

Feasibility Study for REDD+ in Prey Long Area, Cambodia

Source(s):

[2011 Report on Feasibility Study for REDD+ in Prey Long Area, Cambodia \(English\)](#)

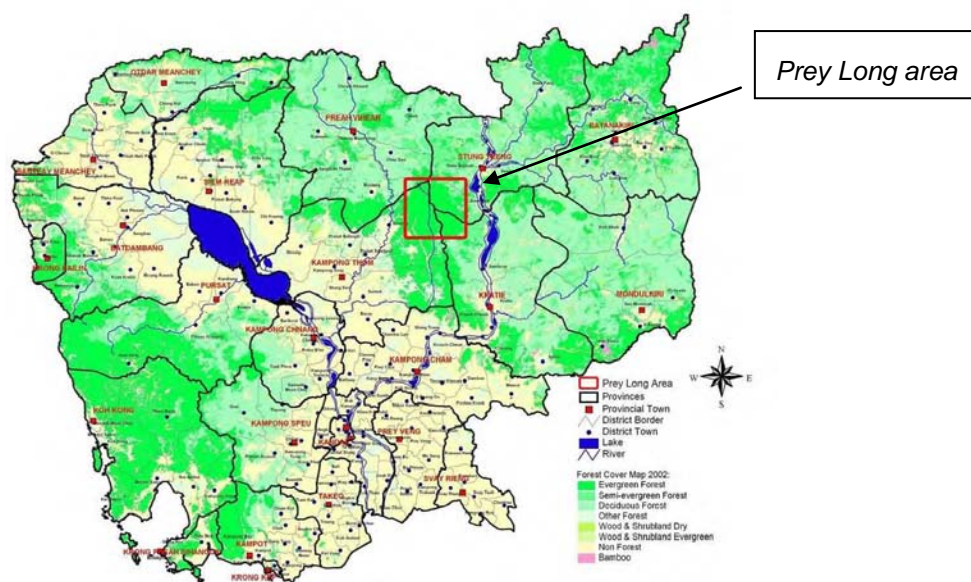
[平成 23 年度 新メカニズム実現可能性調査「カンボジア・プレイロング地域における REDD+に関する新メカニズム実現可能性調査」報告書 \(*2\) \(Japanese\)](#)

[Theilade, I. and Schmidt, L. 2011. REDD+ and Conservation of Prey Long Forest, Cambodia \(*3\) \(English\)](#)

*Note: This profile is of a feasibility study for a REDD+ project, not of an actual REDD+ project. The issues covered by the feasibility study in Japanese fiscal year 2011 were (p.6, *2, p.22):*

- *Identification of deforestation drivers and developing REDD+ strategies (See the section 'Emissions and removals with and without project')*
- *Collection of information on drivers of deforestation for setting reference scenario (See the section 'Emissions and removals with and without project')*
- *Determining the project boundary (See the section 'Emissions and removals with and without project')*
- *Developing a REDD+ training manual and translating it into Khmer to enable local communities to understand REDD+ (See the section 'Community participation') (p.13).*

Project location



Map of forest cover in Cambodia and Prey Long (p.12).

The Prey Long area includes mainly low land evergreen forests (McDonald, 2004) that are spread

across four provinces in the north-central parts of Cambodia and the west bank of the Mekong River. Kompong Thom is the largest of these 4 provinces. Kratie province is located in the eastern part along the Mekong River, while Stung Treng and Preah Vihear provinces are located in the northern part. The gross area is estimated to be 520,000 ha (Ashwell et al., 2004; Olsson and Emmett, 2007). It is said that the population in this area is gradually increasing but human pressure on the forest is not so serious (Olsson and Emmet, 2007). The proposed Protected Forest, which is under the process of establishment, will be the project boundary (*2, p.11).

Project area: Currently, the target project area is around 560,000 ha. Along with this study, the Cambodian government is finalizing establishment of a Protected Forest in the area, and the final area is estimated to be around 400,000 ha (p.4,*2, p.17,35,59).

Reference region: In this study, the entire four provinces (Kratie, Kampong Thom, Stung Treng and Preah Vihear), were chosen as the reference area. Kampong Cham was also suggested due to its influence in the Prey Long area, but because of time constraints it was not included in the analysis (p.9, *2p.36).

