ZONING, MAPPING AND SITE ASSESSMENT OF TBENG LECH AND OS SOM COMMUNITY FORESTS IN SIEM REAP AND KAMPONG THOM PROVINCES

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I INTRODUCTION

1.1 Background

Forest Administration (FA) reported in 2011 that deforestation rate from 2006 to 2010 was estimated at 0.5 % annually (FA, 2011). Forest degradation has reduced forest quality, diminished forest products, loss of native species diversity and threatened livelihoods of local communities. Furthermore, the impact of climate change has put more pressure to local livelihood.

Therefore, in order to contribute to the improvement of local livelihood and climate change mitigation, restoration forest has to be taken into account. Forest restoration refers to re-establish the presumed structure, productivity and species diversity of the forest originally present at a site. The ecological processes and functions of the restored forest will closely match those of the original forest.

The project "Multi-function forest restoration and management of degraded forest areas in Cambodia", launched in December 2011 aims at building capacity of local communities for restoration of community forests in Siem Reap and Kampong Thom provinces for production of timber and NTFPs as a means to improve livelihoods of local communities. In order to achieve the objective, a series of activities have been proposed, one of which is the assessment and zoning of the two pilot sites. At the completion of the project, project results and experience will be compiled, published and distributed to interested stakeholders.

1.2 Objective

The objective of this assignment is to conduct resources assessment and zoning and mapping out the Tbeng Lech and Ou Some community forestry (CF) in Siem Reap and Kampong Thom provinces, respectively.

II METHODOLOGY

2.1 Zoning and mapping

Based on available maps on the two communities, the team conducted rapid field assessment by using GPS device and the help from Google map as well as CF member consultation, zoning was divided mainly based on present forest cover (land cover). After consultation and site visits, maps were produced using ArcMap 2010.

2.2 Resource assessment

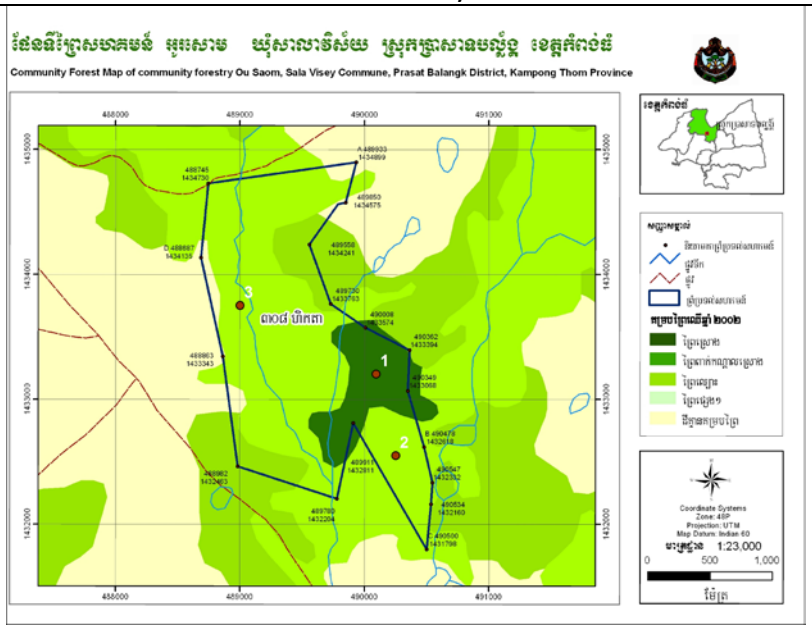
In order to have better picture about tree species and some physical characteristics of the two community forestry, sample plots were established in both communities. The main establishment of sample plots is to better understand tree species presented in each main forest/land cover type. Furthermore, secondary data on soil characteristics on both communities were reviewed.

Sample plots in Ou Some Community forestry: There were three sample plots in this community. These three sample plots located in different forest cover types, especially in semi-evergreen forest, abandon agricultural land area with grass and deciduous forest that

dominated with Tbeng (*Dipterocarpus obtusifolius)*. Figure 1 shows plot location in Ou Some community forestry.

Plot	X	Y
1	490085	1433213
2	490261	1432556
3	488993	1433767

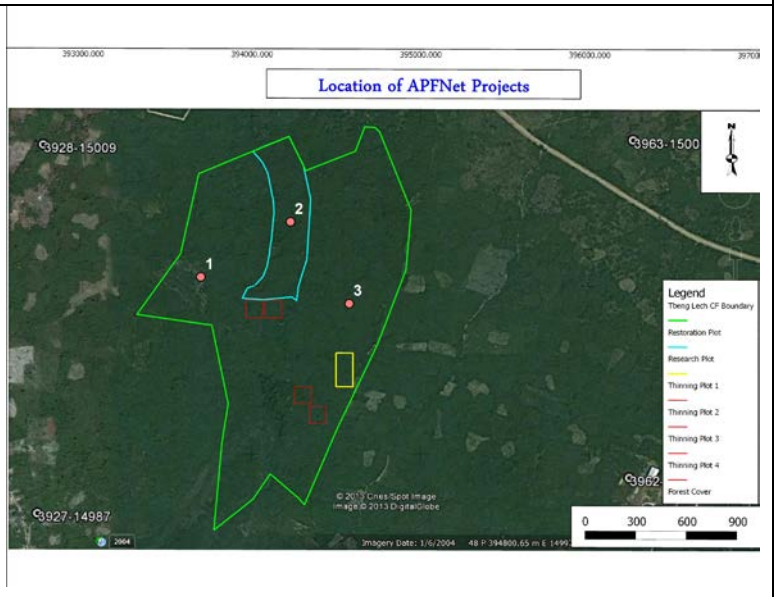
Figure 1: Map showing plot location in Ou Some Community Forestry



