



Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

**5 year management plan of Laving-Lavern Provincial
Protected Area, Savannakhet**

October 2010

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Annex

Introduction

Savavannakhet is the largest province of Lao People's Democratic Republic (Lao PDR), located in the southern part of the country. It is believed to be rich in forestry and biodiversity resources including rare wildlife and plant species. The forest resources played important role in the livelihood of multi-ethnic people and contributed largely in the development of the country as well as Savannakhet Province. Therefore, the Party and Government as well as Savannakhet Administration considered the forestry as potential for the socio-economic development of province and therefore adopted the policy on forest conservation for sustainable use. However, the forest resources in the province have been depleted due to various factors. The most important was the high economic valued species occurring in Savannakhet forest and exposed to the international market. These species include: *Dalbergia* spp, *Dalbergia cochinchinensis*, *Erythropholeum fordii*, *Azelia xylocarpa*, and *Pterocarpus*. Other factors include slash and burn traditional practice for rice growing and illegal logging. These factors are main cause of rapid decrease of forest cover and will generate in the long run impacts to the livelihood of local people and to ecosystems and biodiversity.

Under this context, to conserve the forest and sustain the ecosystem for the livelihood and socio-economic development of the province, the government of Lao PDR and its concerned ministries and local administrations have developed a systematic management, including the development of policy and regulations on the forest protection and development as well as forest business. At the same time the public awareness building is developed aiming at increasing the understanding on the relevant regulations and creating conditions for the public involvement in the forest protection and development. As the sametime, the forest is divided into three categories: protected forest (area), protection forest and production forest. Under these categories, there are in Savannakhet 3 National Protected Areas (NPAs) namely Phou Xang He, Dong Phou Vieng and Se Bang Nouan and two Provincial Protected Areas (PPAs), Laving Lavern and Dong Na Tad.

Part 1 - Background, physical and socio-economic status of Laving Lavern PPA

1.1. Background

Laving Lavern PPA was officially established in 2005 (by Provincial Governor's Regulation No 448/SV on June 7, 2005), with an area of 36,534ha, located in the eastern part of the province, about 270km from Savannakhet town, and laid within two districts namely Sepone and Vilabouly. Laving Lavern PPA is believed to be rich in forestry and biodiversity resources that play important role for the livelihood of the people living in the proximity of the PPA and at the same time contribute to the effective protection of watershed and environment in the area.

1.2. Physical status

1.2.1. Location and topography

Laving Lavern PPA location is as follows:

Longitude: E 106°05'50" to 106 °30'00"

Latitude: N 16 °53'00" to 17 °06'10"

On the north, the PPA boundary starts from the border between Savannakhet, Khammouane and Vietnam and follows the provincial boundary with Khammouane Province to the point at 625m altitude at the source of Sangi River;

On the South, it starts from the confluence and follows Sangi river to Ban Soung Village and Ban Thaphing Village and continue to follow Salou creek to its confluence with Sebanghieng River and follows Sebanghieng up to its confluence with Salou creeks;

On the West, its starts from the point at 885m altitude at Sagni source and follows the river to its confluence; and

On the East, its starts from Salou creek confluence and follows the river up to the point at 1.268m altitude and then follows the border line between Lao PDR and Vietnam up to the border between Savannakhet, Khammouane and Vietnam.

Laving Lavern PPA is characterized by the mountains and the limestone cliffs. The flat plain is only present as terrace of Sebanghieng River and other small tributaries in the southern part. The mountainous areas present high slope but not higher than 45°; while the limestone cliff slope is mostly higher than 45°. The altitude varies from 450 masl to 850 masl. The peak is 1,268 masl. The area is covered by the dry evergreen forest and mixed deciduous forest in some part especially on the cliff.

1.2.2. Climate

The information on rainfall, humidity and temperature is provided as in the following table.

Table 1 - Climate at Laving Lavern PPA

Month	Average temperature (°C)			Average humidity (%)			Rainfall (mm)		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
January	21,2	20,0	19,0	66	71	68	0	0	0
February	19,9	15,0	26,0	70	69	65	21,2	0	0
March	22,0	21,6	26,2	65	64	62	28,5	10,6	43,3
April	24,6	21,0	27,6	58	60	66	8,2	6,0	85,7
May	26,2	26,9	27,6	73	72	69	210,2	323,6	212,3
June	25,4	26,8	28,5	75	77	73	250,2	363,4	107,7
July	26,2	27,9	27,0	82	80	76	180,2	187,6	342,1
August	25,8	26,6	26,9	79	80	78	289,5	217,2	284,2
September	26,1	26,3	26,9	78	80	79	148,2	196,8	324,6
October	25,7	26,4	25,4	65	56	66	305,2	89,3	130,9
November	22,7	23,5	24,0	70	75	73	1,5	11,0	0,8
December	21,6	22,0	22,4	69	72	72	0	0	0

Source: PWREO Meteorological and hydrological Unit

The climate in Laving Lavern PPA, similar to the whole province of Savannakhet is humid tropical and dominated by the North-east and south-west monsoon.

The Northeast monsoon occurs from mid November to mid April and during this period it is dry and the temperature may be high up to 40°C. While the Southwest monsoon occurs from mid May to mid October, during this period the rainfall is heavy and the humidity is about 80%.

In brief, the area is dominated by a specific climate with high temperature and dry in dry season and humid in wet season.

Laving Lavern PPA is under the territory of two districts (Sepone and Vilabouly) but the metrological and hydrological station does not exist in Vilabouly; all the information described above is mostly collected from Sepone station except the information on rainfall. However, as the two districts of the PPA are located in the same mountainous area and topographic situation, the climate is insignificantly different and therefore the information from Sepone station could be assumed as the information for Laving Lavern PPA.

1.3. Natural resources

1.3.1. Forestry

Table 2 – Tree species recorded in Laving Lavern PPA

No	Category	Family	Species	Remarks
1	large trees	36	102	
2	Shrub	20	28	
3	Lianas	16	25	
4	Therophyte	11	23	
5	Vascular plant	1	8	
6	Palm	1	1	
7	Fern	5	5	
	Total	90	194	

Source: Report of the survey on fauna and flora by the PA and NUOL Team

In general the status of forest in the Laving Lavern PPA is characterized by its abundance and diversity. In accordance to the diverse topographic situation, the plant diversity is high, including diverse formation. Most of the PPA is comprised of dry evergreen forest and some parts are mixed deciduous that could be observed on the limestone cliffs. In general the forest could be divided into 3 dominant categories:

- **Riparian gallery forest**

This forest occurring adjacent to the rivers is abundant in plant species, Key plant species found are: *Hymenopyramis brachiata*, *Allospondias lakonensis*, *Artocarpus lancefolius*, *Castanopsis spp*, *Hoppea odorata*, *Anisoptera robusta*, *Dipterocarpus*, *Terminalia bellirica*, bamboo, etc

- **Montane evergreen forest**

Key plant species found are: *Erythropholeum fordii*, *Toona febrifuga*, *Chukrasia tabularis*, *Fokinia chinensis*, *Pinus merkusii*, *Lagerstroemia cochinchinensis*, *Diospyros glandulosa*, *Diospyros mollis*, *Bombax spp*, *Albissia codoratisima*, *Adina cordifolia*, *Dillenia spp*, *Castanopsis spp*, *Hoppea odorata*, *Anisoptera robusta*, *Dipterocarpus*, *Allospondias lakonensis*, *Terminalia bellirica*, Fern, Palm, bamboo and vascular plants etc. The forest density is high, and the forest is in good and intact condition.

- **Unstocked Forest and regrowth under the management and use by community**

The areas are used mostly by the local people for the slash and burn cultivation of rice and other crops used for daily consumption. The areas are located about 4-5 Km from the villages. The forest in this area is mostly the regrowth forest from the slash and burn agriculture.

The results of the survey on fauna and flora by the PA and NUOL Team in Laving Lavern PPA show that the area is abundant and consists of diversity of tree species. *(See details in annexes)*

1.3.2. Aquatic and Wildlife

Table 3 - List of aquatic and wild animals recorded in Laving Lavern PPA

No	Species	Genera	Family	Species
1	Mammal	19	50	61
2	Aves	29	65	84
3	Reptile	11	22	18
4	Amphibian	6	12	19
5	Fish	9	13	17
	Total	74	162	199

Source: Report of the survey on fauna and flora by the PA and NUOL Team

In general, the wildlife in Laving Lavern PPA is abundant and consists of diversity of species. The report of the survey on fauna and flora by the PA and NUOL team during February 16 to March 3, 2010 shows that (i) **61** species, **19** families, **50** genera of mammals are recorded, of these species 28 are seen and others are from interview and camera trapped by WCS (2009;); (ii) **84** species, **65** genera, **29** Family of birds are seen, heard and some are camera trapped by WCS (2009) in the west part of the PPA (Ban Kaway Village); (iii) **28** species, **22** genera, **11** families are recorded and other species are also recorded.

The main findings of the survey on fauna and flora by the PA and NUOL team and camera trapped by WCS show that in Laving Lavern PPA there are a number of rare and nationally and internationally threatened species namely: Banteng, Lao Langur, Serow, Marble cat, Wreathed Hornbill, Crested Argus, Oriental Pied Hornbill, Grey Peacock Pheasant, *Cuora trifasciata*, *Python molurus* and etc. In addition, the villagers reported that in last 2-3 years a local people has caught a young Saola (*Pseudoryx nghetinhensis*), this is therefore information on the possible occurrence of Saola in the area.

The rapid survey shows that there are number of aquatic species especially fish. Unfortunately, the survey was not focusing on the aquatic species, because there

is no specialist on the aquatic species in the team and the information on the fish species is therefore not accurate.

1.3.3. Land and water resources

Laving Lavern PPA is located in the mountainous area which is source of many rivers namely Sebanghieng, Sebangfai, Sekok, Sesagni (see the map). Besides this, there are number of creeks that are tributaries of the above rivers. The main rivers are Sebanghieng and Sebangfai that are tributaries of the Mekong river; these rivers flow more than hundred kilometers through hundred thousands of people which depend on the beneficial use of water from the river for their livelihood.

No agency carries out survey and classification of soil in Laving Lavern PPA.

1.4. Social status

1.4.1. Population, livelihood, ethnicity and culture

In the proximity of and within the PPA, there are 15 villages with a total population of 4,124 inhabitants of which 2,038 are female. 90% of these are of Tri ethnic group and most of them are animist. The main occupation is farming with slash and burn practice and livestock raising is supplementary. In the period of no farming production, the villagers go to the forest to collect the Non-Timber Forest Products (NTPF) or poach wildlife for the daily consumption or for selling. Details are provided in the above table.

Table 4- Population in Laving Lavern PPA

Village name	Nr Villages	Population		Nr HH	Ethnic				Religion		
		Total	Female		Lao	Tri	Ma kong	Phou Thai	Buddism	Animist	Christian
Sepone	8	2.763	1.342	516		8				8	
Ban Thaphing		819	410	163		✓				✓	
Ban Na		495	247	95		✓				✓	
Ban Sopsalou		298	165	57		✓				✓	
Ban Lavern		119	60	22		✓				✓	
Ban Spaong		237	113	51		✓				✓	
Ban Kok Lak		487	201	79		✓				✓	
Ban Tapong		183	87	26		✓				✓	
Ban Lou Salia		125	59	23		✓				✓	
Villabouly D	7	1.451	696	232		6		1	1	6	
Ban Angkham		280	138	37				✓	✓		
Ban Sopsaloung		178	76	32		✓				✓	
Ban Huaythong		294	137	39		✓				✓	
Ban Soung		175	83	29		✓				✓	
Ban Apom		116	54	21		✓				✓	
Ban Salor		273	133	50		✓				✓	
Ban Kalay		135	75	24		✓				✓	
Total	15	4.214	2.038	748		14		1	1	14	

Source: Planning and Investment Office of Vilabouly and Sepone Districts; Ang Kham Focus Zone and Fabang Focus Zone

Table 5 – Poverty evaluation matrix and Labour poytential in Laving Lavern PPA

Village Name	Household	HH with 16kg/ month/pers	HH with permanent home	HH affordable to health care	HH affordable to Education	HH with sufficient clothes	Villages that have access to	Villages that have access to	Villages that have access to safe water	Villages that have access to transport service	Main Labour		Secondary Labour (Children, Elderly, Disable)	
											Fem	Total	Fem	Total
Sepone District	471	343	220	420	415	439	3	7		2	804	1.623	538	1.140
Ban Thaphing	151	140	83	144	144	150	✓	✓		✓	285	511	125	308
Ban Na	77	40	45	69	71	58		✓			128	241	119	254
Ban Sopsalou	57	30	10	34	27	57		✓			100	225	65	73
Ban Lavern	16	11	1	15	15	16		✓			53	86	7	33
Ban Spaong	42	27	23	33	34	34	✓	✓		✓	62	122	51	115
Ban Kok Lak	79	56	45	77	76	75		✓			108	266	93	221
Ban Tapong	26	22	4	26	26	26	✓				40	114	47	69
Ban Lou Salia	23	17	9	22	22	23		✓			28	58	31	67
Villabouly D.	219	128	115	106	145	193	4	7		2	355	694	341	757
Ban Angkham	34	21	26	30	30	34	✓	✓		✓	72	134	66	146
Ban Sopsaloung	31	17	15	17	19	29	✓	✓		✓	40	85	36	93
Ban Huaythong	39	22	21	16	18	30	✓	✓			70	141	67	153
Ban Soung	27	14	7	5	12	20		✓			35	84	48	91
Ban Apom	20	13	6	9	15	17		✓			25	55	29	61
Ban Salor	45	29	29	20	38	43	✓	✓			71	131	62	142
Ban Kalay	23	12	11	9	13	20		✓			42	64	33	71
Total	690	471	335	526	560	632	7	14		4	1.159	2.319	909	1.899

Source: Planning and Investment Office of Vilabouly and Sepone Districts; Ang Kham Focus Zone and Fabang Focus Zone

In the proximity and within the PPA, there are 15 villages with a total population of 4,124 inhabitants in 748 Households (HH); of this population 2,038 are female. 90% of these are of Tri ethnic group, except in Ban Ang Kham village the people are Phou Thai ethnic, all are animist.