Forest area and types

Forest type of Prey Long (p.13, *3, p.10)

Forest type	Characteristics
1. Deciduous forest	This type of forest is similar to the dry seasonal forest found in dryer climates in Indochina. Trees are relatively short (3-12 m) drought tolerant species with small leaves and thick bark. Dry deciduous forests form a transition to natural grassland, which are found on the very dry sandy sites.
2. Evergreen short forest	This is a transition type to tall evergreen forest and often with similar species composition, yet trees are significantly smaller.
3. Lagerstroemia forest	Stands are distinguished by their white bark and high, erect, fluted stems. They often dominate patches of forests.
4. Short riparian forest / melaleuca forest	This forest type occurs near rivers and streams on land that is periodically inundated and retains moisture during the dry season.
5. Deciduous swamp forest	A quite unique forest type occurring around Pes Lake in the northern part of Prey Long. Several unique species and growth forms can be found.
6. Tall evergreen Dipterocarp forest	Found on moist but not waterlogged areas. Includes a large diversity of species with canopy closure at 30-50m.
7. Evergreen swamp forest	Occurs on wet sites with permanent or long-term inundation. The forest type is rare and endemic to central Cambodia.

Prey Long is the largest lowland evergreen forest in Cambodia, and probably in the Indo-Burma Hotspot (*3, p.5). Prey Long forest is reportedly home to 80% of the most valuable and endangered indigenous tree species of Cambodia. Furthermore, the area was identified as vital to the national reserve network by a group of national experts due to its importance for flora conservation (p.14,*3,

p.6). Though lowland forest was once the most common vegetation type in Cambodia (*3, p.6), this has mostly been converted into rice fields (*2, p.14).

Annual precipitation reaches around 2,500 mm. The monsoon season extends from June to October (*2, p.12).

The forest in the Prey Long area is an important watershed that sustains fisheries and agricultural activities in Cambodia and Vietnam, and it is also a source of non timber forest products (NTFPs), such as resin, that contribute to local livelihoods (p.18, *2, p.14).

Forest management and use context

Prey Long area falls under the regulatory and management jurisdictional authority of the Ministry of Agriculture, Forestry and Fisheries (MAFF) under the 2002 Forest Law. Forest concessions were granted to Pheapimex Fuchan, Everbright CIG Wood Co. Ltd. and Colexim Forest Concession for logging in the Prey Long area. Everbright has a concession of 136,376 ha in Kratie and Steung Treng districts, and Colexim has a 139,610 ha concession in Kampong Thom district located in the northern part of the Prey Long area. These concessions were halted in 2002 to reform the forestry sector, and with the aim of introducing sustainable forest management. The land rights of local residents in the Prey Long area are generally weak and vulnerable to concessionaires' activities (p.5, *2, pp.15-16).

There is a possibility that Prey Long will be selected as a site for a sub-national REDD+ activity, though this is still uncertain (*2, p.9). Since 2002, Conservation International (CI) has been conducting forest conservation activities in the Central Cardamom Protected Forest, located in the Southeast, in partnership with local communities and the Forestry Administration (FA). In Cardamom, a Conservation Agreement with local communities, CI and the FA for law enforcement for forest management has been implemented. Since the Cardamom project has shown success in the region, the FA asked CI to explore the possibility of implementing the same scheme for the Prey Long area by utilizing REDD+ (p.4, *2, p.17). The FA is preparing to establish a Protected Forest in the Prey Long Area with the support of CI (p.6, *2p.17).

There are 250,000 people living in about 340 villages in the Prey Long area. Most of them belong to the Kuy ethnic group. The forest is an intrinsic part of their culture and spiritual life. Local villagers collect resin (*3, p.8), and this provides a substantial, and often the only, cash income to many households in the vicinity of Prey Long (*3, p.25).

Each household has forest use rights. These either apply to individual Dipterocarp trees or to Dipterocarp forest areas. All these rights are respected by the villagers. Illegal logging also creates jobs for the villagers. Some illegal logging is conducted by villagers, and some by settlers hired by powerful business persons or military leaders (*2, p.15).

