 500-1200 m asl. The area is traversed by the Nam Kading River, which flows from the S to the W boundary, and the Nam Mouan, which enters the area from the E and joins the Nam Kading close to the center of the NPA. These major rivers generally form a steep valley system, except around the former settlement of Ban Donme, where the banks of the Nam Kading are gently sloping. The streams that feed these rivers from the surrounding hills are generally seasonal. Exposed rock faces are common, and are especially impressive along the SW border.” (ASEAN Centre for Biodiversity)

e) Forest type

“Main Forest Types: Mostly dry evergreen/semi-evergreen forest on high relief terrain, but some areas of mixed deciduous. The Nam Kading valley is dominated by broadleaf evergreen forests with a high density of large trees, and of species attractive to frugivores. Surveyors in 1994-1995 considered much of the forest to show signs of past disturbance from fire or cultivation. The natural influence of topography and soil type is not well understood, however, and the forest does show high species diversity with 83 tree species recorded in a sample of 428 individuals from two areas. Three species of dipterocarp accounted for a large percentage of trees recorded.” (ASEAN Centre for Biodiversity)

3. Scope of Work and Areas to be Reforested

The scope of work includes preparation of the reforestation master plan during the whole operation period of the NT1HPP (2022 – 2048), managing and implementing the reforestation plan and carrying out reforestation activities. Further, for the natural reforestation the contractor will be responsible for the management of the forests, to ensure it will not further be further deforested, but recovers (2022 – 2027).

The reforestation activities to be carried out cover a total of 6,998.0 ha in the BOA. The designated BOA is divided into two areas of a total of 3,543.1 ha inside the Nam Kading National Protection Area (NPA) and 3,454.9 ha outside the Nam Kading NPA (see Figure 3-1). The overall objective is the implementation of reforestation activities (covering a total of 6,998.0 ha) to meet its goals of increasing forest area in relation to the NT1 HPP Concession Agreement as compensation for the area claimed by the reservoir.

The reforestation activity includes active seedling/sapling and passive natural reforestation. At least 1,000 seedling plants or saplings per hectare shall be planted covering the active seedling/sapling reforestation area of 2,310.9 ha as presented in Figure 3-1 and Table 3-1. The remaining area of 4,687.1 ha shall be passively reforested (marked in yellow in Figure 3-1). Passive means hereby naturally reforested, but under protection and monitoring measures.

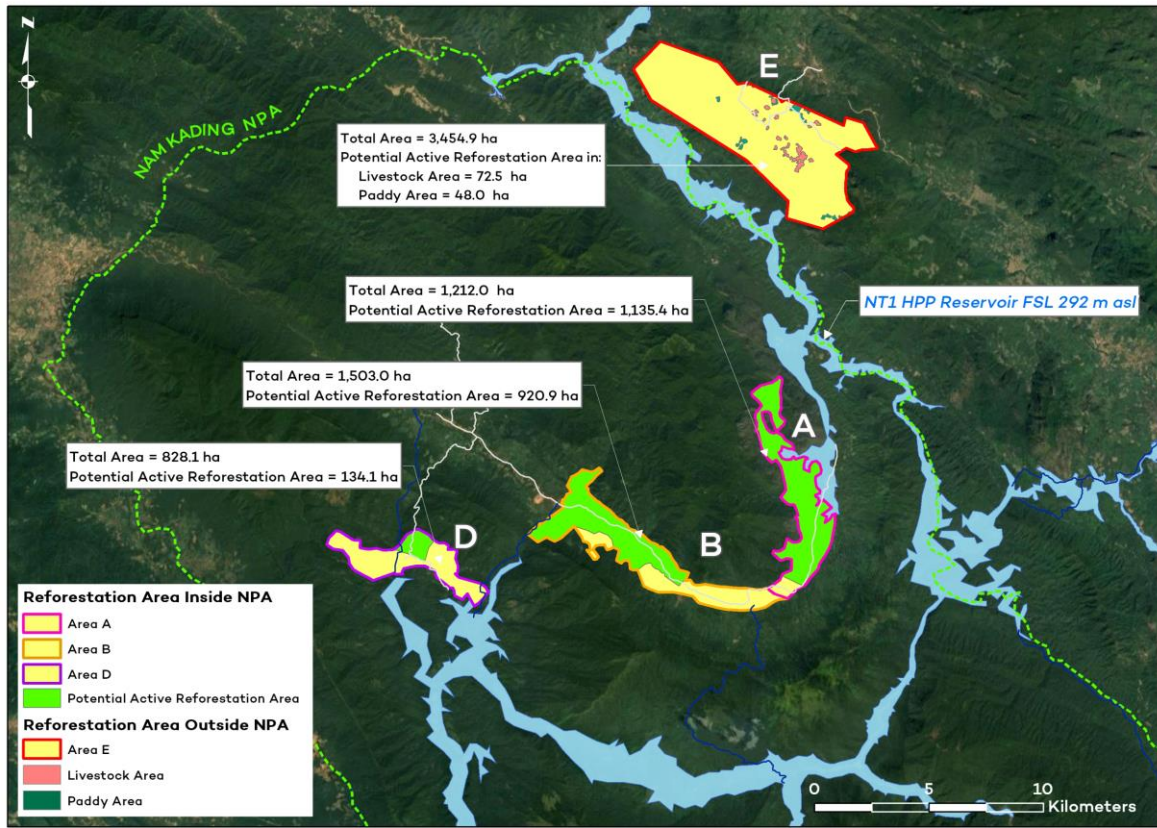


Figure 3-1: Reforestation Areas of the designated Biodiversity Offset Areas.