The people living in this area are poor (table 5), most of the people are shorted of rice, not affordable to all daily needs namely education, medicine, clothes. All of the people practice the slash and burn cultivation to grow rice and other crops namely maize, cassava, water melon and cucumber. In addition, there are collection of NTPF and poaching of wildlife for daily consumption or for selling.

1.4.2. Education status

Table 6 - Information on education

No	Village Name	Population		Primary School	Nr of Teachers	Nr of scholars		Nr of Illiterate persons	
		Total	Female			Total	Female	Total	Female
I.	Sepone District	2.763	1.342	08	08	264	72	275	45
1.	Ban Thaphing	819	410	1	1	60	21	43	8
2.	Ban Na	495	247	1	1	51	16	100	20
3.	Ban Sopsalou	298	165	1	1	35	12	75	8
4.	Ban Lavern	119	60	1	1	18	2	2	0
5.	Ban Spaong	237	113	1	1	37	5	14	0
6.	Ban Kok Lak	487	201	1	1	28	10	33	9
7.	Ban Tapong	183	87	1	1	20	4	5	0
8.	Ban Lou Salia	125	59	1	1	15	2	3	0
II.	Villabouly D.	1.451	696	07	12	259	112		
1.	Ban Angkham	280	138	1	3	75	39	56	12
2.	Ban Sopsaloung	178	76	1	1	28	11	14	0
3.	Ban Huaythong	294	137	1	1	25	10	11	0
4.	Ban Soung	175	83	1	2	26	12	7	0
5.	Ban Apom	116	54	1	1	26	7	5	0
6.	Ban Salor	273	133	1	3	51	18	21	0
7.	Ban Kalay	135	75	1	1	28	15	9	0
	Total	4.214	2.038	15	20	523	184		

Source: District Education Office; Ang Kham Focus Zone and Fabang Focus Zone

In the proximity of and within the PPA, the education is slowly developed as shown in table 6. Of 15 villages there are 14 villages where primary school exists, except Ban Tapong village. The main problem is there are only 2-3 classes in each school and there is no upper primary school, except Ban Ang Kham village. Other

issue is lack of teachers. Most of teachers teach more than one class. The school is in very poor conditions. Due to the above factors, the education is not properly developed, the illiterate rate is high, and the children at the scholarship age do not attend school. In addition, table 6 shows that the ratio of school enrollement is quite high between male and female.

1.4.3. Public Health

Table 7 - Information on Public Health

No	Village Name	Village Health Center	Village health volunteers	Water source for Household consumption	Toilet
I. Sepone District					
1.	Ban Thaphing	1	yes	Well, Gravity	no
2.	Ban Na	no	yes	River/Creek /Pond	no
3.	Ban Sopsalou		yes		no
4.	Ban Lavern		no		no
5.	Ban Spaong		yes		no
6.	Ban Kok Lak		no		no
7.	Ban Tapong	no	no		no
8.	Ban Lou Salia	no	no		no
II. Villabouly D.					
1.	Ban Angkham	1	yes		no
2.	Ban Sopsaloung	no	yes		no
3.	Ban Huaythong	no	no		no
4.	Ban Soung	no	yes		no
5.	Ban Apom	no	yes		no
6.	Ban Salor	no	yes		no
7.	Ban Kalay	no	yes		no

Total

Source: District Health Office; Ang Kham Focus Zone and Fabang Focus Zone

1.5. Infrastructure

- **Road:**

The road N23 is the main road that runs from the road N9 Xat Ban Na Bo of Sepone District through the western part of Laving Lavern PPA. From this road there are two accesses to the PA.

1st access: A dirty road starts from Ban Vang Hai village of Sepone District, to Fabang Focus Zone and Ban Sopsalou village and then follows Sebanghieng River to Ban Lavern, located in the PPA.

2nd access: A dirty road starts from Ban Keng Tao through Ang Kham Focus Zone of Vilabouly District to Ban Salor Village, located at the boundary of the PPA.

In general the communication in this region is not possible especially in PPA and target villages. The dirty road can only provide access to the focus zones, the access to the PPA and target villages can be only made by narrow road or trail, with depression and in some portion access could be done by water way on Sebangfai River. Therefore the access into the PPA and the communication between villages is not possible particularly in the wet season.

- **Electricity:**

No target village in the PPA has access to electricity provided by the national grid, except Ang Kham Focus Zone; Fabang Focus Zone uses the electricity generated by the individual generator using river flow, with less than 1% of population of villages living in the proximity of and within PPA.

- **Communication:**

Ang Kham Focus Zone of Vilabouly District is the only area that can use the mobile phone, and no communication in Fabang Focus Zone and other target villages is possible.

1.6. Economy and production

Economy and production in the proximity of and within the PPA is under developed. The shortage of rice of most of the population in this area is between 3 to 6 months per annum, the production is traditional and largely dependent to the nature.

Table 8 – Agricultural, livestock and fishery production

No	Village Name	Agricultural area			Indus- trial tree	Crop	Industrial tree		Livestock and Fishery						
		Wet season	Irriga- ted	S&B			Species	Area (Ha)	Buff alo	Cattle	Ho rse	Pork	Go at	Poult ry	Fish ery
I.	Sepone District	<u>34,75</u>	<u>9,8</u>	<u>252,92</u>	<u>17,3</u>	<u>1,7</u>			<u>340</u>	<u>809</u>	<u>2</u>	<u>761</u>	<u>198</u>	<u>2.042</u>	<u>5</u>
1.	Ban Thaphing	32,25	3,5	87,32	6,7		- Eagle wood - Industrial tree	0,85 0,63	120	286		150	20	555	5
2.	Ban Na			66,5	4	0,9			20	52	2	58	20	169	
3.	Ban Sopsalou			24					50	160		200	40	300	
4.	Ban Lavern			0,3					32	66		30	15	350	
5.	Ban Spaong	1,8	1,7	25,8	6,3	0,8			10	25		30	32	76	
6.	Ban Kok Lak	0,5	0,3	20					60	130		230	40	400	
7.	Ban Tapong		0,8	18					32	38		33	16	106	
8.	Ban Lou Salia	0,2	3,5	11	0,3				16	52		30	15	86	
II.	Villabouly D.	<u>14,3</u>		<u>105,6</u>		<u>6,1</u>			<u>398</u>	<u>300</u>		<u>266</u>	<u>124</u>	<u>2.432</u>	<u>8</u>
1.	Ban Angkham	14,3		6,4		2,9	Persea kursii	4	135	68	0	20		80	4
2.	Ban Sopsaloung	0	0	12,6		0,3	Persea kursii	1	23	35	0	30	15	200	2
3.	Ban Huaythong	0	0	5,2		0,3			30	15	0	15	10	100	
4.	Ban Soung	0	0	29		0,6			60	20	0	100	10	220	
5.	Ban Apom	0	0	17		0,6			32	21	0	45	21	465	
6.	Ban Salor	0	0	22,8		0,7			43	103	0	30	55	1200	2
7.	Ban Kalay	0	0	12.6		0,7			75	38	0	26	13	167	
	Total	<u>49,05</u>	<u>9,8</u>	<u>358,52</u>	<u>17,3</u>	<u>7,8</u>		<u>6,3</u>	<u>738</u>	<u>1.109</u>	<u>2</u>	<u>1.027</u>	<u>322</u>	<u>4.474</u>	<u>13</u>

Source: District Agriculture and Forest Office; Ang Kham Focus Zone and Fabang Focus Zone

1.6.1. Agricultural production and forestry

As described above, primary occupation of most of the population is the slash and burn cultivation for rice and other crop. In addition, the NTFP collection and poaching occur. Table 8 shows that the agricultural area is limited especially the paddy field cover only 40.5ha, and mostly distributed in two villages (Ban Thaping of Sepone District and Ban Ang Kham of Vilabouly District). While other 13 target villages have no paddy field and the slash and burn agriculture is the main practice with a total area of 358.52 ha, which is considered as large area. The main crop includes: rice, maize, cassava, sweet potatoes. The industrial crop in the area consists of *Persea kursii* (Yang Bong) and eagle wood; other crops are limited.

- **Forest resource and NTFP use**

As described above, most of the population occupation is the slash and burn cultivation for rice and other crop. In addition, the NTFP collection and poaching occur. Table 8 shows the agricultural area is limited especially the paddy field cover only 40.5ha, and main parts are distributed in two villages (Ban Thaping of Sepone District and Ban Ang Kham of Vilabouly District); while other 13 target villages have no paddy field and the slash and burn agriculture is the main practice with a total area of 358.52 ha, that is considered as large area. The main crop included: rice, maize, cassava, sweet potatoes. The industrial tree plantation in the area consists of *Persea kursii* (Yang Bong) and eagle wood; and other crops are limited. The NTFPs play important for the livelihood of the people living in the proximity of and in the PPA, the main income is generate from the sale of NTFPs namely the bark of *Persea kursii*, beberin (*Coscinium fenestratum*), orchids, rattan and bamboo shoots. In addition, the income is also obtained from the sale of wildlife product and in return is used to purchase the necessary goods and daily food. The NTFPs collection and poaching by the local people generate negative impacts such as degradation of non timber forest resources and loss of wildlife species.

1.6.2. Handicraft and processing

The handicraft production in the area is limited to the interlace (bambou) and weave for the household use. The industrial processing is not developed.

1.6.3. Trade and service

The trade and service in the area is not developed, except in the focus zone where the trade is operated, however it is very limited and does not generate regular income.

Part II. Analysis of impact and threat

2.1. Analysis methodology(Problem Tree)

The problem analysis is done in a brainstorming meeting with the local people and concerned officers (from Focus Zone, Provincial Forestry Office, and District Administration) to discuss the problem and threat to the PA, as well as their causes, so that the key problems that impacted and are impacting Laving Lavern PPA are overviewed. Details of problem analysis are given as in figure 1.

2.2. Impact and threat on Laving Lavern PPA

The occupation of the local people is primarily slash and burn farming for rice and other crops such as cassava, maize, peanuts; and the traditional hunting seems necessary for their survival. Other issues are: (i) the PPA boundary is not well demarked; (ii) the regulation on the PPA management is not available; and (iii) the community development is not done. In conclusion the impacts to Laving Lavern PPA could be summarized as follows:

2.2.1. Slash and burn agriculture

Most of local people practice slash and burn agriculture; this is due to the land and forest land allocation and assistance for livelihood development for the village in the proximity of and within Laving Lavern PPA were not done. Another reason for slash and burn practice occurrence is the high slope of the area, except the terrace along Sebanghieng River. The terrace is flat and could be developed and transformed to paddy field for rice production. However the resource and labor for this labor intensive undertaking is limited and the paddy field is therefore very limited (Table 8). Furthermore, in these remote areas, the local people, are doted with low level of education, the trade and service do not exist, alternatives of livelihood is not available and therefore the traditional practice of slash and burn cultivation is the best mean for their daily subsistence.

2.2.2. Land allocation

The land and forest land allocation is not implemented due to the lack of financial and human resources.

2.2.3. Seasonal production

The production in the area depends largely on the nature and it is seasonal due to the lack of irrigation system to support the dry season production (irrigated rice field cover about 9.8 ha). Furthermore, due to the lack of health care service in this remote area, the health problem of local people is another factor that impacts the production.

2.2.4. Illegal logging and NTFP collection

The illegal logging and NTFP collection are main impacts to the PPA; however, it could not be totally solved, because the majority of the local people depend on the PPA natural resources for their primary subsistence and income generation. Furthermore, the use of timber forest product and NTFPs increases with the growth of population in the area and the management measures for Laving Lavern PPA is yet developed and implemented.