Sample plots in Tbeng Lech Community forestry: Three sample plots were established in this community as shown in Figure 2 below. Plots represent the land cover in the forest restoration site, former agricultural land area, and degraded evergreen forest in the community.

Plot	X	Y
1	393697	1500046
2	394233	1500380
3	394576	1499893

Figure 2: Map showing plot location in Tbeng Lech Community Forestry



Shape of sample plot: Each sample plot is rectangle with the size of 50x100m. Different subplots were established in each plot. As shown in Figure 3.

Data collection: Trees and seedlings were recorded in datasheet as shown in the Appendix 1 to Appendix 4. These data were collected from plots and subplots as shown in Table 1.

Figure 3: Lay out of plot and subplot in the two community forestry

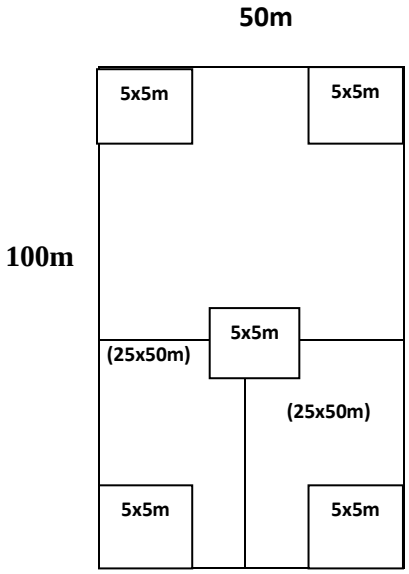


Table 1: data recording in each plot and subplot

No.	Plot and subplot	Trees, seedling and NTFP	Remark
1	50x100m	Tree with DBH≥30cm	Record tree species, height, and diameter (Appendix 1)
2	50x50m	Tree with DBH=10-29 cm	Record tree species, height, and diameter (Appendix 2)
3	25x50m	DBH<10cm (H>1m)	Record tree species, height, and diameter (Appendix 3)
4	5x5m	seedling	Record seedling (Appendix 4)

III ZONING AND MAPPING

3.1 Ou Some community forestry:

Based on Croker soil types, Ou Some community forest consisted of two soil types, namely: Plinthite podzols and Cultural hydromorphics as shown in Figure 4. Cultural hydroorphics are a group of soils strongly affected by rice cultivation (Kazutake & Keizaburo, 1966). Plinthite podzols is one of the more interesting features of the soils in Cambodia. This soil is little recharging of ground water supplies and impermeable substrata which promote surface runoff and severe erosion of the loose sandy surface (Crocker, 1962). Even, there are different soil types have been recorded by Crocker in 1962, the vegetation cover in this community seems not to be different based on this soil types such as deciduous forest are common in both soil types while degraded evergreen forest have been also been found in both soil types of the Southwest of the community. Therefore, using vegetation cover and

human activities for zoning this community would provide a better view about different zone in Ou Some community forest.

There are two main forest types have been observed during field visit. These two main forest types are deciduous and semi-evergreen forest. Both forest types have been disturbed by human activities through over harvesting, shifting cultivation, and forest fire. However, deciduous forest can be further classified into small patches of abandon agricultural land with grass and forest land area dominated with Tbeng (*Dipterocarpus obtusifolius)*.

Figure 4: Soil types in Ou Some Community Forest based on Croker soil type.

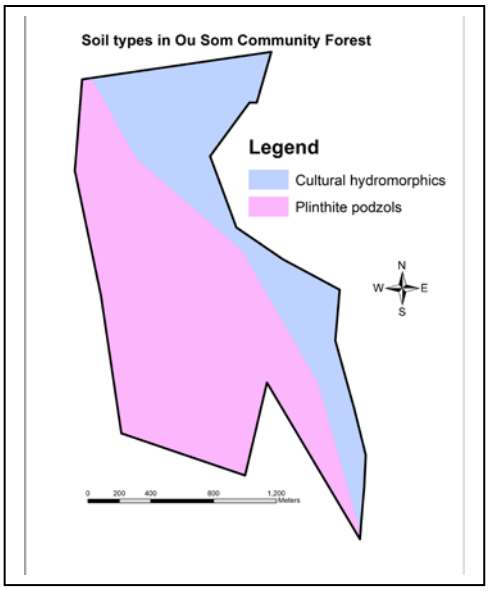
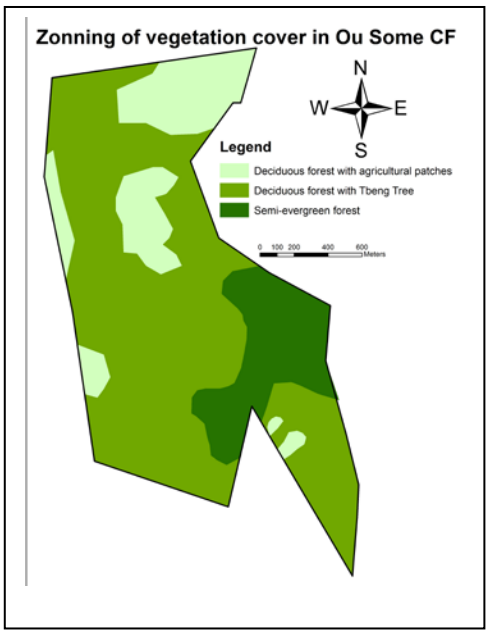