Table 3-1: Detail of the Reforestation Areas inside (exemplify of Figure 3-1)

Area	Land use type	NPA	Total Area (ha)	Active seedling/sapling reforestation (ha)	Passive natural reforestation (ha)
A	Former residential area	Inside NPA	1,212.0	1,135.4	76.6
B	Forest	Inside NPA	1,503.0	920.9	582.1
D	Forest	Inside NPA	828.1	134.1	694.0
E	Protection Forest Area	Outside NPA	3,454.9	120.5	3,334.4
Total			6,998.0	2,310.9	4,687.1

The implementation of the reforestation plan and the reforestation activities should follow the, rules and laws, and relevant regulations stipulated by the GoL including the Concession Agreement as listed below:

- Environmental Protection Law (Revised Version) 2013, No. 29/National Assembly, 18 Dec 2012
- Decree on Agreement and Endorsement of The National Biodiversity Strategy and Action Plan 2016-2025
- Law on Water and Water Resources, 11 May 2017
- Law on Land, 21 June 2019
- Forestry Law, 25 July 2019
- Wildlife and Aquatic Law, No. 07/National Assembly, 24 December 2007
- Concession Agreement, Annex C on Integrated Environmental and Social Obligations for Nam Theun 1 Project
- Decree on National Environment Standard No. 81GV, 21 February 2017 and No. 0832MONRE, 7 February 2017
- Standard Environmental and Social Obligations (SESO) as a set of contractual obligations under the Concession Agreement

The Contractor may consider and refer suitable international reforestation guidelines further to develop an effective Reforestation Plan. The examples of international reforestation guidelines are listed below:

- The Gold Standard Afforestation/Reforestation (A/R) Requirements (The Gold Standard Foundation, 2013)
- Reforestation and Maintenance Guidelines (United States Agency for International Development, 2005)

The detailed specifications of the reforestation species shall be included in the reforestation plan and approved by the Department of Forestry (DOF) or the Provincial Agriculture and Forestry Office (PAFO). It is mandatory to consider several native tree species already occurring in the NPA. As documented in the ESIA the native species have been listed in Appendix 1.

At least 20 of these different native species shall be considered. The contractor has to provide a method showing why which mixture of species shall be considered in which area (A, B, D, E). For area A, B, and D, which are within the NPA species should be of high ecological, but low economical value. For area E the exact opposite can be considered.

The activities shall include but are not limited to:

- 1) Assessment of the reforestation areas to define where which species should be considered in what numbers in close collaboration with NT1PC and the DOF/PAFO or assigned parties including local officials, and other key local stakeholders in the designated areas. Surveys and identification in the BOA by the Contractor are required to identify the baseline data. Checking and justifying the potential reforestation areas for active and passive reforestation in the BOA. The expected active and passive reforestation areas presented in Figure 3-1 and Table 3-1 are subject to be changed or updated and confirmed according to NT1PC or DOF/PAFO comments. Additionally, the preparation of the reforestation plan including the implementation is subject to change or update accordingly by the Contractor's own cost at no additional charge to NT1PC.
- 2) Preparation of the reforestation plan. The plan should include the justification of the selected localities, species selections, and methods. The plan shall describe the method, access, camps, equipment, facilities, training, number of staff, experts etc. and ensure sustainable reforestation as follow: active seeding/planning regeneration, natural regeneration, species selections, seeding method, work plan, gear and tools, nursery or sapling production techniques, terrestrial habitats, soil, access to water, topography, maps, erosion risk, including schedule, monitoring, maintenance and protection of the reforestation area. In order to protect and ensure sustainable reforestation in the BOA, the plan shall also include the BOA protection measure such as development of community involvement, public awareness, law enforcement to prevent deforestation and wildfire, voluntarily monitoring, patrolling plans, prevention of wildfire measures, etc.
- 3) Implementation of the reforestation activity as mentioned in #2 (above) includes blocking all the existing access roads once the reforestation works are completed and implementing the active reforestation to prevent further access to avoid any poaching activities. During the implementation phase, monthly progress reports shall be provided to NT1PC. At the end of the implementation phase, the Reforestation Implementation Report shall be provided to NT1PC.
- 4) Reparation and monitoring of reforestation according to NT1PC or DOF/PAFO comments. Reparation means hereby active reforestation by seeding or planning by the Contractor's own cost in both assigned active and/or passive reforestation areas as assigned by NT1PC or DOF/PAFO. During the reparation and monitoring phase, quarterly progress reports shall be provided to NT1PC.
- 5) Training for the staff in regard to health and safety. The training shall include environmental education awareness training for the workers. The contractor has to be compliant with the requirements of the project's environmental health and safety standards as defined in the CA and the ESMMP-CP.
- 6) Coordinate with NT1PC, the DOF/PAFO, its regional offices, and local stakeholders in terms of seedling and planting time and relevant reforestation activities.