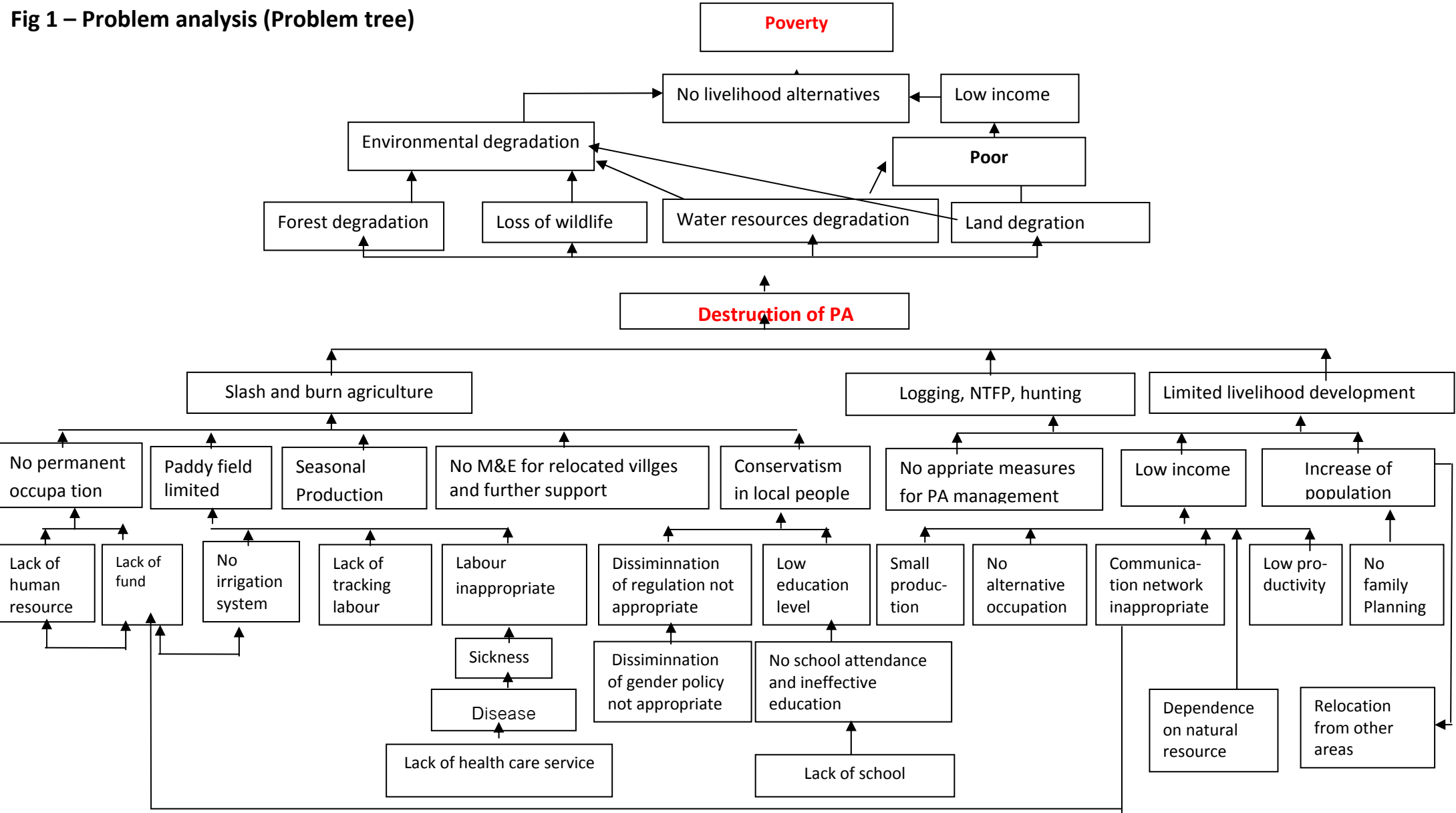
2.2.5. Low income

The income generation has limited options and depends therefore on the natural resources. The production in the area is limited and mostly for subsistence. Assistance for income generation is not developed. Fund for development is limited, in some village where the potential for income generation has no access road. Productivity and quality of products are low due to low technology. In addition, livelihood alternatives are not available in exception slash and burn cultivation, NTFP collection, and wildlife hunting and trade; and the later can generate cash that local people can pay for the necessary daily food and goods.

2.2.6. Livelihood development

The road and other infrastructures are critical for the livelihood development; however, the access road and the road between villages are yet developed. The access by road is possible only in dry season. Therefore the access to villages and the communication between villages are mostly done by walking. Furthermore, the access to some villages could not be done only in dry season along the river, when the water in the river is low. In some PPA target villages which are also target of the poverty reduction program, the Poverty Reduction Fund is there; however its support to development is still limited. Due to underdeveloped infrastructure and limited financial support in the area, the development of livelihood of local people is constrained.

Fig 1 – Problem analysis (Problem tree)



Part III. Objective Analysis and Strategic Plan for PA Management

3.1. Objective analysis (Problem tree)

Following the analysis of problem by organizing the brain streaming meeting attended by the representatives of relevant villages, focus zones and districts of the PPA, the change from negative problem tree to positive problem tree or objective tree and from the impact to benefit is the methodology to solve the problems (see figure 2).

The analysis shows that the key problems in the area are the encroachment of forest area, illegal logging, NTFP harvesting as well as the demaging wildlife poaching and the lack of alternatives for livelihood. Therefore the strategy of the management plan focuses on solving main causes of problems by taking into account the local context.

3.2. Strategy for PA Management

To solve the problems occurred and to develop the livelihood of local people living in the proximity of and within the PA and at the same time to conserve the forest resources including aquatic and wildlife as well as other biodiversity, the strategy for conservation and development consists of 6 programs as the following:

- 1. Zoning and sustianble management of the natural resources in the PA; strengthening the management through the local staff capacity building, staffing properly following the PA organizational structure.***
- 2. Development of livelihood by diversifying occupation for the local people taking into account the potential of the area.***
- 3. Survey on the potential for ecotourism development.***
- 4. Scientific survey focusing on the internationally and nationally important species for further conservation.***
- 5. Construction of necessary infrastructure for the PA Management.***
- 6. Awareness bulding on forest and biodiversity conservation.***

All the 6 programs were discussed by the technical team representing the Focus Zone, districts and province.

3.2.1. Zoning and sustainable management of the natural resources in the PA; strengthening the management through the local staff capacity building, staffing properly following the PA organizational structure.

This program consists of project on survey and zoning and, after that, project on land use planning in the PPAs to clearly define specific areas on the map and in the field. These areas include management zone, core zone and corridor. At the same time, a clear regulation on management has to be developed in consultation with local people. Another critical issue is the development of organizational structure and the staffing should be properly done, taking into account the number and the quality of staff. The training and study tour should also be organized for exchange of experiences and enhancing the capacity of local staff on PA management and development. The best is a project on technical capacity building for the relevant district staff, particularly from forestry, agricultural and livestock sub-sectors, village volunteer and committee. The capacity building will ensure the readiness and necessary capacity to implement the relevant responsibility for extension.

3.2.2. Development of livelihood by diversifying occupation for the local people taking into account the potential of the area

As result of the problem analysis (problem tree), the key and overarching issue occurring and impacting Laving Lavern PPA is the poverty. The poverty has many causes that include lack of area for production, low productivity, and no alternatives for livelihood improvement and occupational development that can generate regular family income. Therefore, this program focuses on the development of agricultural production for sale as well as other alternatives especially annual crop, industrial crop, fruit tree, livestock, NTFP domestication, handicraft development, tourism and other services , taking into account the local potential. This aims at reducing gradually the poverty.

3.2.3. Development of ecotourism

The development of ecotourism is an important program to generate income of local people for the long run, and therefore, the program has to develop a project to undertake survey on ecotourism potential. If the result of the survey is promising, the PA may be declared as ecotourism site and the follow-up activities are marketing and human resource development.

3.2.4. Scientific survey on biodiversity

Laving Lavern PPA is rich in biodiversity resources, as shown by the result of the survey by NUOL in collaboration with the technical team comprised of staff of the provincial and district Forestry Division and village committee during February 16 to March 10, 2010 (see annex). Due to the budget constraint, the above survey has to be shortened and has not covered all the PPA; and due to limited experience of the team, the result of the survey is incomplete and the information may be inaccurate. The biodiversity resources in the PPA may be higher than what is shown in the survey report. In another hand, the survey focused on mammals and birds, while the aquatic resources and reptiles were rapidly assessed due to the lack of specialist on fish and reptile. Besides, the area was subject to the wildlife monitoring with camera trap by WCS in the Northeast of the PA and the result of the monitoring shows that the area contains more nationally and internationally significant species for conservation, these species includes clouded leopard, Striped Rabbit, Doug Langur and number of bird species.

The biodiversity Program will focus on the monitoring survey in the whole Laving Lavern PPA, and assessing the population of nationally and internationally threatened species and/or nearly extinct species for further conservation.

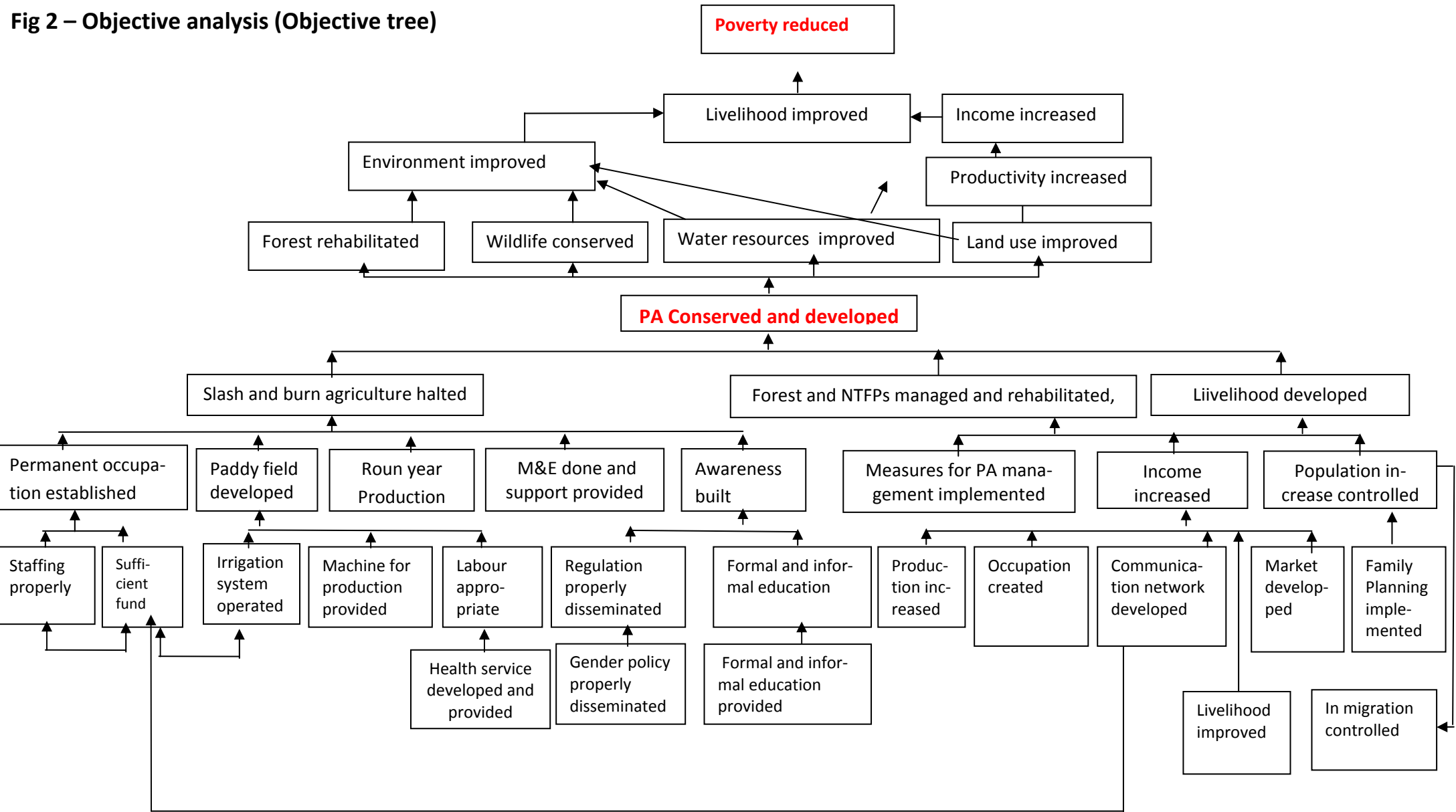
3.2.5. Construction of basic infrastructure for the PA Management

The main infrastructure for the PA Management included the field office, checking point, necessary equipment for the PA operation and the field work such as electric generator (solar cell), safe water supply system from ground water or gravity-fed water where is possible.

3.2.6. Awareness building on forest and biodiversity conservation

The Program aims at disseminating relevant regulations to local people, awareness building for the scholars and local people through the distribution of printed material and poster, radio program, mass media, and meeting with local people to increase better understanding about the importance of natural resources and aquatic and wildlife.

Fig 2 – Objective analysis (Objective tree)



3.3. Program Project and prioritization

3.3.1. Project program

Based on the result of problem analysis and objective analysis (part II and part III), the overall objective of the Laving Lavern PPA is developed. The overall objective is 'to manage sustainably the abundant forestry and biodiversity resources in the PPA and develop the livelihood of the people living in the proximity of and within the PPA'. To meet the overall objective, 6 programs are developed as follows:

- 1. Zoning and sustainable management of the natural resources in the PA; strengthening the management through the local staff capacity building, staffing properly following the PA organizational structure.***
- 2. Development of livelihood by diversifying occupation for the local people taking into account the potential of the area.***
- 3. Survey on the potential for ecotourism development.***
- 4. Scientific survey focusing on the internationally and nationally important species for further conservation.***
- 5. Construction of basic infrastructure for the PA Management.***
- 6. Awareness building on forest and biodiversity conservation.***

The above programs focus on the conservation and development aiming and improving the livelihood of the people living in the proximity of and within the PPA and their participation in the conservation of PA and biodiversity. Therefore, there is a need to implement simultaneously many projects to complete a program. The projects were identified based on the local context as follows:

- ***Program 1: Zoning and sustainable management of the natural resources in the PA; strengthening the management through the local staff capacity building, staffing properly following the PA organizational structure*** comprises of the following projects:
 1. Land use planning and land allocation
 2. Boundary demarcation and zoning (core zone, management zone, corridor) and development of regulation on resource use in different areas.
 3. Patrolling to monitor the change in forest, illegal logging, wildlife poaching and NTFP harvesting that are not complying with the PA regulation.

4. Establishment of the village volunteers as network of local coordination.
 5. Training need assessment and preparation implementation plan for training and study tour.
 6. Provision of necessary office equipment and vehicle for the PA operation in the PA office and the field work
- ***Program 2: Development of livelihood by diversifying occupation for the local people taking into account the potential of the area*** comprises of the following projects:
 1. Extension of crop production, industrial tree plantation, fruit tree plantation based on the local context.
 2. Support the livestock and poultry farming.
 3. Support the handicraft development.
 4. Support the domestication and rehabilitation of NTFPs.
 5. Support the market development.
 - ***Program 3: Survey on the potential for ecotourism development*** comprises of the following projects:
 1. Undertake survey on ecotourism potential including natural, cultural and historic aspects in the PPA.
 - ***Program 4: Biodiversity conservation*** comprises of the following projects:
 1. Biodiversity survey (plant, wild life, insect);
 2. Assess the population and status of the internationally and nationally important species (Cuora trifasciata, Black Bear, Wreathed Hornbill, Striped Rabbit, Marble cat).
 - ***Program 5: Construction of basic infrastructure for the PA Management*** comprises of the following projects:
 1. Construction of field office, checking point, and facilities such as toilet, safe water from ground water or gravity-fed water supply system where is possible and electric generator or solar system.