Figure 5: Zoning of Ou Some community forest based on forest cover and human activities



Abandon agricultural land with grass is observed having very low tree density. This abandon agricultural land is observed as small patches in most of community area, especially in the

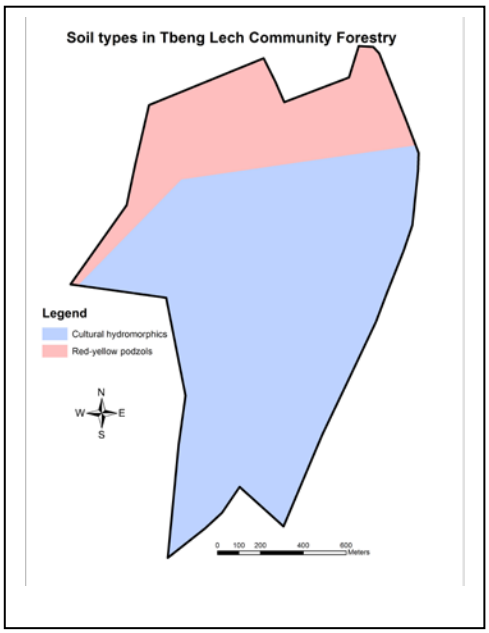
west part of the community which is impossible to map out within limited time. Therefore, only the main abandon agricultural land with grass was mapped out. This area used to be planted rice and left abandon for many years. Land area dominated by Tbeng (*Dipterocarpus obtusifolius)* are deciduous forest which was over harvested for some years while degraded semi-evergreen forests are mixed by deciduous tree species and evergreen tree speciees.

In general there are many species have been observed in this community. These species include Tbeng (*Dipterocarpus obtusifolius)*, Korkos (*Sindora cochinchinensis*), Pring, Popel (*Shorea cochinchinensis*), Chromas (*Vatica odorata*), Kray *(Polyalthia cerasoides),* Semoin (*Nephelium hypoleucum*), Trob Tum (*Crypteronia paniculata*), and Thlok. Some tree spcies can be used as NTFPs or as medicinal plant in their community such as Kray (Polyalthia cerasoides) and Trob Tum (*Crypteronia paniculata*). Beside different tree species, many other NTFPs have also been observed including, Ondeng Meas, Kandab Chang Eh, Kroput Chruk, and rattan.

3.2 Tbeng Lech community forestry:

Based on Croker soil types, Tbeng Lech community forest consisted of two main soil types, namely: Red-yellow podzols and Cultural hydromorphics as shown in Figure 6. Crocker (1962) described Red-yellow podzols as a soil type that has a low natural fertility in deeply developed acid soil profile. The A horizon is usually friable loamy sand or sandy loam while B horizon was sandy loam to clay loam.

Figure 6: Soil types in Tbeng Lech Community Forest based on Croker soil type.

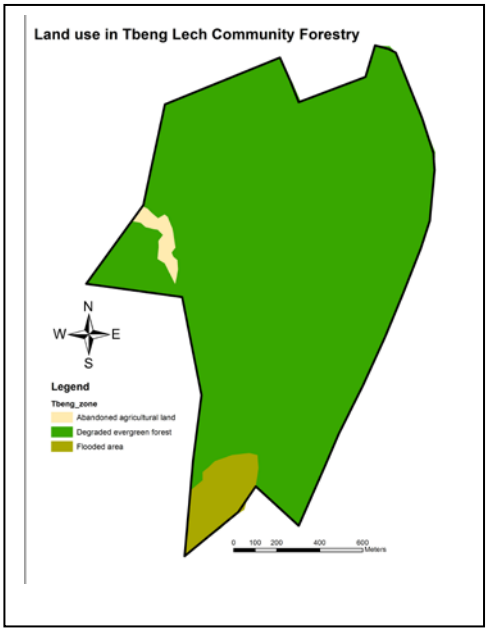


Again, the same in Ou Some Community Forest, the vegetation cover in Tbeng Lech Community Forest seems not to be different based on this soil types recorded by Crocker in 1962 such as degraded evergreen forest have been found in both soil types of the whole community. However, vegetation cover shows its different when there is some human activities and drainage system. Therefore, using vegetation cover caused by human activities and drainage system for zoning this community would provide a better view about different

zone in this community forest. Through field visit, the Southwestern part of the community was flooded because this area is located close to many streams.