Rates and drivers of deforestation and degradation

According to current analysis, in the Prey Long area the evergreen forest is being lost at a rate of 1.81%/year and the deciduous forest at a rate of 1.39%/year. As a whole, this deforestation rate is much higher than the average deforestation rate in Cambodia, which is reported as 0.8%/year (p.4, *2, p.17)

In the Prey Long area, deforestation is driven by small-scale, unplanned logging by local communities, and by large-scale logging through land concessions that convert forest for agricultural activities (p.4, *2, p.16). Commercial agriculture, small-scale agriculture, new settlements, infrastructure development, illegal logging and mining development were identified as the 6 main drivers of deforestation (*2, pp. 27-32).

(1) Commercial agriculture

Large amounts of forest are lost to cassava or rubber plantations every year. Most of this takes place under legitimate ELCs (Economic Land Concessions), nevertheless, land plans are weak and consequently activities often do not follow the ELC management plan.

(2) Small-scale agriculture

Villagers depend on small-scale agriculture. Cash employment opportunities are scarce, improved agricultural technology is not available and villagers cannot obtain fertilizers. In this circumstance they tend to clear forests for their agriculture.

(3) New settlements

Settlers come from other districts, following relatives already settled in Prey Long or seeking more productive land or employment opportunities. The government establishes Social Land Concessions for landless farmers.

(4) Infrastructure development

The main infrastructure developments are the waterpower generation facility in the Stung Sen River located in Dang kambet district in Kampon Thom province, the construction of the national highway from Tala and Robieb in the northern part of the Long and the construction of the bridge that spans the Mekong river.

(5) Illegal logging

Many commercially valuable trees are found in the Prey Long forest. The large size of the area is difficult to patrol to prevent illegal logging.

(6) Mining

Deforestation is caused not only by mining, but also by settlement following mining. Small-scale gold mining is conducted illegally by domestic or foreign actors. Sometimes residents have been forced to relocate because of the mining development.

Project proponents

- Conservation International Japan (CI Japan) (p.22)

Implementation timeframe

Project goals

To reduce emissions from deforestation in Prey Long by promoting forest conservation through community level conservation agreements and the management activities of the forest offices in Prey Long (p.17).

Implementation activities

By considering the establishment of the Bilateral Offset Credit Mechanism (BOCM) between the Japanese and the Cambodian government, the project will prepare the infrastructure needed for forest conservation activities based on the existing support from Japan. Also, by combining technical assistance with JICA, the project will pilot forest conservation activities based on the Conservation Agreement CI Cambodia organized in Cardamom (p.14, *2, p.57).

REDD+ activities will include the establishment of a ranger station, measures for alternative livelihood such as patrolling or sustainable agriculture, support of sustainable agricultural techniques, and improvement of irrigation facilities (*2, p.59).

Actors' roles and responsibilities

CI Japan	-
CI Foundation(CI-HQ and CI-Cambodia Program)	Collection of local information, communication and consultation with Cambodian government, support workshops, collection of existing data and information at local level (p.4)
Kyushu University	Partnership for forest inventory survey (p.4)
University of Hyogo	Translation of REDD+ training manual into Khmer (p.4)

Community participation

It is especially important that the project follows a process of free, prior, informed consent (FPIC) to strengthen governance across the area (p.6, *2, pp.55-56). While preventing deforestation and degradation, it is also important to secure access to forest resources for local communities and stakeholders. To raise awareness on REDD+ and prevent negative effects, a training manual on REDD+ was developed in Khmer. This Manual is aimed at local leaders to explain REDD+ in their communities (p.13, *2, pp.55-56).

Project financing

The costs for REDD+ activities for the Prey Long area are estimated in the following table, with a 5% inflation rate applied. Project costs such as monitoring are not included.