- **Program 6: Awareness building on forest and biodiversity conservation** comprises of the following projects:
 1. Awareness building on the forestry resources for the different social groups living within and outside the area.
 2. Production of materials, brochure, stickers, bill board, newspaper and radio or TV program.

3.3.2. Project prioritization

The project prioritization is based on the following criteria:

- Importance of the conservation,
- Contribution to the national program,
- Contribution to the poverty reduction,
- Involvement of the local people, and
- Beneficial to the community.

The project prioritization is based on each criteria score from 0 to 3 (based on the Nam Et Phou Leuy NPA). The project which has highest score from the 5 above criteria is ranked as 1 and the lower is ranked lower. (Details are given as in Annex).

Table 8 – Priority projects

No	Projects	Priority
1.	Land use planning and land allocation	1
2.	Boundary demarcation and zoning (core zone, management zone, corridor) and development of regulation on resource use in different areas.	1
3.	Patrolling to monitor the change in forest, illegal logging, wildlife poaching and NTFP harvesting that are not complying with the PA regulation.	2
4.	Extension of crop production, industrial tree plantation, fruit tree plantation based on the local context.	2
5.	Support the livestock and poultry farming.	2

No	Projects	Priority
6.	Support the handicraft development.	2
7.	Support the domestication and rehabilitation of NTFPs.	2
8.	Support the market development.	4
9.	Establishment of the village volunteers as network of local coordination.	3
10.	Training need assessment and preparation implementation plan for training and study tour.	3
11.	Provision of necessary office equipment and vehicle for the PA operation in the PA office and the field work	2
12.	Undertake survey on ecotourism potential including natural, cultural and historic aspects in Laving Lavern PPA.	4
13.	Biodiversity survey (plant, wild life, insect).	1
14.	Assess the population and status of the internationally and nationally important species namely: Cuora trifasciata, Black Bear, Wreathed Hornbill, Striped Rabbit, Marble cat).	1
15.	Construction of field office, checking point, and facilities such as toilet, safe water from ground water or gravity-fed water supply system where is possible and electric generator or solar system.	2
16.	Awareness building on the forestry resources for the different social groups within and outside the area.	3
17.	Production of material brochure, stickers, bill board, newspaper and radio or TV program.	3

3.4. Stakeholder analysis and budget estimate

3.4.1. Stakeholders

3.4.1.1. Village level

The villagers are key stakeholders for the PA management because they live in the PA and depend largely on the PA natural resources. The stakeholders at the village level are: villagers, village administration of all villages located in the proximity of or within the PA. They benefit directly from the implementation of the project.

3.4.1.2. Business

The business sector is the important stakeholder because the government cannot implement all aspects of PA development, as the fund is limited. Therefore the business sector is encouraged to involve in the PA development especially the tourism site development and tour service, and support other good production.

3.4.1.3. District level

The district stakeholders are representatives of District Agriculture and Forestry Office (DAFO), Education Office, Health Office, Governor's Office, Defense Office, Security Office and Information Office. The DAFO forestry Unit is responsible for the overall forestry management, including the dissemination and monitoring of the implementation of relevant law and regulations on forestry conservation and rehabilitation, while the agriculture unit, livestock unit and irrigation unit are responsible for the implementation of development activities. The District Defense Office and army forces are responsible for the patrolling and monitoring of the hunting and illegal logging. While other sectors have to provide support, coordinate and involve relevant groups in the implementation of projects, according to their responsibility.

3.4.1.4. Provincial level

The Provincial stakeholders are representatives of Provincial Agriculture and Forestry Office (PAFO), Planning and Investment Office, Tourism Office and governor of two districts. PAFO is responsible for the supervision of PA conservation, coordination with all provincial and central relevant parties and technical support. The Planning and Investment Office is responsible for the funding support to the PA project, facilitate the investment of private sectors on tourism development and participate in the project evaluation, while other Provincial Offices are responsible for supporting the implementation of developmental activities.

3.4.1.5. National level

The key stakeholder at national level is the Department of Forestry (DOF) Division of Forestry Resources conservation (DFRC). In fact, DOF develop the policy on PA and watershed conservation, coordinate with all relevant national agencies and international organization on the funding purposes, undertake the monitoring and evaluation (M&E), and support the project implementation including technical assistance.

3.4.1.6. International organization

The organizations working on the biodiversity conservation, watershed management, environmental protection, wildlife conservation are stakeholders. These stakeholders play important role in providing the technical support and implementing the international policy on the nature conservation.

The stakeholder analysis emphasizes all stakeholders from village to national level and international level with their concern related to the implementation of the plan and their benefits.

3.4.2. Cost estimate

The cost estimate is prepared for five year, while the annual budget will be developed according to need and the availability of the fund.

Table 9 - Cost estimate for 5 year

No	Projects	Budget (US\$)
1.	Land use planning and land allocation	90,000
2.	Biodiversity survey	80,000
3.	Boundary demarcation and zoning (core zone, management zone, corridor) and development of regulation on resource use in different areas	60,000
4.	Patrolling	150,000
5.	Extension of crop production, industrial tree plantation, fruit tree plantation	100,000
6.	Support the livestock and poultry farming	30,000
7.	Support the handicraft development	20,000
8.	Support the domestication and rehabilitation of NTFPs	45,000
9.	Provision of necessary office equipment and vehicle for the PA operation in the PA office and the field work	80,000
10.	Construction of field office, checking point, and facilities	70,000
11.	Establishment of the village volunteers	10,000
12.	Training need assessment and preparation implementation plan for training and study tour.	100,000
13.	Dissemination of regulation; Awareness building on the importance of the conservation for the local communities and other social groups	75,000
14.	Support the market development.	20,000
15.	Undertake survey on ecotourism potential	50,000
16.	Village development Fund	100,000

17.	Database on the PA	20.000
18.	Monitoring and evaluation	40.000
19.	Maintenance	20.000
	Total	1.160.000
	Operating cost 20%	232.000
	Grand Total	1.392.000

3.5. Organizational structure and responsibility

3.5.1. Organizational structure

The organizational structure is developed for Laving Lavern PA to implement project activities. The figure 3 shows that at least 32 positions should be properly staffed for the effective implementation of Laving Lavern PPA projects. These positions are as follows:

- **Implementing Team**
 - 1 Head of PA
 - 2 Deputy Heads of PA
- **Administration Unit**
 - 1 planning Officer
 - 1 Accountant
 - 1 driver
- **Community Development Unit**
 - 1 forestry staff
 - 1 agricultural staff
 - 1 livestock staff
 - 1 irrigation staff
- **Conservation Unit**
 - 1 staff on awareness
 - 1 staff on patrolling
- **Checkpoints**
 - 20 staff

3.5.2. Responsibility of agencies

3.5.2.1. Supervisor at national level

The Department of Forestry (DOF) at national level is responsible for the development of policy on PPA. The DOF has also to coordinate with all relevant national agencies, international organization on the funding purposes, monitoring and evaluation (M&E), and support the implementation of project including technical assistance.

3.5.2.2. Provincial Steering Committee

The PPA conservation link with the activities of many parties and therefore there is a need for the effective and successful implementation to establish the coordination network especially with the concerned provincial departments and districts. The committee comprises of the PAFO Director and governors of Sepone and Vilabouly Districts. The Committee is responsible to provide technical and management guidance to the implementing team in line with socio-economic development plan of province and districts and the priority program of the Ministry of Agriculture and Forestry. The committee has also to coordinate with relevant sectors at the district and provincial levels.

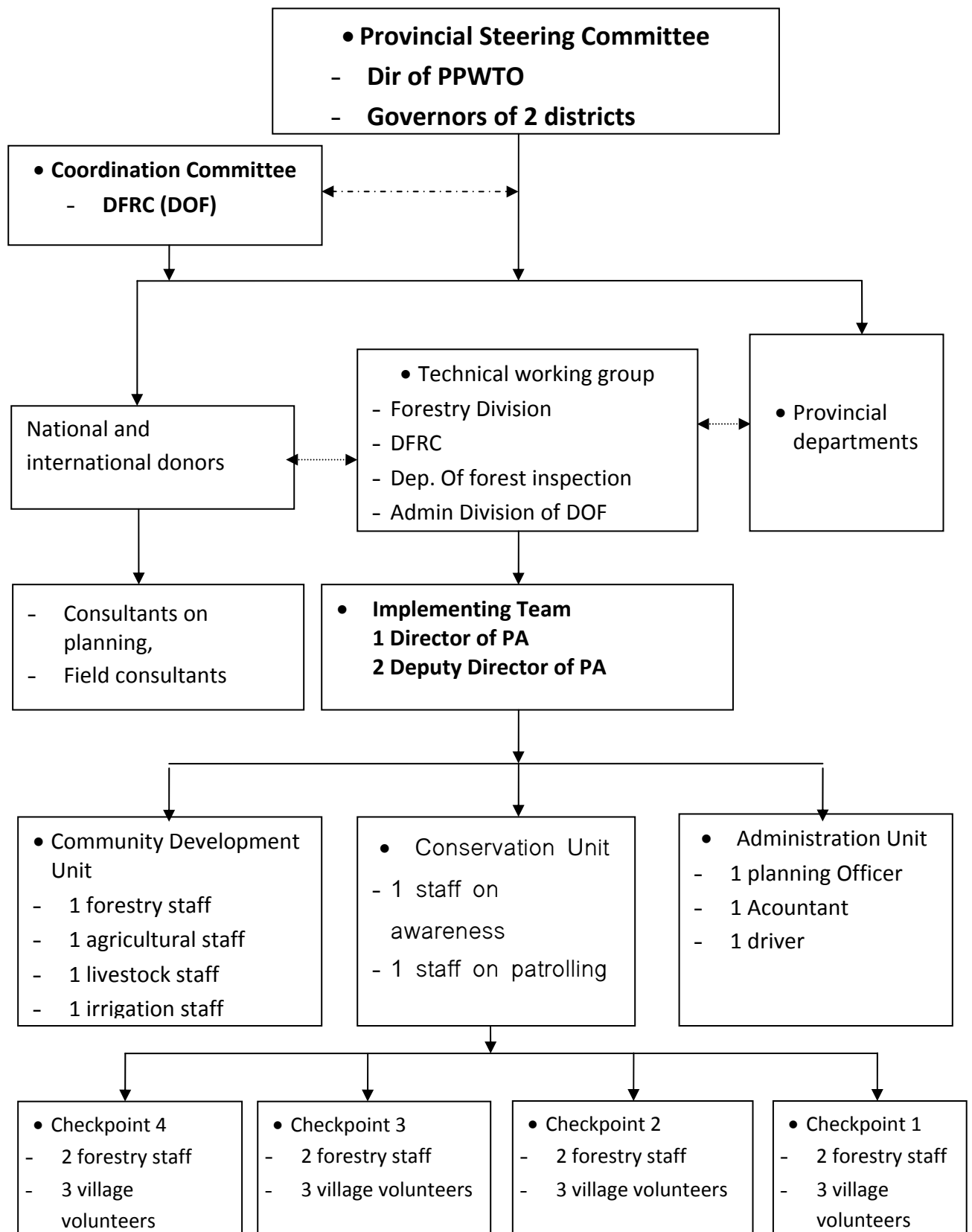
3.5.2.3. Technical working group

The Technical Working Group is responsible for the support on technical and management aspect, monitoring and regular supervision of the project implementation and solving all problems during the implementation.

3.5.2.4. Implementing Team

The Implementing Team is responsible for the day-to-day management of the project implementation including the preparation of documents, agreements, implementation plan, project activities, budget, staffing and the technical and regular progress reports for approval by the management.