- 7) Preparation of the Reforestation Completion Report. The document shall include the implemented activities, evaluation of the impact of the reforestation, monitoring, maintenance, and protection to ensure the appropriate handover to NT1PC.
- 8) Development of the Reforestation Master Plan for 27 years (2022 – 2048), which composes of 3 phases: preparation, implementation and monitoring. The Plan shall include detailed activities, time schedule and estimation of the budget in each phase. The Contractor will be responsible for the preparation and implementation of the reforestation activities (up to December 2027), the monitoring phase will further responsible by NT1PC and local authorities (2028 – 2048).

4. Deliverables

All the deliverables (reports) shall be provided in English and Lao in electronic form as soft copies in Microsoft Word format and Portable Document Format (PDF). All deliverables shall be submitted to NT1PC for review and comment. The Contractor shall correct any deficiencies or incorporate comments and resubmit all deliverables to NT1PC within 5 business days.

The following deliverables are requested for each phase.

Phase 1: Project Preparation	<ol style="list-style-type: none"> 1) Development of the Master Plan. 2) The Plan should include the requirement as mentioned in Chapter 3, #1 and #2. 3) Presentations of the Master Plan addressed to NT1PC, and DOF/PAFO or assigned parties to obtain the approval.
Phase 2: Implementation of Reforestation	<ol style="list-style-type: none"> 4) Reforestation Implementation Monthly Progress Report. During the period commencing from the first day of the month, the Contractor shall prepare and submit the report to NT1PC within the first week of the following month. The report should include the progress of the reforestation implementation and activities carried out to date, relevant pictures and maps justifying the selected tree species and the localities, total area of seedling, number of seeds/sapling planted, awareness-raising events, relevant EHS data including the number of workers, safety statistics e.g. total man-hours, first aid case, man-days lost, accident or incidents relating to the health, safety and welfare of stakeholders, major injury, fatalities, etc.. 5) Reforestation Implementation Report. The report should include detailed activities and results of the reforestation, relevant pictures, aerial photos, and maps justifying the total area of seedling and number of seeds/sapling planted, relevant implemented activities, monitoring and evaluation of the reforestation, maintenance, and protection. The report shall be prepared and submitted to NT1PC no later than end of October 2024. 6) A one-day presentation of the reforestation implementation to NT1PC, and DOF/PAFO or assigned parties.
Phase 3: Reparation and Monitoring of Reforestation	<ol style="list-style-type: none"> 7) Reparation and Monitoring of Reforestation Quarterly Progress Report. The Contractor shall prepare and submit the report to NT1PC within the first week of the following third month. The report should include the status and results of the reforestation monitoring, reparation and relevant activities carried out to date including relevant aerial photos, pictures, and maps justifying the problems, awareness-raising events, and corrective actions taken to eliminate defects or other undesirable situation in order to protect the BAO.
Phase 4: Completion of Reforestation	<ol style="list-style-type: none"> 8) Reforestation Completion Report. The report should include detailed activities and results of the reforestation, aerial photos, relevant pictures and maps justifying the total area of seedling and number of seeds/sapling planted, relevant implemented activities, monitoring and evaluation of the reforestation, maintenance, and protection to ensure the appropriate handover to the authorities as well as any relevant recommendation. The report shall be prepared and submitted to NT1PC for review before submitting to GOL for approval no later than end of November 2027. 9) Obtaining the approval from GOL by December 2027.

	10) Presentations of reforestation completion addressed to DOF/PAFO or assigned parties for approval.
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5. Schedule

The Contractor shall implement, complete and submit the deliverables specified below as per the identified time schedule.

Deliverables (end of each Phase)	Due Date
Phase 1: Project Preparation	End of July 2022
Phase 2: Implementation of Reforestation	August 2022 - Oct 2024
Phase 3: Reparation and Monitoring of Reforestation	Nov 2025 - Oct 2027
Phase 4: Completion of Reforestation, obtaining approval, and handover to GOL	End of Dec 2027

6. Required Content of Contractors Proposal

The Consultant has to present (incl. CV) their team of experts in an organigram, reference projects and years of experience in that field.

7. References

ASEAN Centre for Biodiversity. (n.d.). *Nam Kading NBCA (NKD)*. Retrieved from <http://chm.aseanbiodiversity.org/>

Berkmüller, K., S. Southammakoth and V. Vongphet. (1995). *Protected Area System Planning and Management in Lao PDR: Status Report to Mid-1995*. Vientiane: Lao-Swedish Forestry Cooperation Programme and IUCN.