There are three main types of land cover in this community, namely: degraded evergreen forest, abandon agricultural land, and waterlogged area. Degraded evergreen forest in this community is regrowth forest with higher density and most of trees are still young. The majority of land cover in this community is dominated by degraded evergreen forest with lower density if compared with previous condition. During group discussion with local community, it reveals that this community used to be covered by evergreen forest with plenty of Chhoe Teal (*Dipterocarpus alatus*), Korki (*Hopea ordorata*), Korkoh (*Sindora cochinchinensis*) Kranhoung (*Dalbergia cochinchinensis*), and Thung (*Pterocarpus macrocarpus*). Currently, forests in this community have been degraded. Only small trees have been found. Furthermore, commercial tree species such as *Hopea ordorata*, *Dalbergia cochinchinensis*, *Pterocarpus macrocarpus*, *Anisoptera costata* were reported to present in this community with very low density. Only one small abandon agricultural patch was observed in the west of the community as shown in Figure 7. This abandon agricultural land has been left abundant after the establishment of this community (12 year). In addition to the two zones mentioned above, there is one waterlogged area in the whole year round which was observed and reported in the Southwest of the community.

Figure 7: Zoning of Tbeng Lech community forest based on forest cover human activities and drainage system.



IV RESOURCES ASSESSMENT

4.1 Ou Some Community Forest

Semi-evergreen forest: This forest type presented in the Southeast of the community. In this forest, all big trees of the high-value timber (HVT) species were removed as results of illegal logging and land encroachment. Only a few big trees of lesser known species such as Khos

(*Lithocarpus elegans)*, Popel (*Shorea cochinchinensis*), Pun Svay, Kreng have been observed scattering in this forest type. However, the high natural regeneration of has been noted in this site. Even there are natural regeneration, but these regeneration are mostly less commercial tree species such as Chromas (*Vatica odorata*), Kokoh (*Sindora cochinchinensis*), Popeal, Pring, Trobtum (*Crypteronia paniculata*).

Abandoned agricultural lands inside deciduous forest: This area is dominated with invasive species, *Imperata cylindrica* (Sbove) mixing with pioneer tree species, such as *Pinus merkusii, Tramkang, Svay Prey (Mangifera indica).* There are also regeneration of less commercial tree species, especially Chromas (*Vatica odorata*), Pha Oung, and some Kokoh (*Sindora cochinchinensis*). Since forest fire happen frequently, some seedlings have been disturbed. Furthermore, many seedlings were regenerated from sprout.

Deciduous forest dominated with Tbeng (*Dipterocarpus obtusifolius)***:** In this stand, *Dipterocarpus obtusifolius* in the second diameter class presented around 60% of tree species in the area. Even this species are the majority species in the second diameter class, Kroel was the main big tree species in the first diameter class (DBH≥30cm). It is noted that seedling density in this site is quite high. The majority seedlings species in this site are Plong, Tbeng (*Dipterocarpus obtusifolius*), Kreal, Kray *(Polyalthia cerasoides),* and most of them are low commercial tree species.

4.2 Tbeng Lech Community Forest

Waterlogged area: This waterlogged zone is located in Southwestern part of the community. Not so many tree species presented in this area since it is flooded in the whole year round. The main species in this area are Sroeng (some time it is called Kongkang which means mangrove) and Khloem Andoek. Only Sroeng can be used locally for cottage construction, warehouse for keeping pigs and cows.

Degraded evergreen forest: Before degraded, this area consisted of many main species including Chhoeu Teal (*Diperocarpus alatus)*, Pdeak (*Anisoptera costata*), Korki (*Hopea odorata*), Kokos (*Sindora cochinchinensis*), Kronhoung (*Dalbergia cochinchinensis*), Popel (*Shorea cochinchinensis)*, Chambak, and Thnung (*Pterocarpus macrocapus*). Practicing shifting cultivation and illegal logging, this area becomes degraded. Currently, the main species found in this area are Poplea, Langeang (*Cratoxylum formosum)*, Chambak, Semoin (*Nephelium hypoleucum*), Angkat Khmao, Kray (*Polyalthia cerasoides*), and Chromas (*Vatica odorata*). However, some commercial tree species including Koki (*Hopea odorata*), Kokos (*Sindora cochinchinensis*), Kranhoung (*Dalbergia cochinchinensis*), Pdeak (*Anisoptera costata*), and Thnung (*Pterocarpus macrocapus*) have been observed in this area with very low density and they are still young and, thus, could not provide seed for the next generation at this moment.

Abandoned agricultural lands (Veal Trapeang Ropeak): This area used to be clear for rice cultivation and left abundant for 12 years already since the establishment of this community forestry. Currently different tree and other plant species have been observed in this area including *Dipterocarpus alatus, Hopea odorata*, Komphneang, and rattan. This area is flooded every year from September to November.