Fig 3: Organizational structure for the PPA (Draft)



Annex 1: List of wildlife recorded in the Laving Lavern PPA

1.1. Mammals

No	Family	Species Name		Area surveyed		
		Lao name	Scientific name	NE	C	W
1	Bovidae	ກະທົງ	<i>Bos gaurus</i>	(x)	(x)	(x)
2	Bovidae	ເຍືອງ	<i>Naemorhedus sumatraensis</i>	(x)	(x)	[x]
3	Canidae	ໝາໃນ	<i>Couon alpinus</i>	(x)	(x)	(x)
4	Cercopithecidae	ລິງກັງ	<i>Macaca arctoides</i>	X	[x]	[x]
5	Cercopithecidae	ລິງຫາງຍາວ	<i>Macaca ascicularis</i>	(x)	(x)	(x)
6	Cercopithecidae	ລິງຫາງໝູ	<i>Macaca nemestrina</i>	(x)	(x)	(x)
7	Cercopithecidae	ລິງວອກ	<i>Macaca mulatta</i>	(x)	(x)	[x]
8	Cercopithecidae	ຂາແດງ	<i>Pygathrix remaeus</i>	(x)	(x)	[x]
9	Cercopithecidae	ຄ່າງດຳ	<i>Semnopithecus francoisi</i>	(x)	(x)	(x)
10	Cervidae	ສາວລາ	<i>Pseudoryx nghetinhensis</i>	(x)	(x)	[x]
11	Cervidae	ກວາງ	<i>Cervus unicolor</i>	(x)	[x]	[x]
12	Cervidae	ຟານດົງ	<i>Megamuntiacus vuquangensis</i>	(x)	[x]	[x]
13	Cervidae	ຟານແດງ	<i>Muntiacus muntjac</i>	(x)	[x]	X
14	Falidae	ເສືອໂຄ່ງ	<i>Panthera tigris</i>		(x)	(x)
15	Falidae	ເສືອດາວ	<i>Panthera pardus</i>	(x)	(x)	(x)
16	Falidae	ເສືອລາຍເມກ	<i>Pardofelis nebulosa</i>	(x)	(x)	(x)
17	Falidae	ເສືອລາຍຫິນອ່ອນ	<i>Pardofelis marmorata</i>			(x)
18	Falidae	ເສືອແມວ	<i>Prionailurus bengalensis</i>	[x]	[x]	[x]
19	Falidae	ເສືອໄຟ	<i>Catopuma temminkii</i>	(x)	(x)	(x)
20	Herpestidae	ຈ່ອພອນຄາງເຫຼືອງ	<i>Mustela kathiah</i>	(x)	(x)	[x]
21	Herpestidae	ຈ່ອພອນກິນປູ	<i>Herpestes urva</i>	(x)	(x)	[x]
22	Hylobatidae	ທະນີແກ້ມເຫຼືອງ	<i>Hylobates gabriellae</i>	X	(x)	(x)
23	Huisticidae	ເພັ້ນ	<i>Hystrix brachyura</i>	(x)	[x]	X
24	Huisticidae	ຫອນ	<i>Atherurus macrourus</i>	(x)	(x)	(x)
25	Leporidae	ກະຕ່າຍປ່າ	<i>Lepus pequensis</i>	(x)	(x)	(x)
26	Leporidae	ກະຕ່າຍສາຍພູຫຼວງ	<i>Nesolagus sp</i>	(x)	(x)	(x)
27	Lorisidae	ລິງລົມໃຫຍ່	<i>Nycticebus pygmacus</i>	(x)	(x)	(x)
28	Lorisidae	ລິງລົມນ້ອຍ	<i>Nycticebus coucang</i>	(x)	(x)	(x)
29	Nanidae	ລິ້ນຄວາຍ	<i>Manis Javanica</i>	(x)	(x)	(x)
30	Manidae	ລິ້ນງົວ	<i>Manis pentadactyla</i>	(x)	[x]	[x]

31	Muridae	ອັນໃຫຍ່	<i>Rhizomys sumatranus</i>	(x)	(x)	(x)
32	Muridae	ອັນນ້ອຍ	<i>Rhizomys pruinosus</i>	(x)	(x)	(x)
33	Muridae	ໝູຫວາຍ ຫາງຍາວ	<i>Leopoldamys sabanus</i>	(x)	(x)	(x)
34	Muridae	ໝູພຸກໃຫຍ່	<i>Bandicota indica</i>	(x)	(x)	(x)
35	Muridae	ໝູທ້ອງຂາວ	<i>rattus rattus</i>	[x]	[x]	X
36	Mustelidae	ໝາໄມ້	<i>Martes flavigula</i>		(x)	(x)
37	Mustelidae	ນາກນ້ຳເລັບສັ້ນ	<i>Ambloynyx cinerea</i>	[x]	(x)	(x)
38	Mustelidae	ນາກນ້ຳໃຫຍ່ຂົນລຽບ	<i>Lutrogale perspicillata</i>	[x]	(x)	(x)
39	Mustelidae	ໝູລິງ	<i>Arctonyx collaris</i>	(x)	(x)	(x)
40	Prionodontidae	ເຫງັ້ນຫາງປ້ອງ	<i>Prionodon linsang</i>	(x)	(x)	[x]
41	Prionodontidae	ເຫງັ້ນຫາງປ້ອງ ລາຍຈຸດ	<i>Prionodon pardicolor</i>		(x)	(x)
42	Pterropodidae	ບ່າງລົ້ວໃຫຍ່	<i>Petaurista philippensis</i>	(x)	(x)	(x)
43	Pterropodidae	ເຈຍຖ້ຳທົ່ວໄປ	<i>Hipposideros armiger</i>	X	X	X
44	Pterropodidae	ເຈຍປີກ້ວຍ	<i>Eonycteris spelaea</i>	X	(x)	(x)
45	Pterropodidae	ເຈຍນ້ອຍທຳມະດາ	<i>Cynopterus brachyotis</i>	X	X	X
46	Pterropodidae	ປິ້ງໄມ້ຟາງ	<i>Tylonycteris robustula</i>	(x)	(x)	X
47	Pterropodidae	ປິ້ງໃບຕອງກ້ວຍ	<i>Myotis muricola</i>	(x)	(x)	(x)
48	Sciuridae	ກະແຕ	<i>Tupaia belangeri</i>	(x)	(x)	[x]
49	Sciuridae	ກະດ່າງ	<i>Ratufa bicolor</i>	(x)	X	(x)
50	Sciuridae	ກະຮອກແດງ	<i>Collosciurus finlaysoni</i>	X	[x]	(x)
51	Sciuridae	ກະຮອກແກ້ມແດງ	<i>Dremomys rufigenis</i>	(x)	X	(x)
52	Sciuridae	ກະເລັນ	<i>Tamiops maritimus</i>	X	(x)	X
53	Suidae	ໝູປ່າ	<i>Sus scrofa</i>	X	[x]	[x]
54	Tragulidae	ໄກ້	<i>Tragulus napu</i>	(x)	(x)	(x)
55	Ursidae	ໝີ	<i>Ursus malayanus</i>	(x)	(x)	(x)
56	Ursidae	ເໝືອຍ	<i>Ursus thibetanus</i>	(x)	(x)	(x)
57	Viverridae	ເຫງັ້ນໝາກຄໍ້	<i>Paradoxurus hermaphroditus</i>		(x)	(x)
58	Viverridae	ເຫງັ້ນຫາງກ່າ	<i>Viverra zibetha</i>	(x)	(x)	(x)
59	Viverridae	ເຫງັ້ນຫາງກ່າລາຍຈຸດ	<i>Viverra megaspila</i>	(x)	(x)	(x)
60	Viverridae	ເຫງັ້ນອີ້ມ	<i>Viverricula indica</i>	(x)	(x)	(x)
61	Viverridae	ໝີຂໍ້	<i>Arctictis binturong</i>	(x)	(x)	(x)

Note: x= Seen and heard, [x]= trace, (x)= secondary information or from interview
NE: Nordeastern part (Laving Lavern); C: Central part (Ban Na-Sapong); W:
Western part (Ban Salor-Houay Soung).

1.2. Birds

No	Family	Species Name		Area		
		Lao name	Scientific name	NE	C	W
1	Accipitridae	ແຫວອີ່ມມ	<i>Spizeatus cirrhatus</i>		X	X
2	Accipitridae	ແຫວຫົວງອນ	<i>Aviceda jerdoni</i>		X	
3	Accipitridae	ແຫວນົກເຂົາ	<i>Accipiter badius</i>	X	X	X
4	Alcedinidae	ນົກກະເຕັນ	<i>Alcedo bercules</i>		X	
5	Alcedinidae	ນົກກະເຕັນຊິວຫຼແດງ	<i>Alecdo atthis</i>	X	X	X
6	Apodidae	ນົກແອ່ນຕົ້ນຕານ	<i>Cypsiurus balasiensis</i>	X	X	X
7	Apodidae	ນົກແອ່ນບ້ານ	<i>Apus pacificus</i>	X	X	X
8	Ardeidae	ນົກເຈົ້າຈອບ	<i>Ardeola bacchus</i>		X	X
9	Bucerotidae	ນົກແກງ ຫຼື ໝານ້ອຍ	<i>Anthracoceros albirostris</i>	(x)	X	(x)
10	Bucerotidae	ນົກກົກ	<i>Aceros nipalensis</i>	(x)	(x)	(x)
11	Centropodidae	ນົກກົດປັດ	<i>Centropus sinensis</i>	X	X	X
12	Cerylidae	ນົກເຕັນໃຫຍ່ລາຍ	<i>Magaceryle lugubris</i>			X
13	Cisticolidae	ນົກກະຈ່ອງ	<i>Orthotomus atroquularis</i>		X	X
14	Columbidae	ນົກມຸມດົງ	<i>Ducula badia</i>	(x)	(x)	X
15	Columbidae	ນົກເຂົ້າຕັ້	<i>Strptopeli orientalis</i>	X	X	X
16	Columbidae	ນົກເປົ້າປົກແດງ	<i>Treron pompadora</i>	(x)	(x)	X
17	Columbidae	ນົກເປົ້າປົກຂຽວ	<i>Treron bineineta</i>	(x)	(x)	X
18	Columbidae	ນົກເປົ້າຫຼັງຂຽວ	<i>Treron bicinctat</i>			X
19	Columbidae	ນົກເປົ້າໃຫຍ່	<i>Treron sieboldii</i>	X	X	X
20	Coraciidae	ນົກຂາບດົງ	<i>Eurystomus orientalis</i>		X	X
21	Corvidae	ນົກແຊງແຊວຫາງຍອຍ	<i>Dicrurus paradiseus</i>		X	X
22	Corvidae	ນົກແຊງແຊວຫາງແງ່ມ	<i>Dicrurus macrocercus</i>	X	X	X
23	Corvidae	ນົກແຊວມົ່ນ	<i>Dicrurus annectans</i>		X	X
24	Corvidae	ນົກເຫຼືອງ	<i>Oriolus chinensis</i>		X	X
25	Corvidae	ນົກພະຍາໄພ	<i>Pericrocolus brevirostris</i>		X	X
26	Corvidae	ນົກຂີ້ເທົ່າ	<i>Coracina polioptera</i>	(x)	(x)	X
27	Corvidae	ອີ່ກາ	<i>Convus macrorhynchos</i>	X		X
28	Eurostopodidae	ນົກກະບາທໍາມະດາ	<i>Caprimulgus indicus</i>			X
29	Eurostopodidae	ນົກກະບາໃຫຍ່	<i>Eurostopodus macrotis</i>			X
30	Halcyonidae	ນົກເຕັນໃຫຍ່ຫົວດໍາ	<i>Halcyon pileata</i>	X	X	X
31	Halcyonidae	ນົກກະເຕັນໃຫຍ່ຂຽວ	<i>Todiramphus chloris</i>	X	X	
32	Laniidae	ນົກແຈນແວນ	<i>Lunius colluriooides</i>	X		X
33	Megalaimidae	ນົກກະໂດກຫຼຽວ	<i>Megalaima faiostrieta</i>	X		X
34	Megalaimidae	ນົກປົກຫົວແດງ	<i>Megalaima flanklinii</i>	X		X
35	Muscicapidae	ນົກກະຈິກ	<i>Culicicapa ceylonensis</i>	X	X	X
36	Muscicapidae	ນົກໄກ່ຂວານໍ້າ	<i>Enicurus lescbenaultia</i>	X	X	
37	Muscicapidae	ນົກແຕ້ມປຸນ	<i>Copsychus saularis</i>	X	X	X
38	Nectariniidae	ນົກກະປັດຫອ້ງຂາວ	<i>Dicaeum concolor</i>		X	X

39	Nectariniidae	ນົກກາຝາກຫົວແດງ	<i>Dicaeum cruentatum</i>	X	X	
40	Nectariniidae	ນົກກາຝາກ ທ້ອງໝີນ	<i>Phylloscopus spp.</i>	X	X	X
41	Nectariniidae	ນົກກາຝາກປົກລາຍ	<i>Musicapa dauurica</i>		X	
42	Nectariniidae	ນົກກິນນ້ຳຫວາລາຍ	<i>Arachnothera magna</i>	X		
43	Nectariniidae	ນົກກະບົດຕົວແດງ	<i>Aethopyga gouldiae</i>	X	X	
44	Passeridae	ນົກກະແດບເດົ້າເຫຼືອງ	<i>Motacilla flava</i>			X
45	Passeridae	ນົກກະແດບເດົ້າ	<i>Motacilla alba</i>	X	X	
46	Passeridae	ນົກກະແດບເດົ້າຄື້ວຂາວ	<i>Dendronanthus indicus</i>			X
47	Passeridae	ນົກໄກ່ຂວານ້ຳຫຼັງເທົາ	<i>Enicurus schistaceus</i>	X	X	X
48	Passeridae	ນົກລົງເຕີ້ (ກະແດບເດົ້າ)	<i>Anthus richardi</i>			X
49	Passeridae	ນົກກະຈາບບ້າ	<i>Passer montanus</i>	X	X	X
50	Phasianidae	ນົກຍູງ	<i>Pavo muticus</i>			(x)
51	Phasianidae	ໄກ່ຂວາຫຼັງຂາວ	<i>Lophura nycthemera</i>	(x)	[x]	(x)
52	Phasianidae	ໄກ່ຂວານິນ	<i>Lophura chiaradi</i>	(x)	(x)	(x)
53	Phasianidae	ນົກກາງຂອດ	<i>Polyplectron bicalcaratum</i>	(x)	(x)	[x]
54	Phasianidae	ນົກວ່ວາວ	<i>Rheinardia ocellata</i>	(x)	(x)	(x)
55	Phasianidae	ໄກ່ປ່າ	<i>Gallus gallus</i>	X	X	X
56	Picidae	ນົກສະໄລ່ໃຫຍ່ຫົວແດງ	<i>Picus flavinucha</i>		X	
57	Picidae	ນົກສະໄລ່ຫົວດຳ	<i>Picus erythropygius</i>		X	
58	Picidae	ນົກສະໄລ່ຫອເຫຼືອງ	<i>Picus flavinucha</i>		X	
59	Pittidae	ແຕ້ວແລ້ວສີຟ້າ	<i>Pitta cyanea</i>			(x)
60	Psittacidae	ນົກກ່າງ	<i>Psittacula krameri</i>	(x)	(x)	
61	Psittacidae	ນົກແຂກ	<i>Psittacula alexandri</i>		X	
62	Pycnonotidae	ນົກຂວກ (ກະແທດພຸ່ມ)	<i>Pycnonotus blandordi</i>	X	X	X
63	Pycnonotidae	ນົກແກ້ດແກ້ດພຸ່ມ	<i>Phylloscopus spp.</i>	X	X	X
64	Pycnonotidae	ນົກຈຸກໃຫຍ່ຫົວດຳ	<i>Pycnonotus melanicterus</i>			X
65	Pycnonotidae	ກະແທດຫົວຈຸກກີ້ແດງ	<i>Pycnonotus jocosus</i>	X	X	X
66	Rallidae	ນົກໄກ່ນາເອີກຂາວ	<i>Amaurornis phoenicurus</i>			X
67	Rallidae	ນົກໄກ່ນາ	<i>Gallinula chloropus</i>			X
68	Scolopacidae	ນົກຂີ້ກະເດືອນ	<i>Tringa tetanus</i>			X
69	Strigidae	ນົກເຄົ້າໝາກກອກ	<i>Ghucidium cuculoides</i>	X	X	X
70	Strigidae	ນົກເຄົ້າກະແລວ	<i>Athene brama</i>			X
71	Strigidae	ນົກເຄົ້າຫນ້ອຍ	<i>Otus sunia</i>			X
72	Sturnidae	ນົກອ້າງຫົວຈຸກນ້ອຍ	<i>Acridotheres cinereus</i>	X	X	
73	Sturnidae	ນົກສາລິກາ	<i>Gracula religiosa</i>	X	X	
74	Sturnidae	ນົກອ້າງຂີ້ຕາຄວາຍ	<i>Acridotheres fuscus</i>	X	X	X
75	Sturnidae	ນົກອ້າງໝ່ວງ	<i>Acridotheres tristis</i>	X	X	
76	Sturnidae	ນົກອ້າງໃຫຍ່	<i>Acridotheres cristatellus</i>	X	X	
77	Sylviidae	ນົກເຕືອໄພ	<i>Ponatorbinus erythrogenys</i>		X	X
78	Sylviidae	ນົກທົວຂະໝັບແດງ	<i>Garrulax strepitans</i>		X	X
79	Sylviidae	ນົກທົວເທົາ	<i>Garrulax maesi</i>	X		
80	Sylviidae	ນົກກະລາງຫົວຂາວ	<i>Hirundo rustica</i> Linnaeus	X	X	X
81	Trogonidae	ນົກຫວ້າເອີກເຫຼືອງ	<i>Harpactes oreskios</i>		X	