Duckworth, J.W., et al. (1998). Bird records from Laos, October 1994-Augst 1995.

Pöyry Energy Ltd. (2014). *Feasibility Study Report: Nam Theun 1 Hydro Power Project for Phonesack Group Co. Ltd.* Bangkok.

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The Gold Standard Foundation. (2013, August). *The Gold Standard Afforestation/Reforestation (A/R) Requirements*. Retrieved from https://www.goldstandard.org/sites/default/files/ar-requirements_v0-9.pdf

United States Agency for International Development. (2005, June). *Reforestation and Maintenance Guidelines, MACH Project*. Retrieved from https://pdf.usaid.gov/pdf_docs/Pnadk290.pdf

APPENDIX 1 LIST OF THREE SPECIES IDENTIFIED

Appendix 1.1 List of NTFPs species identified by interviewed villagers

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDuea	PhiengTon	NamMuet	VangMark
Food										
1	Dok khae	<i>Markhamia stipulata</i> (Wall.) Seem. Ex. K. Schum.	x	x	x	x	x	x		x
2	Het bot*	<i>Lentinus polychrous</i>	x	x	x	x	x	x	x	x
3	Het khao	<i>Lentinus squarrosulus</i>	x	x	x	x	x		x	x
4	Het hou nou dam	<i>Auricularia polytricha</i>	x	x	x	x	x	x		x
5	Het hou nou daeng	<i>Auricularia auricular</i>	x	x	x	x	x	x		x
6	Het pheung dam	<i>Boletus edulis</i> Bull.	x		x	x	x	x		
7	Het pheung leuang	<i>Boletus chrysenteroides</i>	x		x		x			
8	Het pouak lao*	<i>Termitomyces microcarpus</i>	x	x	x	x	x	x	x	x
9	Het pouak tab nhai	<i>Termitomyces schimperi</i>	x	x	x	x	x	x		x
10	Het la ngok daeng	<i>Amanita caesarea</i>	x	x	x	x	x		x	x
11	Het la ngok leuang	<i>Amanita hemibapha</i>				x	x			x
12	Het la ngok khao	<i>Amanita princes</i>				x	x			x
13	Het daeng	<i>Russula lepida</i>					x			
14	Het khai khao	<i>Russula delica</i> Fr.				x	x			
15	Het than noi	<i>Russula densiforia</i>	x	x	x		x	x		x
16	Het tin kabkae	<i>Schizophyllum commune</i> Fr.	x	x	x		x	x	x	x
17	Het seth	<i>Cantharellus spp.</i>				x				

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDuea	PhiengTon	NamMuet	VangMark
18	Hom nam*	<i>Amaranthus spinosus</i> L.	x	x	x	x	x	x	x	x
19	Houa ka buk	<i>Amorphophallus paeoniifolius</i> (Denn.) Nicol.		x	x	x	x	x		x
20	Phak khan chong	<i>Limnocharis flava</i> (L.) Buch.				x	x			x
21	Kheua mak teck	<i>Celastrus paniculatus</i> Willd.	x				x			
22	Kheua sa khan	<i>Piper ribesoides</i> Wall.								
23	Khon khaen	<i>Dracaena angustifolia</i> Roxb.	x	x	x	x	x	x		x
24	Ko deuay	<i>Castanopsis indica</i> (Roxb.) A. DC.		x						
25	Mak bok	<i>Irvingia malayana</i> Oliv. ex A. Benn					x			
26	Mak fai	<i>Baccaurea ramiflora</i> Lour.	x	x	x	x	x	x	x	x
27	Mak ken	<i>Flacourtia indica</i> (Burm.f) Merr.	x		x	x	x	x		x
28	Mak khaen	<i>Zanthoxylum rhetsa</i> (Roxb.) DC.	x	x		x	x	x		x
29	Mak kham phep*	<i>Dialium indum</i> L.	x	x	x	x	x	x	x	x
30	Mak kho*	<i>Livistona saribus</i> (Lour.) Merr. ex Chev.	x	x	x	x	x	x	x	x
31	Mak kok	<i>Spondias pinnata</i> (Koenig ex L.f.) Kurz.	x	x	x	x		x	x	x
32	Mak lin mai	<i>Oroxylum indicum</i> (L.) Kurz.	x	x	x	x	x	x		x
33	Mak pheuang pa	<i>Averrhoa carambola</i> L.	x	x	x	x	x		x	
34	Mak sim	<i>Amalocalyx microlobus</i> Pierre ex Spire.				x				
35	Mak tao*	<i>Arenga westerhoutii</i> Griff.	x	x	x	x	x	x	x	x
36	Mak thong	<i>Sandoricum koetjape</i> (Burm.f.) Merr.		x	x		x		x	x