VI CONCLUSSION

There are two main forest types have been observed during field visit in Ou Some Community Forestry, namely: Semi-evergreen and deciduous forest. However, deciduous forest can be divided into deciduous forest dominated with Tbeng Tree and Deciduous forest cover by abandon agricultural patches with grass. Therefore, three zones have been classified for Ou Some community forest. These are semi-evergreen forest, deciduous forest dominated by Tbeng, and deciduous forest covered by abandon agricultural patches with grass.

There are three main types of land cover in Tbeng Lech community forest. Therefore, three zones have been classified in this area namely: degraded evergreen forest, abandon agricultural land, and waterlogged area in the southwest of the community.

In general there are many species have been observed in Ou Some community forest. These species include Tbeng (*Dipterocarpus obtusifolius)*, Korkoh (*Sindora cochinchinensis*), Pring, Popel (*Shorea cochinchinensis*), Chromas (*Vatica odorata*), Kray (*Polyalthia cerasoides*), Semoin (*Nephelium hypoleucum*), Trob Tum (*Crypteronia paniculata*), Thlok, and especially *Pinus merkusii*. Some tree species can be used as NTFPs or as medicinal plant in their community such as Kray (*Polyalthia cerasoides*) and Trob Tum (*Crypteronia paniculata*). Beside different tree species, many other NTFPs have also been observed including, Ondeng Meas, Kandab Chang Eh, Kroput Chruk, and rattan.

It was reported that Tbeng Lech community used to have a plenty of Chhoe Teal (*Dipterocarpus alatus*), Korki (*Hopea ordorata*), Korkoh (*Sindora cochinchinensis*) Kranhoung (*Dalbergia cochinchinensis*), and Thung (*Pterocarpus macrocarpus*). Currently, forests in this community have been degraded. Only small trees have been found. Furthermore, commercial tree species such as *Hopea ordorata*, *Dalbergia cochinchinensis*, *Pterocarpus macrocarpus*, *Anisoptera costata* that have plenty in this area before were reported to present in this community with very low density.

References

Crocker, C.D. 1962. Exploratory survey of the soils of Cambodia. Soil commission and USAID, Joint publication, Phnom Penh, Cambodia.

FA. 2011. Cambodia forest cover 2010

Kazutake K., Keizaburo K. 1966. Major Soils of Southeast Asia and the Classification of Soils Under Rice Cultivation (Paddy Soils).

Appendix 1: datasheet for recording tree with DBH≥30cm

Plot No.....Team.....leader.....Date.....

No.	Tree species	DGL[1] (cm)	DBH (cm)	Total height (m)	height up to first branch (m)	Remark (plot characteristics tree characteristics, slop, etc.)

[1] Diameter at Ground Level

Appendix 2: datasheet for recording tree with DBH=10-29cm

Plot No.....Team.....leader.....Date.....

No.	Tree species	DGL (cm)	DBH (cm)	Total height (m)	height up to first branch (m)	Remark (plot characteristics tree characteristics, slop, etc.)

Appendix 3: datasheet for recording tree with DBH<10cm (H>1m)
Plot No.....Team.....leader.....Date.....

No.	Tree species	DGL (cm)	DBH (cm)	Total height (m)	height up to first branch (m)	Remark (plot characteristics tree characteristics, slop, etc.)

Appendix 4: Datasheet for recording seedling (H≤1m)
Plot No.............Team leader..Date...

Plot	Subplot	Tree species	Number	Remark (plot characteristics tree characteristics, slop, etc.)

Appendix 5: Resources in Ou Some Community Forestry

Plot No.	Species (Khmer reading)	Scientific name	Density (ha)	Remark
DBH greater than or equal 30 cm				
1	Khos	*Lithocarpus elegans*	2	Mean DGL=46.0±5.208cm Mean DBH=33.76±1.29cm Mean total high= 11.74±0.66m Mean height at first branch=4.88±0.27m
1	Kray	*Polyalthia cerasoides*	2	
1	Po Pel	*Shorea cochinchinensis*	4	
1	Pun Svay		2	
3	Kroel	*Gluta laccifera*	12	Mean DGL=52.03±4.97cm Mean DBH=42.18±3.66cm Mean total high= 8.38±0.67m Mean height at first branch=3.08±0.45m
4	Plou	*Dillenia parviflora*	2	Mean DGL=38.70±1.62cm Mean DBH=33.60±1.08cm Mean total high= 11.6±1.29m Mean height at first branch=2.27±0.75m
4	Trameng		2	
4	Trosek	*Peltophorum sp.*	4	
DBH=10-29cm				
1	Poplea		4	Mean DGL=18.24±0.56cm Mean DBH=14.56±0.53cm Mean total high= 9.80±0.27m Mean height at first branch=4.66±0.24m
1	Chom bok		12	
1	Chromass	*Vatica odorata*	4	
1	Khos	*Lithocarpus elegans*	16	
1	Kokoh	*Sindora cochinchinensis*	72	
1	Kray	*Polyalthia cerasoides*	44	
1	Plou	*Dillenia parviflora*	20	
1	Popel	*Shorea cochinchinensis*	24	
1	Preng		28	
1	Langeang	*Cratoxylum formosum*	8	
1	Semoin	*Nephelium hypoleucum*	24	
1	Smakrabey		32	
1	Thlork	*Parinari anamensis*	16	
1	Tromeng		4	
3	Thlok		4	Mean DBL=17.88±0.61cm Mean DBH=14.38±0.46cm Mean total high=7.29±0.22m Mean height at first branch=4.30±0.22m
3	Chombak	*Irvingia malayana*	4	
3	Kokoh	*Sindora cochinchinensis*	4	
3	Kroel	*Gluta laccifera*	8	
3	Krong		4	
3	Pha Oung		4	
3	Plou	*Dillenia parviflora*	4	
3	Popel	*Shorea cochinchinensis*	8	
3	Preng		28	
3	Rernh		8	
3	Smach		16	
3	Sro Ngam		8	
3	Sral	*Pinus merkusii*	24	
3	Tbeng	*Dipterocarpus obtusifolius*	172	