82	Trogonidae	ນົກຫວ້າຫົວແດງ	<i>Harpactes erythrocephalus</i>	X		
83	Tytonidae	ນົກຜີພາຍ	<i>Tyto alba</i>	(x)	(x)	(x)
84	Tytonidae	ນົກເຄົ້າກູ້ຮູກ	<i>Otus bakkamoena</i>	X	X	X

1.3. Reptile and amphibian

No	Family	Species Name		Area surveyed		
		Lao name	Scientific name	NE	C	W
ຈຳພວກສັດເລືອຄານ						
1	Agamidae	ກະທ້າງ	<i>Physignathus cocincinus</i>	X	[x]	[x]
2	Agamidae	ກະປອມຄໍແດງ	<i>Calotes versicolor</i>	(X)	X	X
3	Bataguridae	ເຕົ້າຄໍາ	<i>Cuora trifasciata</i>	(X)	(X)	(X)
4	Bataguridae	ເຕົ້າງັບ	<i>Cuora galbinifrons</i>	(X)	(X)	(X)
5	Colubridae	ງູເຊືອກພັດເທລືອງ	<i>Dendrelaphis formosus</i>	(X)	X	(X)
6	Colubridae	ງູປາ	<i>Gerarda sp.</i>	(X)	(X)	X
7	Colubridae	ງູສາລາຍຈຽງໜ້າ	<i>Elaphe taeniura</i>		X	
8	Colubridae	ງູສາ	<i>Elaphe flavolineata</i>	(X)	(X)	(X)
9	Colubridae	ງູສິງຕາໂລ້	<i>Ptyas mucosus</i>	(X)	(X)	(X)
10	Colubridae	ງູຕາແຫ	<i>Xenochrophis sp.</i>	(X)	(X)	(X)
11	Elapidae	ງູຈົງອາງ	<i>Ophiophagus hannah</i>	(X)	(X)	(X)
12	Elapidae	ງູເຫົ່າດໍາ ຫຼື ດົງ	<i>Naja kaouthia</i>	(X)	(X)	(X)
13	Elapidae	ງູທໍາທານ ຫຼື ກ່ານປ້ອງ	<i>Bungarus sp.</i>	(X)	(X)	(X)
14	Gekkonidae	ກັບແກ້	<i>Gekko gekko</i>	X	X	X
15	Gekkonidae	ຈິ່ງມບ້ານຫາງໜາມ	<i>Hemidactylus frenatus</i>	X	X	X
16	Gekkonidae	ຈິ່ງມບ້ານຫາງແປ	<i>Hemidactylus platyurus</i>	X		
17	Platysternidae	ເຕົ້າຫົວໃຫຍ່ ຫຼື ເຕົ້າຫາງ	<i>Platysternon megacephalum</i>	(X)	(X)	(X)
18	Pythonidae	ງູເຫລືອມ	<i>Python molurus</i>	(X)	(X)	(X)
19	Pythonidae	ງູຫຼາມ	<i>Python reticulatus</i>	(X)	(X)	(X)
20	Scincidae	ຈິ່ງໂກະທອງ	<i>Mabuya multifasciata</i>	(X)	X	X
21	Scincidae	ຈິ່ງໂກະດໍາຂ້າງແດງ	<i>Lygosoma bowringii</i>		X	
22	Scincidae	ຈິ່ງມຕອງ	<i>Mabuya macularia</i>	(X)	(X)	X
23	Scincidae	ງູຂູ ຫລື ຈິ່ງໂກະຫາງຍາວ	<i>Takydromus sexlineatus</i>	(X)	(X)	(X)

24	Scincidae	ຈີ່ໂກະຫ້ວຍ	<i>Tropidophorus cocincinensis</i>	(X)	(X)	
25	Trionychidae	ປາຝາ	<i>Amyda sp.</i>	(X)	(X)	[X]
26	Varanidae	ແລນ	<i>Varanus bengalensis</i>	(X)	(X)	(X)
27	Varanidae	ເຫ້ຍ	<i>Varanus salvator</i>	(X)	(X)	(X)
28	Viperidae	ງູຂຽວຫົວໃຫຍ່	<i>Trimeresurus stejnegeri</i>	(X)	(X)	X
ຈຳພວກກົບຂຽດ						
1	Bufo	ຄັນຄາກບ້ານ	<i>Duttaphrynus melanostictus</i>	X	X	X
2	Bufo	ຄັນຄາກຫ້ວຍຕົວແປ	<i>Anonia sp.</i>		X	
3	Bufo	ຄັນຄາກຫ້ວຍໃຫຍ່	<i>Ingerophrynus sp.</i>			X
4	Dicroglossidae	ຂຽດມື້ນ ຫຼື ຂຽດຫ້ວຍ ຫົວກ່ານ	<i>Sphaerotheca rufescns</i>	X	X	
5	Dicroglossidae	ກົບຕຸ່ມ ຫລືກົບຫ້ວຍ	<i>Hoplobatrachus sp.</i>		X	
6	Dicroglossidae	ຂຽດອີ່ໂມ້ທຳມະດາ	<i>Fejervarya limnocharis</i>	(X)	(X)	(X)
7	Dicroglossidae	ກົບນາ	<i>Hoplobatrachus rugulosus</i>	(X)	(X)	(X)
8	Dicroglossidae	ຂຽດໂມ້ຫຼັງແຊກຂາວ	<i>Fejervarya sp.</i>		X	
9	Megophryidae	ຂຽດຫ້ວຍຕາແດງ ຫຼັງລາຍ	<i>Xenophrys major</i>			X
10	Microhylidae	ອີ່ງໝາກແດງ	<i>Kaloula mediolineata</i>	(X)	(X)	(X)
11	Microhylidae	ອີ່ງອ່າງບ້ານ	<i>Kaloula pulchra</i>	(X)	(X)	(X)
12	Microhylidae	ຂຽດຂາຄຳ	<i>Microhyla pulchra</i>	(X)	(X)	(X)
13	Microhylidae	ຂຽດນ້ຳເຕົ້າຂາລາຍ	<i>Microhyla sp.</i>	X	X	X
14	Microhylidae	ຂຽດນ້ຳເຕົ້າຫຼັງລາຍ	<i>Microhyla fissipes</i>	X		
15	Microhylidae	ຂຽດຫ້ວຍຂາຍາວ	<i>Microhyla berdmorei</i>	X		
16	Ranidae	ຂຽດຕະໂອດດຳ	<i>Rana sp.</i>	X		X
17	Ranidae	ຂຽດຕະໂອດໃຫຍ່ຫຼັງຂຽວ	<i>Rana sp.</i>		X	
18	Ranidae	ຂຽດຂຽວໃບບົວຂາລາຍ	<i>Odorrana livida</i>		X	
19	Rhacophoridae	ຂຽດຕະປາດບ້ານ	<i>Polypedates leucomystax</i>	(X)	(X)	(X)

1.4. Fish

No	Family	Species Name		Area surveyed		
		Lao name	Scientific name	NE	C	W
1	Channidae	ປາຄໍ່ກັ້ງ	<i>Channa orientalis</i>	X	(X)	(X)
2	Bagridae	ປາກົດ	<i>Mustus sp.</i>	(X)	X	(X)

3	Belonidae	ປາສາໂທງ	<i>Xenentodon sp.</i>	X	X	X
4	Cyprinidae	ປາຈາດ	<i>Poropuntius laoensis</i>	X	X	X
5	Cyprinidae	ປາອີ່ໄທ	<i>Cyclocheilichthys repasson</i>	X	X	X
6	Cyprinidae	ປາຊີວ	<i>Rusbora paviei</i>	X	X	X
7	?	ປາເລີຍຫີນ	<i>Garra cambodgiensis</i>	(X)	(X)	X
8	Mastacembelidae	ປາຫຼາດ	<i>Mastacembelus sp.</i>	(X)	(X)	X
9	Siluridae	ປາເຊືອມ	<i>Ompok bimaculatus</i>	(X)	(X)	X
10	Mastacembelidae	ປາຫຼົດແຫ້ວ	<i>Mastacembelus armatus</i>	(X)	(X)	X
11	Bagridae	ປາສະແຍງ	<i>Mystus sp.</i>	X	X	X
12	Channidae	ປາຄໍ່	<i>Channa striata</i>	X	X	X
13	Clariidae	ປາດູກ	<i>Clarias batrachus</i>	(X)	X	X
14	Cobitidae	ປາຮາກກ້ວຍ	<i>Acanthopsis sp.</i>	X	X	X
15	Eleotridae	ປາບູ່	<i>Oxyeleotris marmoratus</i>	(X)	(X)	X
16	Cobitidae	ປາແຂ້ວໄກ້	<i>Botia sp.</i>	(X)	(X)	X
17	Cyprinidae	ປາຕອງ	<i>Poropuntius sp.</i>	(X)	(X)	X

Note: x= Seen and heard, [x]= trace, (x)= secondary information or from interview
NE: Nordeastern part (Laving Lavern); C: Central part (Ban Na-Sapong); W:
Western part (Ban Salor-Houay Soung).

Annex 2: Stakeholder analysis per program

Program 1: Zoning and sustainable management of the natural resources in the PA; strengthening the management through the local staff capacity building

Stakeholder	Concern/benefits	Impact
<i>Villagers</i>	<ul style="list-style-type: none"> - Land title - NTFP collection - Industrial tree plantation and NTFP - Job opportunity and income generation - Livestock Security - Training on agriculture and livestock - Joint-responsibility - Cooperation improved 	<ul style="list-style-type: none"> + +/- + + +/- + +/- +
<i>Village administration</i>	<ul style="list-style-type: none"> - Land use planning (for production) - Village boundary demarcation - Supplementary occupation - village forestry - Management capacity enhanced - Empower other parties to seek fund for village development - Coordination with target villages improved - Study tour 	<ul style="list-style-type: none"> + + + + + + +/- +
<i>Business</i>	<ul style="list-style-type: none"> - benefits 	<ul style="list-style-type: none"> -
<i>District agencies</i>	<ul style="list-style-type: none"> - Stabilization of Land use - Grievance on Land use - Land tax - Halt slash and burn agriculture - Wildlife conservation - Law enforcement - Technical capacity and English proficiency enhanced - Increase the number of staff - Improve coordination mechanism - Study tour 	<ul style="list-style-type: none"> + + + + +/- + + +/- +/- +
<i>Provincial agencies</i>	<ul style="list-style-type: none"> - Halt slash and burn agriculture - Met the target of the land and forest land allocation program - Support the marketable agricultural product production - Forest conservation - Plantation and rehabilitation - Wildlife conservation - Watershed management and soil erosion - Reduce slash and burn agriculture and hunting - Technical capacity enhanced 	<ul style="list-style-type: none"> +/- + +/- + + + + + +

	- Study tour	+
	- Coordination mechanism and operational procedure development	+
<i>National Agencies</i>	- Met the target of program on halting slash and burn agriculture	+
	- Poverty reduction	+
	- Increase forest coverage	+
	- Biodiversity conservation	+
	- Scientific studies	+
	- Met the target of the human resource development	+
	- Sufficient capacity for village to implement development project	+
	- Met the target of decentralization	+
<i>International organization</i>	- Improvement of environment	+
	- Environmental protection	+
	- Research on wildlife and forestry	+
	- Conservation of rare and threatened aquatic and wildlife	+
	- Livestock security	+/-
	- Coordination mechanism	+
	- Financial support to development activities	+/-