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDuea	PhiengTon	NamMuet	VangMark
37	Mak thoum	<i>Rubus multibracteatus</i> Lév. et Van.	x	x	x		x			x
38	Phak bouang	<i>Passiflora foetida</i> L.			x	x	x	x	x	x
39	Phak hak tin houg	<i>Helminthostachys zeylanica</i> (L.) Hook.		x	x	x	x	x		x
40	Phak kha nhaeng	<i>Limnophila geoffrayi</i> Bonati.	x	x	x		x			x
41	Phak khao thong*	<i>Houttuynia cordata</i> Thunb.	x	x	x	x	x	x	x	x
42	Phak khi lek	<i>Senna siamea</i> (Lam.) Irwin & Barn.	x	x	x	x	x		x	x
43	Phak kout*	<i>Diplazium esculentum</i> (Retz.) Sw.	x	x	x	x	x	x	x	x
44	Phak lam	<i>Adenantha pavonina</i> var. <i>microsperma</i> (Teijsm. & Binn.) I.C. Nielsen.						x		
45	Phak nam	<i>Lasia spinosa</i> (L.) Thwaites.		x	x	x				x
46	Phak nao	<i>Acacia pennata</i> (L.) Willd. ssp. <i>insuavis</i> (Lace) I.C. Nielsen.	x	x	x	x	x	x		x
47	Phak nok*	<i>Centella asiatica</i> (L.) Urban.	x	x	x	x	x	x	x	x
48	Phak sai*	<i>Monordica charantia</i> L.	x	x	x	x	x	x	x	x
49	Phak samek	<i>Syzygium gratum</i> (Wight) S.N. Mitra	x		x	x				x
50	Phak si sang	<i>Apium graveolens</i> L.	x	x		x		x		x
51	Phak tam nin	<i>Coccinia grandis</i> (L.) Voigt.	x	x		x	x	x	x	x
52	Phak thon	<i>Albizia procera</i> (Roxb.) Benth.	x			x				x
53	Phak tiou som	<i>Cratoxylum formosum</i> (Jack.) Dyer.	x	x	x	x	x	x		x
54	Phak van*	<i>Melientha suavis</i> Pierre ssp. <i>suavis</i>	x	x	x	x	x	x	x	x

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDuea	PhiengTon	NamMuet	VangMark
55	Pheuak	<i>Colocasia esculenta</i> (L.) Schott.	x	x	x	x	x	x	x	x
56	Som phot	<i>Rhus chinensis</i> Mill.	x	x	x	x		x		x
57	Som sieo	<i>Bauhinia malabarica</i> Roxb.		x						
Total			40	40	40	44	45	34	22	44
Medicines										
1	Chandai	<i>Dracaena loureiri</i> Gagnep.		x					x	
2	Kha*	<i>Alpinia</i> spp.	x	x	x	x	x	x	x	x
3	Kheua haem	Menispermaceae	x		x	x		x		x
4	Kheua khao ho*	<i>Tinospora crispa</i> (L.) Hook. F. & Thoms.	x	x	x	x	x	x	x	x
5	Khok ien don	<i>Eurycoma harmandiana</i> Pierre.	x							
6	Mak kabao	<i>Hydnocarpus kurzii</i> (King.) Warb. ssp. <i>Australis</i> Sleum.		x	x					
7	Mak naeng*	<i>Amomum</i> spp.	x	x	x	x	x	x		x
8	Mak seng beua	<i>Strychnos nux-vomica</i> L.			x					
9	Phaen din yen	<i>Aglaonema modestum</i> Schott ex Engl.						x		
10	Phouang phi	<i>Clerodendrum paniculatum</i> L.	x							
11	Pit pi daeng	<i>Plumbago indica</i> L.		x	x					x
12	Song fa	<i>Clausena harmandiana</i> (Pierre.) Pierre ex Guill.		x	x					
13	Tin pet*	<i>Alstonia scholaris</i> (L.) R. Br.	x	x	x	x	x	x		x
14	Wai sa noi	<i>Pothos scandens</i> L.		x	x	x	x	x		
15	Ya houa	<i>Smilax glabra</i> Wall. ex Roxb.	x	x	x	x				x
Total			8	10	11	7	5	7	3	7