3	Trobtum		4	
4	Thlok	*Parinari anamensis*	8	Mean DGL=24.65±1.97cm Mean DBH=19.39±1.50cm Mean total high= 7.20±0.48m Mean height at first branch=2.80±0.52m
4	Plou	*Dillenia parviflora*	8	
4	Popel	*Shorea cochinchinensis*	16	
4	Trosek		4	
DBH<10cm (H>1m)				
1	Bakdorng		16	Mean total high= 3.79±0.05m
1	Bay Kdang		8	
1	Bay Nhen		48	
1	Beng Ches		8	
1	Po Pleak		8	
1	Chambak	*Irvingia malayana*	16	
1	Chompus Moin		296	
1	Chompus Sek		40	
1	Chromass	*Vatica odorata*	360	
1	Khos	*Lithocarpus elegans*	80	
1	Kampot Chruk		832	
1	Kampot		16	
1	Kokoh	*Sindora cochinchinensis*	360	
1	Kray	*Polyalthia cerasoides*	296	
1	Kromoun		16	
1	Krong		144	
1	Lengkung		8	
1	Langeang	*Cratoxylum formosum*	128	
1	Long		64	
1	Angkanh		792	
1	Angkot Khmao	*Diospyros bejaudii*	248	
1	Ombeng Ches		24	
1	Om Puch		208	
1	Andeng Meas		88	
1	Peng Ches		152	
1	Plong		216	
1	Plou	*Dillenia parviflora*	8	
1	Pnek Trey		64	
1	Popel	*Shorea cochinchinensis*	32	
1	Poplea		232	
1	Preng		208	
1	Prus		8	
1	Pokmot Chma		24	
1	Rousey Psom Srach		8	
1	Romdoul		216	
1	Champos Sek		8	
1	Semoin	*Nephelium hypoleucum*	920	
1	Smakrabey		224	
1	Sandek	*Mischocarpus sundaicus*	8	

1	Santung		8	
1	Srokum		24	
1	Thlong		112	
1	Thlork	*Parinari anamensis*	16	
1	Tromoung		80	
1	Trosek	*Peltophorum sp.*	8	
1	Trobtum	*Crypteronia paniculata*	1152	
3	Thlok	*Parinari anamensis*	40	Mean total high= 3.42±0.05m
3	Chom		8	
3	Chambok	*Irvingia malayana*	104	
3	Chamrong Svay		56	
3	Chromass	*Vatica odorata*	16	
3	Kommel		24	
3	Kampot Chruk		8	
3	Kormol		40	
3	Kray	*Polyalthia cerasoides*	288	
3	Kreal		208	
3	Kreang		8	
3	Krong		248	
3	Langang	*Cratoxylum formosum*	8	
3	Machou		24	
3	Nonout		40	
3	Om Puch		128	
3	Antong Sor		16	
3	Phaong		888	
3	Plong		392	
3	Popel	*Shorea cochinchinensis*	16	
3	Preng		216	
3	Renh		32	
3	Smach		96	
3	Sandek		8	
3	Sral	*Pinus merkusii*	32	
3	Srokom	*Xylia dolabriformis*	104	
3	Srongam		256	
3	Tbeng	*Dipterocarpus obtusifolius*	560	
3	Tromeng		24	
3	Tromoung		24	
3	Trobtum	*Crypteronia paniculata*	16	
4	Thlork	*Parinari anamensis*	8	Mean total high= 2.96±0.17m
4	Chambok		24	
4	Kray	*Polyalthia cerasoides*	48	
4	Kralanh	*Dialium cochinchinensis*	8	
4	Krong		16	
4	Plong		8	
4	Plou	*Dillenia parviflora*	40	
4	Popel	*Shorea cochinchinensis*	16	
4	Poplear		72	