Program 2: Development of livelihood by diversifying the occupation for the local people, taking into account the potential of the area

Stakeholder	Concern/benefits	Impact
<i>Villagers</i>	- Revolving Fund and credit for village production	+
	- Increase agricultural production	+
	- Supplementary occupation	+
	- Market develop for export	+
	- Fair price	+
<i>Business</i>	- Support the business	+
	- Low price of goods	+/-
	- Bargain price	+/-
	- Reduce export tax	+
<i>Village administration</i>	- Increase income of villagers	+
	- Reduce the poverty	+
	- Support agricultural and handicraft production	+/-
	- Develop market for village products	+
<i>District agencies</i>	- Job opportunity	+
	- Tourism development	+/-
	- Support goods production	+/-
	- Market	+
	- Reduce the dependence on natural resources	+/-
	- Reduce the poverty	+
	- Reduce the slash and burn agriculture and hunting	+
<i>Provincial</i>	- goods production	+/-

<i>agencies</i>	- Food production - Poverty reduction - Market - Enhanced the technical capacity	+/- + + +
<i>National Agencies</i>	- Met the target of goods production - Met the target of Food production - Poverty reduction - Reduce the slash and burn agriculture	+ + + +/-

Program 3: Survey on the potential for ecotourism development

Stakeholder	Concern/benefits	Impact
<i>Villagers</i>	- Tour service - Job opportunity - Income from service increase	+ + +
<i>Business</i>	- Study on the tourism safety - Study on the safety for tourist	+ +
<i>Village administration</i>	- Investment in developing tourism site	+
<i>District agencies</i>	- Support tourism development - Revenue from business tax	+/- +
<i>Provincial agencies</i>	- Support tourism site development - Increase income of local people	+ +
<i>National Agencies</i>	- Tour service - Job opportunity - Income from service increase	+ + +
<i>International organization</i>	- Support the ecotourism and income generation	+

Program 4: Biodiversity conservation

Stakeholder	Concern/benefits	Impact
<i>Villagers</i>	- Wildlife conservation, wildlife population increase - Joint responsibility - Better cooperation on development	+/- +/- +
<i>Business</i>	- Forest resources abundant, livelihood developed, society in peace - Empower other parties to seek fund for village development - Village coordination mechanism improved - Livelihood improve	+ + + +
<i>Village</i>	- Cooperation in resources management	+

<i>administration</i>	- increase the number of staffs - Improve coordination mechanism - Study tour	+/- + +
<i>District agencies</i>	- Environment conserved, livelihood improved and peace society - Study tour - Improve coordination mechanism and operational procedure	+ + +
<i>Provincial agencies</i>	- Met the target on biodiversity conservation - Local people experienced and involve in the biodiversity survey - Met the target of the decentralization	+ + +
<i>National Agencies</i>	- Implement Strategy on biodiversity conservation of international organization - coordination mechanism - Activities funding	+ + +
<i>International organization</i>	- Sustainable biodiversity conservation, wildlife population increase - Co-responsibility - Better cooperation on development	+/- +/- +

Program 5: Construction of basic infrastructure for the PA Management

Stakeholder	Concern/benefits	Impact
<i>Villagers and Village administration</i>	- Accommodation for the PA staff - Accommodation required during the meeting/training	+ +
<i>PA staff</i>	- Field office - Checkpoint - Clean water, generator	+ + +
<i>International organization</i>	- Financial support on construction - Accommodation for the field staffs	+/- +

Program 6: Awareness building on forest and biodiversity conservation

Stakeholder	Concern/benefits	Impact
<i>Villagers</i>	- Public hearing and involvement in activity implementation - Understanding of laws and regulation on biodiversity conservation and of biodiversity importance	+/- +/-
<i>Village administration</i>	- Involve and support the team in the dissemination of relevant laws and regulation information on biodiversity conservation - Understanding of policy and regulations	+/- +
<i>District agencies</i>	- Cooperation in the resource conservation by local people - Environment conserved	+ +

<i>Provincial agencies</i>	- Environment conserved, livelihood improved and peace society	+
<i>National Agencies</i>	- Met the target on biodiversity conservation - Local people experienced and involve in the biodiversity survey - Met the target of the decentralization	+ + +
<i>International organization</i>	- Implement Strategy on biodiversity conservation of international organization - Activities funding	+ +/-

Annex 3: List of plant species recorded in the Laving Lavern PPA

1. Larger Tree

No	Lao name	Scientific name	Family
1	ເຫຼືອງດົງ	<i>Aglaia euphorioides</i> Pierre	Meliaceae
2	ເຫຼືອງ	<i>Aglaia grandis</i> Korth ex Miquel	Meliaceae
3	ສະແຄ	<i>Albizia lucidior</i> (Steudel) Nielsen	Leguminosae Mimosoideae
4	ຕີນໄກ່	<i>Alstonia rostrata</i> Fischer	Apocynaceae
5	ຕີນເປັດ	<i>Alstonia scholaris</i> (L.) R. Brown	Apocynaceae
6	ຫຳຄ່າງ	<i>Aphanamyxis cochinchinensis</i> Pierre	Meliaceae
7	ເໝືອດ	<i>Aporosa</i> sp.	Euphorbiaceae
8	ເປັນ	<i>Archidendron clypearia</i> (Jack) Nielsen	Leguminosae Mimosoideae
9	ຕາຟານ	<i>Ardisia evonymifolia</i> Pitard	Myrsinaceae
10	ຫາດ	<i>Artocarpus asperula</i> Gagnepain	Moraceae
11	ມີ້ປ່າ	<i>Artocarpus heterophyllus</i> Lamk.	Moraceae
12	ຫາດຂາວ	<i>Artocarpus</i> sp.	Moraceae
13	ດູກດັນ	<i>Arytera littoralis</i> Blume	Sapindaceae
14	ໝາກໄຟ	<i>Baccaurea oxycarpa</i> Gagnepain	Euphorbiaceae
15	ນົມຍານ	<i>Barringtonia annamica</i> Gagnepain	Barringtoniaceae
16	ຈິກດົງ	<i>Beilschmiedia</i> sp.	Lauraceae
17	ຂົມຝາດ	<i>Bischofia javanica</i> B1.	Euphorbiaceae
18	ງົ້ວປ່າ	<i>Bombax albidum</i> Gagnepain	Bombacaceae
19	ງົ້ວບ້ານ	<i>Ceiba pentandra</i> (L.) Gaertner	Bombacaceae
20	ກອກເຫຼື້ອມ	<i>Canarium subulatum</i> Guill.	Burseraceae
21	ກໍ່ໜາມ	<i>Castanopsis indica</i> (Roxburgh) A. DC.	Fagaceae
22	ໜາມນົມປ່າ	<i>Chrysophyllum</i> sp.	Sapotaceae
23	ຍົມຫິນ	<i>Chukrassia tabularis</i>	Meliaceae
24	ຍົມຫອມ	<i>Toona ciliate</i>	Meliaceae
25	ຍົມປ່າ	<i>Ailanthus triphysa</i> (Dennstedt) Alston	Simaroubaceae
26	ຈວງ, ສີໄຄຕົ້ນ	<i>Cinnamomum</i> sp.	Lauraceae
27	ດູກຂຽດ	<i>Codariocalyx motorius</i> Ohashi	Leguminosae Papilionatae
28	ຕົ້ວສົ້ມ	<i>Cratoxylum formosum</i> (Jack) Dyer	Hypericaceae
29	ຕົ້ວແດງ	<i>Cratoxylum formosum</i> (Jack) Dyer subsp.	Hypericaceae

No	Lao name	Scientific name	Family
		pruniflorum Gogel.	
30	ເປົ້າ	<i>Croton joufra</i> Roxburgh	Euphorbiaceae
31	ຕັບເຕົ້າຕົ້ນ	<i>Croton sp.</i>	Euphorbiaceae
32	ໝາກລໍ້າ	<i>Dalbergia balansae</i> Prain.	Leguminosae Papilionatae
33	ຄໍາພີ່ເຫຼືອງ	<i>Dalbergia oliveri</i> Prain	Leguminosae Papilionatae
34	ຄໍາພີ່ດົງ	<i>Dalbergia sp.</i>	Leguminosae Papilionatae
35	ສະໂງ່ມ	<i>Derris alborubra</i> Hemsley	Leguminosae
36	ລໍາໄຍປ່າ	<i>Dimocarpus sp.</i>	Sapindaceae
37	ຮາງຮ້ອນ	<i>Diospyros gardneri</i> Thwaites	Ebenaceae
38	ກ້ວຍລົງ	<i>Diospyros glandulosa</i> Lace	Ebenaceae
39	ນາງດໍາ	<i>Diospyros mum</i> H. Lec.	Ebenaceae
40	ຍາງແດງ	<i>Dipterocarpus costatus</i> Gaertner f.	Dipterocarpaceae
41	ຍາງດົງ	<i>Dipterocarpus retusus</i> Blume	Dipterocarpaceae
42	ບາກ	<i>Anisoptera costata</i>	Dipterocarpaceae
43	ແຄນເຮືອ	<i>Hopea odorata</i>	Dipterocarpaceae
44	ຊູ	<i>Vatica sp.</i>	Dipterocarpaceae
45	ສ້ານແຂງ	<i>Dillenia indica</i> L.	Dilleniaceae
46	ສະຕອງ	<i>Elaeocarpus robustus</i> Roxburgh	Elaeocarpaceae
47	ສົ້ມມູນ	<i>Elaeocarpus siamensis</i>	Elaeocarpaceae
48	ຮັກຍອງ	<i>Elaeocarpus sp.</i>	Elaeocarpaceae
49	ກະຈະ	<i>Erythrophleum fordii</i> Oliv.	Leguminosae Caesalpinioideae
50	ຫາງດີ	<i>Eurya acuminata</i> DC.	Theaceae
51	ແປ່ມ	<i>Garcinia gracilis</i> Pierre	Guttiferae
52	ສົ້ມໂມງ	<i>Garcinia oliveri</i> Pierre	Guttiferae
53	ກົ້ວ	<i>Garcinia sp.</i>	Guttiferae
54	ຂີ້ໜອນ	<i>Garcinia tinctoria</i> (DC) Wight	Guttifera
55	ຂີ້ມອດ	<i>Glochidion fagifolium</i> Miquel	Euphorbiaceae
56	ບົກ	<i>Irvingia malayana</i> Oliver ex A. Bennett	Simaroubaceae
57	ເປືອຍຂາວ	<i>Lagerstroemia calyculata</i> Pierre	Lythraceae
58	ເປືອຍນໍ້າ	<i>Lagerstroemia speciosa</i> Pierre	Lythraceae
59	ເປືອຍຂົນ	<i>Lagerstroemia duperreana</i> Pierre	Lythraceae

No	Lao name	Scientific name	Family
60	ສີໄຄຕົ້ນ	<i>Litsea cubeba</i> (Lour.) Pers.	Lauraceae
61	ບີໝີ	<i>Litsea sp.</i>	Lauraceae
62	ກໍ່ກັງງ	<i>Lithocarpus pattaniensis</i> Barnett	Fagaceae
63	ກໍ່	<i>Lithocarpus sp.</i>	Fagaceae
64	ກໍ່ນົກ	<i>Quercus kerrii</i> Craib	Fagaceae
65	ກໍ່ໜາມ	<i>Quercus sp.</i>	Fagaceae
66	ກໍ່ຂີ້ໝູ	<i>Lithocarpus magneinii</i> (Hickel & A. Camus) A. Camus	Fagaceae
67	ກໍ່	<i>Castanopsis indica</i> (Roxburgh) A. DC	Fagaceae
68	ຕອງທາວ	<i>Mallotus barbatus</i> (Wallich) Mill.Arg.	Euphorbiaceae
69	ປໍ່	<i>Mallotus paniculatus</i> (Lamk.) Mill.Arg.	Euphorbiaceae
70	ມ່ວງ	<i>Mangifera longipetiolata</i> King	Anacardiaceae
71	ມ່ວງປ່າ	<i>Mangifera oblongifolia</i> Hook. f. see <i>M. odorata</i>	Anacardiaceae
72	ເໝືອດແອ້	<i>Memecylon edule</i> Roxburgh	Melastomataceae
73	ຂີ້ໝູ	<i>Ormosia cambodiana</i> Gagnepain	Leguminosae Papilionatae
74	ຫົວໂລ້ນ	<i>Parkia sumatrana</i> Miquel	Leguminosae Mimosoidae
75	ສະຝາງ	<i>Peltophorum dasyrachis</i> Kurz	Leguminosae
76	ໝີ	<i>Schima wallichii</i> (DC.) Korth.	Theaceae
77	ແຕ້ໜາມ	<i>Sindora siamensis</i> Teysm. ex Miq.	Caesalpinioideae
78	ກອກ	<i>Spondias pinnata</i> (Koenig & L.F.) Kurz.	Anacardiaceae
79	ປໍ່ລິ້ນ	<i>Sterculia bracteata</i> Gagnepain	Sterculiaceae
80	ແຄຝອຍ	<i>Stereospermum fimbriatum</i> (Wallich ex G.	Bignoniaceae
81	ສົ້ມມໍ່	<i>Terminalia chebula</i> Retzius	Combretaceae
82	ແຫນ	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae
83	ພຸງ	<i>Tetrameles nudiflora</i> R. Br. & Benn	Datisceae
84	ປໍ່ຫູ	<i>Trema velutina</i> Blume	Ulmaceae
85	ຕີນນົກ	<i>Vitex peduncularis</i> Wall.	Verbenaceae
86	ສະຄ່າງ	<i>Vitex tripinnata</i> (Loureiro) Merrill	Verbenaceae
87	ຂີ້ຈາກ	<i>Walsura angulata</i> Craib	Meliaceae
88	ມູກ	<i>Wrightia pubescens</i> R.Br.	Apocynaceae
89	ຕໍ່ແລນ	<i>Xerospermum laoticum</i> Gagnepain	Sapindaceae
90	ແງວປ່າ	<i>Xerospermum sp.</i>	Sapindaceae