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDuea	PhiengTon	NamMuet	VangMark
Fibers										
1	Dok khaem*	<i>Thysanolaena maxima</i> (Roxb.) O. Ktze.	x	x	x	x	x	x	x	x
2	Mai bong	<i>Bambusa tulda</i> Roxb.				x				
3	Mai sanot	<i>Gigantochloa apus</i> Schytle & Kurz.						x		
4	Mai hok	<i>Dendrocalamus hamiltonii</i> Nees & Arn. ex Munro.	x	x	x	x	x			x
5	Mai khom	<i>Indosasa sinica</i> C.D. Chou & C.S. Chao	x	x	x	x	x	x		x
6	Mai phang	<i>Dendrocalamus lonoifimbriatus</i>	x		x	x	x	x		
7	Mai hia	<i>Schizostachyum blumei</i> cf.	x	x	x	x	x	x	x	x
8	Mai sot	<i>Oxytenanthera parviflora</i>	x	x	x	x	x	x	x	x
9	Mai lai	<i>Gigantochloa albociliata</i> Munro & Kurz		x	x		x			x
10	Po sa	<i>Broussonetia papyrifera</i> (L.) Vent.		x	x	x	x	x	x	x
11	San	<i>Rhapis laoensis</i> Becc.		x	x	x	x	x	x	x
12	Teuy	<i>Pandanus fibrosus</i> Gagnep. ex Mart.		x	x	x	x	x		x
13	Wai thoun*	<i>Calamus poilanei</i> Conrard.	x	x	x	x	x	x	x	x
14	Wai hom	<i>Calamus gracilis</i> Roxb.				x	x	x		
15	Wai khom	<i>Calamus viminalis</i> Willd.			x	x	x	x		
16	Wai nam	<i>Calamus siamensis</i> Becc.		x	x	x	x	x		
17	Wai nyeh	<i>Calamus tenuis</i> Roxb.	x		x	x	x	x		
18	Wai thok	<i>Calamus solitarius</i> T. Evans.		x	x	x	x	x		
19	Wai nam hang	<i>Calamus palustris</i> Griffith.		x	x			x	x	

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuang	PhoneHome	ThaDuaa	PhiengTon	NamMuet	VangMark
20	Wai thabong	<i>Calamus rudentum</i> Lour.		x						
21	Wai nok khor	<i>Calamus wailong</i> S.J. Pei & S.Y. Chen.		x				x		
22	Wai Leum	<i>Calamus laoensis</i> T. Evans.		x						
23	Wai niew	<i>Calamus nambariensis</i> Becc.		x		x				x
24	Wai hangnou	<i>Calamus tetradactylus</i> Hance.		x			x	x		
25	Wai boun	<i>Daemonorops jenkinsiana</i> Mart.		x	x		x	x		x
Total			8	19	17	17	18	19	7	12
Extracts										
1	Fek hom	<i>Vetiveria zizanioides</i> (L.) Nash.	x		x	x	x	x		x
2	Khe hom	<i>Cinnamomum cassia</i> Bl.	x	x			x	x		
3	Khedsana	<i>Aquilaria crassna</i> Pierre ex Lec.		x			x	x		x
4	Khi si*	Dipterocarpaceae	x	x	x	x	x	x	x	x
5	Mak nhaow	<i>Jatropha curcas</i> L.		x	x		x		x	
6	Nam man nyang	<i>Dipterocarpus alatus</i> Roxb. ex G. Don.		x	x		x		x	
7	Nyan	<i>Styrax</i> spp.		x	x					
8	Nyang bong	<i>Persea kurzii</i>	x		x	x	x		x	
9	Peuak meuak	<i>Boehmeria malabarica</i> Webb.		x	x	x	x	x		
10	Sisiet	<i>Pentace burmanica</i> Kurz.	x	x	x		x	x		x
11	Som poi	<i>Acacia concinna</i> (Willd.) DC.		x	x		x	x		x
Total			5	9	9	4	10	7	4	5
Ornamentals										
1	Dok pheung	Orchidaceae			x		x	x		

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDuea	PhiengTon	NamMuet	VangMark
2	Nha bai lai*	<i>Anoetochilus lylei</i> Rolfe ex Downie.	x	x		x			x	
3	Bai lai	<i>Paphiopedilum callosum</i> Pfitz var. <i>sublaeve</i> Cribb.		x		x				
4	Euang kou lab daeng	<i>Aerides crassifolia</i> Par. & Burb.		x		x				
5	Euang phongmalai	<i>Aerides multiflora</i> Roxb.	x	x	x	x				
6	Euang sai mai	<i>Dendrobium aphyllum</i> Fischer.				x			x	
7	Euang kham	<i>Dendrobium chrysotorum</i> Lindl.				x				
8	Euang khao san	<i>Dendrobium compactum</i> Rolfe ex W.Hackett.								x
Total			2	4	2	6	1	1	2	1
Grand Total			63	82	79	78	79	68	38	69

*The most common NTFPs reported by local people.