4	Semoin	*Nephelium hypoleucum*	24	
4	Sokrom	*Xylia dolabriformis*	8	
4	Trosek	*Peltophorum sp.*	48	
Seedling				
1	Chromass	*Vatica odorata*	2,000	
1	Trobtum	*Crypteronia paniculata*	400	
1	Popel	*Shorea cochinchinensis*	6,800	
1	Thlork		80	
1	Preng		6,880	
3	Krong		160	
3	Plong		800	
3	Kampet Chruk		1,520	
3	Bay Nhen		160	
3	Preng		320	
3	Chromass	*Vatica odorata*	320	
3	Thlork	*Parinari anamensis*	240	
3	Kreal		1,440	
3	Tbeng	*Dipterocarpus obtusifolius*	2,560	
3	Chompus Sek		240	
3	Sral	*Pinus merkusii*	80	
3	Kokoh	*Sindora cochinchinensis*	240	
3	Kray	*Polyalthia cerasoides*	640	
3	Chambok	*Irvingia malayana*	320	
3	Machou		480	
3	Tramoung		160	
3	Sandek	*Mischocarpus sundaicus*	80	
3	Smach		160	
3	Thlork	*Parinari anamensis*	80	
4	Kray	*Polyalthia cerasoides*	80	
4	Thlork	*Parinari anamensis*	80	
4	Angkanh		320	
4	Angkot Khmao	*Diospyros bejaudii*	800	
4	Romdeng Meas		2,960	
4	Semoin	*Nephelium hypoleucum*	240	
4	Voi Leng		80	
4	Kandab Chang Eh		320	
4	Batptel		400	
4	Champus Sek		160	
4	Preng		640	
4	Trob Tum	*Crypteronia paniculata*	240	
4	Chromass	*Vatica odorata*	1,440	
4	Pleng		160	
4	Smach		80	
4	Kray	*Polyalthia cerasoides*	880	
4	Krong		80	
4	Plong		720	

4	Pdeak	*Anisoptera costata*	320	
4	Kropet Chruk		320	
4	Romdoul		640	
4	Kokoh	*Sindora cochinchinensis*	80	
4	Tromeng		640	
4	Ombeng Ches		720	
4	Sandek	*Mischocarpus sundaicus*	240	
4	Poplea		160	
4	Plong		480	

Appendix 6: Resources in Tbeng Lech Community Forestry

Plot No.	Species (Khmer reading)	Scientific name	Density (ha)	Remark
DBH greater than or equal 30 cm				
1	Popel	*Shorea cochinchinensis*	4	Mean DGL=40.0±7.50cm Mean DBH=39.20±7.59cm Mean total high= 21.00±0.20m Mean height at first branch=7.70±3.00m
2	Chambak	*Irvingia malayana*	2	There was only one tree in this plot
3	0		0	There was no tree with DBH≥30cm
DBH =10-29cm				
1	Popel	*Shorea cochinchinensis*	4	Mean DGL=17.88±1.57cm Mean DBH=14.36±1.18cm Mean total high= 9.34±0.64m Mean height at first branch=3.46±0.28m
1	Popul		8	
1	Preng		8	
1	Snoul		20	
1	Tramoung		4	
2	Choeu Teal	*Dipterocarpus alatus*	8	Mean DGL=19.11±0.61cm Mean DBH=12.90±0.29cm Mean total high= 12.63±0.0.24m Mean height at first branch=6.09±0.17m
2	Cham Bak	*Irvingia malayana*	84	
2	Chromass	*Vatica odorata*	4	
2	Knul Prey	*Artocarpus rigidus*	8	
2	Kokoh	*Sindora cochinchinensis*	12	
2	Kray	*Polyalthia cerasoides*	12	
2	Kralanh	*Dialium cochinchinensis*	28	
2	Krong	*Aporusa filicifolia*	8	
2	Langeang	*Cratoxylum formosum*	56	
2	Poplea		16	
2	Preng		12	
2	Royong		8	
2	Semoin	*Nephelium hypoleucum*	48	
2	Snoul		32	
2	Srolav		4	
2	Svay Prey	*Mangifera indica*	8	
2	Thlork	*Parinari anamensis*	16	
2	Troleng		12	
2	Trosek	*Peltophorum sp.*	32	
2	Troyoeng	*Diospyros pilosanthera*	52	
3	Cham Bak	*Irvingia malayana*	36	Mean DGL=18.46±0.36cm Mean DBH=13.91±0.77cm Mean total high=11.32±0.16m Mean height at first branch=6.84±0.55m
3	Chromass	*Vatica odorata*	24	
3	Kongha		12	
3	Kokoh	*Sindora cochinchinensis*	12	
3	Kray	*Polyalthia cerasoides*	28	
3	Kralanh	*Dialium cochinchinensis*	68	
3	Krong	*Aporusa filicifolia*	16	