No	Lao name	Scientific name	Family
91	ສົ້ມກົບ	<i>Terminalia sp.</i>	Combretaceae
92	ສະໂກ	<i>Anthocephalus chinensis</i> (Lamk.) A. Rich ex Walp.	Rubiaceae
93	ກ້ານເຫຼືອງ	<i>Anthocephalus sp.</i>	Rubiaceae
94	ຂາວ	<i>Adina cordifolia</i> Roxburgh	Rubiaceae
95	ຫວ້າ	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae
96	ກະເດົາຊ້າງ	<i>Melia azedarach</i> L.	Meliaceae
97	ກຸ່ມນ້ຳ	<i>Hymenopyramis brachiata</i> Wallich	Verbenaceae
98	ກ່ອງຕາເສືອ	<i>Aphanamyxis cochinchinensis</i> Pierre	Meliaceae
99	ກະໂດນນ້ຳ	<i>Barringtonia acutangula</i> (L.) Gaertner	Barringtoniaceae
100	ຮືງ	<i>Keteleeria evelyniana</i> Masters	Pinaceae
101	ແປກ 2 ຍອຍ	<i>Pinus merkusii</i> Junghuhn & De Vriese	Pinaceae
102	ແປກ 3 ຍອຍ	<i>Pinus kesiya</i> Royle ex Gordon	Pinaceae

2. Shrub

No	Lao name	Scientific name	Family
1	ຕີນຕັ່ງ	<i>Anomianthus dulcis</i> (Dunal) J. Sinclair	Annonaceae
2	ໝາກເໝົ້າ	<i>Antidesma sp.</i>	Stilaginaceae
3	ຕາປູ	<i>Aphanamyxis polystachya</i> (Wallich) R. N. Parker	Meliaceae
4	ຕາຟານ	<i>Ardisia sp.</i>	Myrsinaceae
5	ໜາດ	<i>Blumea sp.</i>	Compositae
6	ຊາໝັ້ງ	<i>Camellia sp.</i>	Theaceae
7	ບຶງນາງ	<i>Carallia brachiata</i> (Loureiro) Merrill	Rhizophoraceae
8	ຈັນໄດ	<i>Dracaena cambodiana</i> Pierre ex Gagnepain	Liliaceae
9	ຄອນແຄນ	<i>Dracaena elliptica</i> Thunberg	Liliaceae
10	ໜາມແໜຄ່າ	<i>Eranthemum pulchellum</i> Andrews	Acanthaceae
11	ພຸດປ່າ	<i>Gardenia cambodiana</i> Pitard	Rubiaceae
12	ພຸດ	<i>Gardenia sp.</i>	Rubiaceae
13	ສົ້ມຊື່ນ	<i>Glycosmis parvifolia</i> (Sims) Little	Rutaceae
14	ປໍຊີອິນ	<i>Helicteres viscida</i> Blume	Sterculiaceae
15	ແຂມປ່າ	<i>Ixora cuneifolia</i> Roxburgh	Rubiaceae
16	ແຂມແດງ	<i>Ixora stricta</i> Roxb.	Rubiaceae

No	Lao name	Scientific name	Family
17	ດອກຊ້ອນ	<i>Jasminum sambac</i> (L.) Aiton	Oleaceae
18	ຕ້າງໄກ່	<i>Leea sp.</i>	Vitaceae
19	ໝາກຫວດ	<i>Lepisanthes rubiginosa</i> (Roxburgh) Leenh.	Sapindaceae
20	ເປັນອ້າ	<i>Melastoma sanguineum</i> Sims	Melastomataceae
21	ຜັກຫວານປ່າ	<i>Melientha suavis</i> Pierre	Opiliaceae
22	ດູກໄກ່ດໍາ	<i>Microdesmis caseariaefolia</i> Planchon ex Müll.-Arg.	Euphorbiaceae
23	ກາມກຸງ	<i>Morindopsis capillaris</i> Kurz	Rubiaceae
24	ເຂັມຂາວ	<i>Pavetta indica</i> L.	Rubiaceae
25	ຂີ້ໄກ່	<i>Phyllanthus roseus</i> Beille.	Euphorbiaceae
26	ຫາງເສືອ	<i>Uraria macrostachya</i> Wallich	Leguminosae - Papilionatae
27	ຮັກດຽວ	<i>Walsura robusta</i> Roxburgh	Meliaceae
28	ໜາມເລັບແມວ	<i>Ziziphus oenoplia</i> (L.) Miller	Rhamnaceae

3. Vascular

No	Lao name	Scientific name	Family
1	ນົມມ້າ	<i>Ficus ischnopoda</i> Miquel	Moraceae
2	ໄສແດງ	<i>Ficus altissima</i> Blume	Moraceae
3	ໄສຊຽວ	<i>Ficus annulata</i> Blume	Moraceae
4	ໄສ	<i>Ficus callosa</i> Willdenow	Moraceae
5	ເຕືອປ່ອງ	<i>Ficus hispida</i> L. f.	Moraceae
6	ເຕືອນ້ຳ	<i>ficus sp.</i>	Moraceae
7	ເຕືອ	<i>Ficus sp.</i>	Moraceae
8	ໄສ	<i>Ficus semicordata</i> Buch.-Ham.	Moraceae

4. Bamboo

No	Lao name	Scientific name	Family
1	ໄຜ່ແທ້	<i>Bambusa sp.</i>	Poaceae
2	ໄຜ່ປ່າ	<i>Bambusa arundiana var. spinosa</i> Retz.	Poaceae
3	ໄຜ່ກະຊະ	<i>Bambusa flexuosa</i> Munro	Poaceae
4	ໄຜ່ເຮັຍ	<i>Cephalostachyum virgatum</i> Kurz.	Poaceae

5	ໄຜ່ພາງ	<i>Dendrocalamus lonoifimbriatus</i>	Poaceae
6	ໄຜ່ຊາງ	<i>Dendrocalamus strictus</i> (Roxburgh) Nees	Poaceae
7	ໄຜ່ຊອດ	<i>Oxytenanthera parvifolia</i> Br. (gigantochloa?)	Poaceae

5. Therophyte

No	Lao name	Scientific name	Family
1	ຜັກໜອກດົງ	<i>Centella sp.</i>	Umbelliferae
2	ຜັກສອບແສ້ບ	<i>Connarus semidecandrus</i> Jack	Connaraceae
3	ຜັກອີ່ເລີດ	<i>Piper massiei</i> DC.	Piperaceae
4	ພູປ່າ	<i>Pipersp.</i>	Piperaceae
5	ຄ່າຂົມ	<i>Alpinia bracteata</i> Roxburgh	Zingiberaceae
6	ຄ່າປ່າ	<i>Alpinia purpulata</i> (Veiell.) K. Schum	Zingiberaceae
7	ຄ່ານ້ອຍ	<i>Alpinia sp.</i>	Zingiberaceae
8	ໝາກແໜ່ງປ່າ	<i>Amomum ovoideum</i> Pierre see <i>A. xanthioides</i>	Zingiberaceae
9	ໝາກແໜ່ງແດງ	<i>Amomum villosa</i>	Zingiberaceae
10	ເອື້ອງດົງ	<i>Aneilema herbaceum</i> (Roxburgh) Wallich	Commelinaceae
11	ບອນ	<i>Colocasia antiquorum</i> Schott.	Araceae
12	ບອນຂາວ	<i>Colocasia esculenta</i> (L.) Schott	Araceae
13	ຫຍ້າຫາງກາ	<i>Cyperus diffusus</i> Vahl	Cyperaceae
14	ຫຍ້າກາບຂາວ	<i>Cyperus sp.</i>	Cyperaceae
15	ເລົາ	<i>Erianthus arundinaceus</i> (Retzius) Jeswiet	Gramineae
16	ຫຍ້າຄາ	<i>Imperata cylindrica</i> (L.) Beauvois	Gramineae
17	ແຜ່ນດິນເຢັນ	<i>Murdannia edulis</i> (Stokes) Faden	Commelinaceae
18	ກ້ວຍປ່າ	<i>Musa acuminata</i> Colla	Musaceae
19	ເຕີຍນ້ອຍ	<i>Pandanus sp.</i>	Pandanaceae
20	ຜັກປ່າມ	<i>Salvinia cucullata</i> Roxburgh ex Bory	Pteridophyta - Salviniaceae
21	ຫຍ້າຫຼ່ຽມ	<i>Scleria sp.</i>	Cyperaceae
22	ແຂມ	<i>Thysanolaena latifolia</i> (Roxburgh ex Hornem) Honda	Gramineae
23	ຜັກໜອກ	<i>Centella asiatica</i> (L.) Urban	Umbelliferae

6. Lianes

No	Lao name	Scientific name	Family
1	ເຄືອຕົດໝາ	<i>Paederia tomentosa</i> Blume	Rubiaceae
2	ເຄືອໜາມຫັນ	<i>Acacia pennata</i> (L) Willdenow subsp. <i>kerrii</i> Nielsen	Leguminosae - Mimosoideae
3	ເຄືອໃສ້ຕັນ	<i>Aganosma marginata</i> G. Don	Apocynaceae
4	ເຄືອສົ້ມຂ່ອຍ	<i>Ampelocissus latifolia</i> Roxburgh	Vitaceae
5	ເຄືອຫາງກວາງ	<i>Ancistrocladus tectorius</i> (Loureiro) Merrill	Ancistrocladaceae
6	ເຄືອເຂົາແກບ	<i>Bauhinia curtisii</i> Prain	Leguminosae - Caesalpinioideae
7	ເຄືອສັງວ	<i>Bauhinia glauca</i> (Wallich ex Benth.) Benth.	Leguminosae - Caesalpinioideae
8	ຄັນໄດລົງ	<i>Bauhinia penicilliloba</i> Pierre	Leguminosae - Caesalpinioideae
9	ໜາມເຂັດເຂົາ	<i>Canthium</i> sp.	Rubiaceae
10	ເຄືອໜາກແຕກ	<i>Celastrus paniculatus</i> Willdenow	Celastraceae
11	ເຄືອຄາມ	<i>Cnestis ramiflora</i> Griffith	Connaraceae
12	ເຄືອຫວາຍດິນ	<i>Combretum decandrum</i> Roxburgh	Combretaceae
13	ເຄືອເປັນ	<i>Combretum</i> sp.	Combretaceae
14	ເຄືອແຫມ	<i>Coscinium fenestratum</i> (Gaertner) Colebr.	Menispermaceae
15	ເຄືອຄຳພີ	<i>Dalbergia</i> sp.	Leguminosae - Papilionatae
16	ເຄືອແມດ	<i>Dalbergia volubilis</i> Roxburgh	Leguminosae - Papilionatae
17	ເຄືອດ່າງ	<i>Glinus</i> sp.	Aizoaceae
18	ເຄືອມ້ວຍ	<i>Gnetum scandens</i> Roxburgh	Gnetaceae
19	ເຄືອໃສ້ໄກ່	<i>Ichnocarpus frutescens</i> (L.) R. Brown	Apocynaceae
20	ເຄືອສະຄາມ	<i>Indigofera</i> sp.	Leguminosae - Papilionatae
21	ເຄືອເຂືອງ	<i>Maclura obovata</i> Trec.	Moraceae
22	ເຄືອເຂືອງໜາມ	<i>Maclura</i> sp.	Moraceae
23	ເຄືອຂີ້ກາ	<i>Trichosanthes tricuspidata</i> Lour.	Cucurbitaceae
24	ເຄືອພິພ່ວນ	<i>Uvaria cordata</i> (Dunal) Alston	Annonaceae
25	ເຄືອຢານາງ	<i>Tiliacora triandra</i> (Colebr.) Diels	Menispermaceae

7. Palm

No	Lao name	Scientific name	Family
1	ຫວາຍຫາງໝູ	<i>Calamus balansaeanus</i> Beccari	Palmae
2	ຫວາຍບຸນ	<i>Calamus sp.</i>	Palmae
3	ຫວາຍຕົ້ວແຂງ	<i>Calamus sp.</i>	Palmae
4	ຫວາຍຝາດ	<i>Calamus sp.</i>	Palmae
5	ຫວາຍນົກຂໍ້	<i>Calamus sp.</i>	Palmae
6	ເຕົ້າຫາງ	<i>Caryota mitis</i> Loureiro	Palmae
7	ເຕົ້າຫາງໄກ່	<i>Caryota sp.</i>	Palmae
8	ຫວາຕາເລີກ	<i>Korthalsia grandis</i> Ridley	Palmae
9	ສານ	<i>Rhapis laosensis</i> Beccari	Palmae
10	ໝາກຄໍ້	<i>Livistona speciosa</i> Kurz	Palmae

8. Fern

No	Lao name	Scientific name	Family
1	ກູດຫອມ	<i>Acrostichum aureum</i> L.	Pteridoideae
2	ກູດນ້ອຍ	<i>Adiantum stenochlamys</i> Bak.	Pterydophyta - Parkeriaceae
3	ກູດດົງ	<i>Angiopteris evecta</i> (Forst.) Hoff.	Angiopteridaceae
4	ກູດເຄືອ	<i>Lygodium flexuosum</i> (L.) Swartz	Pterydophyta – Schizaeaceae
5	ກູດຫາງກວາງ	<i>Thelypteris heterocarpa</i> (Blume) Morton	Pterydophyta - Thelypteridaceae