Appendix 1.2 List of TFPs species identified by interviewed villagers

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDuea	PhiangTon	NamMuet	VangMark	PhoneNgam
Protected											
1	Maikhayoug	<i>Dalbergia cochinchinensis</i>			x	x		x	x		x
2	Maikhumphy or Maipadoug, Maidoulayi	<i>Dalbergiacultrata</i>									x
3	Maiketlin	<i>Desmodium lengipes</i>		x	x	x			x		
4	Maimunpa	<i>Cambodiana fragrans box</i>		x	x	x		x	x		x
5	Maimoun	<i>Elaeocarpus sianensis</i>						x			
Total			0	2	3	3	0	3	3	0	3
Specific List											
1	Maisuk	<i>Tectona crandis</i>		x	x		x	x			x
2	Maidouluead	<i>Pterocarpus macrocarpus</i>	x								
3	Maidoulueag	<i>Pterocarpus pedatus</i>			x	x	x	x		x	x
4	Maitaekha	<i>Afzelia xylocarpa</i>		x		x					x
5	Maiketsana	<i>Aquilaris.Sp.</i>	x		x		x	x	x	x	x
6	Maiduanghom	<i>Cinnamomum liseaefolium</i>	x								
7	Maichanhom	<i>Mansonias gagei</i>			x	x		x			
8	maichanpa or Chandoug	<i>Mansonias.Sp.</i>						x		x	
9	Mailangdum	<i>diospyros embryoteris</i>	x								
10	Mailek	<i>Mesua ferra</i>				x					
11	Maihinghom, hingsum	<i>Fokinia chinensis</i>		x			x				
12	Maily	<i>gradenia frangeoides</i>					x		x		
13	Maichandeng	<i>Pterocarpus santalinus</i>		x	x	x	x			x	

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDuea	PhiengTon	NamMuet	VangMark	PhoneNgam
14	Maideng	<i>Xylia kerii</i>	x	x	x	x	x			x	x
15	Maikhaenhuea	<i>Hoppea odorata</i>	x	x	x	x	x	x		x	x
16	Maikhaehom (sakhae)	<i>Cinnamomum cassis BL</i>	x	x	x						x
Total			7	7	8	7	8	6	2	6	7
Management List											
1	Maikhaenkhyom	<i>Shorea harmandii</i>	x		x	x			x	x	x
2	Maikhaenhin	<i>Hopea ferrea</i>	x	x	x	x	x	x	x	x	x
3	Maisykhao	<i>Shorea vulgaris</i>	x	x	x	x			x	x	x
4	Maisydoug	<i>Vatica Cinerea</i>	x				x	x	x	x	x
5	Maisypueakbang	<i>Vatica dyeri</i>	x			x					x
6	Maipueyluead	<i>Terminalia corticosa</i>	x								
7	Maipueykhao pueknar	<i>Lagerstronmia florribunda</i>		x				x			
8	Maipueykhok	<i>lagerstronmia cochinesis</i>	x	x					x	x	
9	Mainumkieng	<i>Melanorrhea laccifera</i>	x	x	x	x					
10	Maitaenarm	<i>Sindora siamensis</i>	x		x	x					x
11	Maitaehor	<i>Sindora cochinchinensis</i>	x	x	x	x	x	x	x	x	x
12	Maimipa	<i>Artocarpus lancefolius</i>	x	x	x	x	x	x	x	x	x
13	Maiseuak	<i>Terminalia tomentosa</i>	x								
14	Maichikdoug	<i>Shorea hypochra</i>	x							x	x
15	Maihung	<i>Pentacme siamensis</i>		x					x		x
16	Maihaen	<i>Terminalia belerica</i>		x				x		x	x
17	Maiyangdeng	<i>Dipterocarpus costatus</i>	x	x	x	x	x			x	x
18	Maiyangkhao	<i>Dipterocarpus alatus</i>	x	x	x	x	x		x	x	x

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDuea	PhiengTon	NamMuet	VangMark	PhoneNgam
19	Maiyangdoug	<i>Diptercarpus turbinatus</i>	x					x		x	x
20	Maimuangpa	<i>Mangifera indica</i>	x	x	x		x	x	x	x	x
21	Maiyomhom	<i>Toona febrifuga</i>	x	x	x		x		x	x	x
22	Maiyomhin	<i>Chukrasia tabularis</i>	x	x	x		x	x	x	x	x
23	Maiyomlaiy	<i>Chukrasia Sp</i>	x								x
24	Maibark	<i>Anisoptera robusta</i>	x	x	x		x	x		x	x
25	Maihao	<i>Parashorea sttellata</i>									x
26	Maisoug	-	x	x	x		x	x		x	x
27	Maikhao	<i>Adina cordifolia</i>	x	x				x			
28	Mailaaen	<i>Hopea pierrei</i>	x								
29	Maidengnum	<i>Xylia dolariformis</i>	x								
30	Maihanum	<i>Eugenia SP</i>	x		x					x	x
31	Maifangdeng	<i>Caesalpinia sappan</i>						x			x
32	Maikhaenyong (khaenhai)	<i>Shorea sp</i>	x		x		x			x	x
33	Maikhuangdeng	<i>Dysoxylum binectariferum</i>	x								
34	Maiyarn	<i>keteleria tonkinensis</i>	x		x				x		
35	Maiyompa (yompha)	<i>Ailanthus fauveliana</i>	x	x							x
36	Maikhaenfaiy	<i>Vatica astrotricha</i>	x					x		x	x
Total			31	18	17	10	12	14	13	20	26
Management II											
1	Maikadaosang (maihien)	<i>Melia azedarch</i>		x					x	x	
2	Maisor	<i>Gmelia arborea</i>	x	x	x		x	x	x		x
3	Maikhaefoy	<i>Stereospermum fimbriatum</i>			x			x		x	x