3	Langeang	*Cratoxylum formosum*	48	
3	Preng		8	
3	Semoin	*Nephelium hypoleucum*	56	
3	Snoul	*Dalbergia nigrescens*	108	
3	Thlork	*Parinari anamensis*	8	
3	Tromoung Sek		4	
3	Trosek	*Peltophorum sp.*	60	
3	Troyoeng	*Diospyros pilosanthera*	60	
DBH<10cm (H>1m)				
1	Krong	*Aporusa filicifolia*	8	Mean total high= 3.33±0.08m
1	Kampneang		696	
1	Angkea Sel		8	
1	Preng		8	
1	Romdeng Meas		160	
1	Smach		8	
1	Tromoung		32	
2	Archdek		8	Mean total high= 4.84±0.05m
2	Baykdang		40	
2	Prokes		352	
2	Chheam Antoung		128	
2	Chhoeu Teal	*Dipterocarpus alatus*	64	
2	Cham Bak		360	
2	Changkeng Sek		792	
2	Chromass	*Vatica odorata*	232	
2	Dork Po		232	
2	Doun Chas		96	
2	Doun Kay		1,416	
2	Khnher		96	
2	Knul Prey	*Artocarpus rigidus*	16	
2	Kompet		56	
2	Kontork		8	
2	Kontreab		32	
2	Kray	*Polyalthia cerasoides*	64	
2	Krobav		8	
2	Krachork Andoeuk		136	
2	Kralanh	*Dialium cochinchinensis*	536	
2	Krong	*Aporusa filicifolia*	1,152	
2	Langeang	*Cratoxylum formosum*	880	
2	Machou Kromoung		8	
2	Angkot Kmao	*Diospyros bejaudii*	1,456	
2	Pdes		1112	
2	Sangva Pich	*Wrightia religiosa*	744	
2	Plong		776	

2	Por Plea		1,592	
2	Preng		208	
2	Prus		320	
2	Romdeng Meas		8	
2	Romdoul		496	
2	Roleak		32	
2	Semoin	*Nephelium hypoleucum*	1,728	
2	Snoul	*Dalbergia nigrescens*	328	
2	Srolav	*Lagerstroemia calyculata*	48	
2	Svay Rongket		24	
2	Treal Sva		8	
2	Tromoung		64	
2	Trasek	*Peltophorum sp.*	48	
2	Troyoeng	*Diospyros pilosanthera*	344	
3	Baykdag		88	Mean total high= 4.33±0.05m
3	Prokes		1,080	
3	Cham Bak	*Irvingia malayana*	120	
3	Chang Out Tmat		32	
3	Chromass	*Vatica odorata*	904	
3	Donchas		24	
3	Donkay		968	
3	Sangva Pech		168	
3	Chanlos		1,232	
3	Knul Prey		32	
3	Kandab		8	
3	Kantrong		24	
3	Kangha		48	
3	Kray	*Polyalthia cerasoides*	168	
3	Kralanh	*Dialium cochinchinensis*	744	
3	krong	*Aporusa filicifolia*	1,048	
3	Langeang	*Cratoxylum formosum*	1,048	
3	Machou		48	
3	Angkot Khmao	*Diospyros bejaudii*	2,096	
3	Pdes		160	
3	Plong		2320	
3	Plou	*Dillenia parviflora*	16	
3	Poplea		1464	
3	Poplea Proes		8	
3	Preng		256	
3	Prus		448	
3	Romdoul		744	
3	Langeang	*Cratoxylum formosum*	200	
3	Semoin	*Nephelium hypoleucum*	2240	
3	Snoul	*Dalbergia nigrescens*	192	
3	Tamoung Sek		648	

3	Tatas		2920	
3	Tramoung		8	
3	Trosek		48	
3	Troyoeng	*Diospyros pilosanthera*	304	
Seedling				
1	Kum Pneang		1,600	
1	Svay		240	
1	Romdeng Meas		2,560	
1	Preng		160	
1	Smach		2,880	
1	Acacia	*Acacia sp.*	80	
1	Tromoung		880	
1	Chanty		160	
1	Baykdang		80	
1	Plong		1,280	
1	Thlork	*Parinari anamensis*	160	
1	Poplea		640	
1	Semoin	*Nephelium hypoleucum*	160	
1	Angkot Kmao		640	
1	Kray	*Polyalthia cerasoides*	400	
1	Donchas		320	
1	Troyoeng	*Diospyros pilosanthera*	160	
1	Langeang	*Cratoxylum formosum*	80	
1	Kum pneng		800	
2	Dounkay		4,960	
2	Krolanh	*Dialium cochinchinensis*	80	
2	Plong		800	
2	Chromass	*Vatica odorata*	240	
2	Romdoul		720	
2	Poplea		400	
2	Prous		3,040	
2	Angkot Kmao		1,920	
2	Semoin	*Nephelium hypoleucum*	1,680	
2	Tromoung		240	
2	Kum Pneang		960	
2	Troyoeng	*Diospyros pilosanthera*	160	
2	Preng		80	
2	Donchas		320	
2	Doun kay		1,120	
2	Snay		80	
3	Angkot Kmao		880	
3	Donkay		8,240	
3	Plong		7,440	
3	Preng		1,600	
3	Semoin	*Nephelium hypoleucum*	2,080	
3	Kralanh	*Dialium cochinchinensis*	80	
3	Poplea		720	

3	Troyoeng	*Diospyros pilosanthera*	1,120	
3	Knher		80	
3	Romdoul		240	
3	Krong	*Aporusa filicifolia*	240	
3	Tatas		4,240	
3	Poplea Proes		80	
3	Baykdang		80	
3	Sangva Pech	*Wrightia religiosa*	320	
3	Kokoh	*Sindora cochinchinensis*	80	
3	Prus		80	
3	Romdeng Meas		400	
3	Chheam Antong		1,200	
3	Dongdav		480	
3	Chromas	*Vatica odorata*	160	