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDuea	PhiengTon	NamMuet	VangMark	PhoneNgam
4	Maibok	<i>Irvingia cambodiana</i>									x
5	Maitong	<i>Sandoricum indicum</i>		x	x		x	x		x	x
6	Maikoug	<i>Dipterocarpus tuberculatus</i>	x	x					x		
7	Maiwadoug	<i>Euginia compongensis</i>		x	x						x
8	Maihualon	<i>Albissia codoratisima</i>		x	x		x	x		x	x
9	Maisikhaiton	<i>Cinnamomum iners</i>	x	x							
10	Maikheng	<i>dialium cochinchinensis</i>								x	
11	Maisakharm (maisafang)	<i>Peltophorum dasyrachis</i>								x	x
12	Maisamsa	<i>Samanea saman</i>	x	x	x					x	x
13	Maisarmkhum	<i>Coruga pinata</i>									
14	Maisysied	<i>Pentaece burmanica</i>									
15	Maimarkkou	-	x	x					x	x	
16	Maikharmpaeb	<i>Dialium indum</i>	x	x	x		x		x	x	x
Total			6	10	7	0	4	4	5	9	9
Management III											
1	Mai ngewpa	<i>Bombax anceps</i>	x	x	x		x	x		x	x
2	Maitinped	<i>Alstonia scholaris</i>	x	x	x		x	x		x	x
3	Maikordeng	<i>Catantansia hystrix</i>	x	x	x		x				
4	Maikornarm	<i>Castanea castanopsis (quercus)</i>	x	x	x		x	x		x	x
5	Maimakbai	<i>Canarium nigrum</i>	x				x		x		
6	Maikarnleuag	<i>Nauclea Orientalis</i>									x
7	Maiboungnung	<i>Lanceaeoflium</i>		x	x					x	x
8	Maithon	<i>Caradllia Inducida</i>		x			x			x	

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDua	PhiengTon	NamMuet	VangMark	PhoneNgam
9	Maikaseng	<i>Albizzia procera</i>	x								
10	Mainokkok	<i>Cananga latifolia</i>					x			x	
11	Maihard	<i>Shorea thorelii</i>	x	x	x		x			x	x
12	Maibenmon	<i>Artocarpus lakoocha</i>	x								
13	Maitinnok	<i>Anogeissus acuminata</i>	x		x					x	x
14	Maikor khimou	<i>Vitex pinnata</i>		x	x		x		x	x	
15	Maikokluaem	<i>Castanopsis indica</i>	x								
16	Maikalao	<i>Canarium kerrii</i>									x
17	Maikhilekdoug	<i>Lagorstroemia macrocarpa</i>	x	x							x
18	Maimarkngeo	<i>Cassia garrettiana</i>	x	x	x		x	x	x	x	x
19	Maisarn	<i>Millingtonia hotensis</i>	x				x	x			
20	Maikhae	<i>Dillenia Spp</i>	x	x	x		x	x		x	x
21	Maisommor	<i>Stereospermum Spp</i>			x		x				
22	Maisom houg	<i>Calophyllum saigonensis</i>					x				
23	Maipor	<i>Sterculia foetida</i>	x	x			x	x			x
24	Maimarkkok	<i>Sterculia villosa</i>	x	x	x		x	x	x	x	x
25	Maimouknoy	<i>Spondias pinnata</i>	x				x	x		x	
26	Maimoukyai	<i>Wrightia tomentosa</i>	x				x	x		x	
27	Maiphoug	<i>Holarrhaena antidysenterica</i>	x		x		x	x	x	x	x
28	Maiphok	<i>Tetrameles nudiflora</i>	x								
29	Maimarkfaen	<i>Parinarium annamensie</i>	x	x			x	x	x	x	x
30	Maikhilek	<i>Protium serratum</i>	x	x			x	x	x	x	x
31	Mailumyaipa	<i>Amoora polystachya</i>	x	x			x	x		x	

No.	Lao Name	Scientific Name	KokTon	SopPat	MeuangMuan	PhoneHome	ThaDuea	PhiengTon	NamMuet	VangMark	PhoneNgam
32	Maikadaokhom	<i>Xerospermum lacticum</i>	x								x
33	Mailuangkhone	<i>Azadirachta indica</i>						x			
34	Maikasung	<i>Hanglietea clauca</i>									x
35	Maitewnarm, tewdeng, tewdum	<i>Peperomia pellusida</i>	x	x	x		x	x	x	x	x
36	Maiharm	<i>Cratexylon prunifolium</i>	x	x							
37	Maikhainao	<i>Michelia masticata</i>									x
38	Maikae	<i>gardenia philastrel</i>	x								
39	Maikuak	<i>Combretum guarangula</i>	x								
40	Maikhingen	<i>Garcinia ferra</i>	x								
41	Maihumao	<i>Pterospermum megalocarpum</i>									
Total			29	18	14	0	23	16	8	19	20
Grand Total			73	55	49	20	47	43	31	54	65