year	Cost (USD)			
	Project implementation	Project management	Community development	total
1	1,000,400	78,000	450,000	1,528,400
2	589,890	81,900	538,750	1,210,540
3	619,385	85,995	536,650	1,242,030
4	1,088,954	90,295	481,525	1,660,773
5	682,871	94,809	493,101	1,270,782
6	717,015	99,550	455,256	1,271,821
7	1,211,466	104,527	468,019	1,784,012
8	790,509	109,754	481,420	1,381,683
9	830,034	115,242	606,300	1,551,576
10	1,351,286	121,004	603,345	2,075,634
11	915,113	127,054	525,779	1,567,946
12	960,869	133,406	542,068	1,636,343
13	1,510,662	140,077	559,171	2,209,910
14	1,059,358	147,081	577,130	1,783,568
15	1,112,326	154,435	595,986	1,862,747
16	1,696,842	162,156	771,706	2,630,704
17	1,226,339	170,264	767,547	2,164,150
18	1,287,656	178,777	658,404	2,124,837
19	1,908,939	187,716	681,324	2,777,979
20	1,419,641	197,102	705,390	2,322,133
total				36,057,568

Benefit sharing

A benefit sharing system between Cambodian government and communities has not been

established (p.15).

Emissions and removals with and without project

Forest change detection

Cambodia is planning to apply IPCC Tier 3 methods. For the REDD+ project in the Prey Long area, spatial modeling will be used to detect forest change (activity data) using satellite imagery (p.9,*2, p.37). CI has developed a simple and fast methodology to assess forest cover and change (deforestation) that can be applied to forest monitoring efforts throughout the world. CI will apply an approach using Landsat that it has already used in over 18 countries. Scenes from two time periods are superimposed, and using a supervised classification system, changes in land cover are detected. As cloud cover is relatively low in Prey Long, it is possible to develop cloud free image sets using an optical sensor. The land cover classification map developed by the Government will be used. The software used will be ERDAS, See5 and/or CART.

Measurement of forest carbon stock

Above and below ground living biomass will be included in the measurement of forest carbon stock. Soil organic matter and litter may be included later. For trees, species, DBH and height are the recorded variables. The number of sample plots will be determined for each forest types, with 50x50 m plots for trees DBH > 30 cm and 20x20 m sub-plot for trees DBH > 7.5cm

Estimation of emissions

The project plans to apply the approved methodology from Verified Carbon Standards (VCS) as the most developed methodology at this stage with modification if required. Specifically, the project plans to apply the "Methodology for Avoided Unplanned Deforestation" (VM0015) for unplanned logging activities, and REDD Methodology Modules (REDD-MF) v1.0 (VM 0007) for planned logging activities (p.8,*2, p.25).

Forest logging under ELCs is not easy to handle as planned logging activities. This point needs further discussion with the Cambodian government so that the project can satisfy the standard required by VCS (pp.8-9, *2, p.44).

CI applied two options to calculate reference emission levels. Under option 1, ELC-driven deforestation was not separated from unplanned deforestation, and a spatial model was used to predict future deforestation inside the project boundary. Under option 2, ELC-driven deforestation and unplanned deforestation were separately analyzed and future deforestation was estimated without applying a spatial model (p.10,*2, p.44).

The carbon stock data for each forest type in Prey Long gathered by FFPRI (unpublished), Kyushu University (unpublished) and an existing survey are as follows (*2, p.49).

source	Biomass(AGLB and BGLB) (tCO2/ha)		note
	Evergreen forest	Seasonal forest	
FFPRI	474.1	135.0	Average for Kratie province and Kampong Thom province
Kyushu Univ.	538.4	126.8	Measured in Kampong Thom province. Average for evergreen forest and seasonal forest.
Top et al. (2004)	517.5	413.7	Measured in Kampong Thom province. Weighed average between evergreen forest and semi evergreen forest

The reference emissions level (REL, tCO₂) was calculated using the following formula (*2).

$$REL = \sum_i A_i \times (C_i - C_{post})$$

Where:

A_i is deforestation area of forest type i (ha)

C_i is CO₂ stock of forest type i (tCO₂/ha)

C_{post} is average CO₂ stock after deforestation (tCO₂/ha)

The REL was estimated as follows (p.11):

source	Reference emission (tCO ₂)			
	Option 1		Option2	
	10 years (2011-2020)	15 years (2011-2025)	10 years (2011-2020)	15 years (2011-2025)
FFPRI	1,535,953	3,970,295	18,689,160	29,583,235
Kyushu Univ	1,767,808	4,587,620	21,509,464	34,064,097
Top et al. (2004)	1,964,601	4,799,638	23,918,146	37,603,607

Project emissions

Forest burning in the project area releases GHGs other than CO₂, but these are not included in the estimation of emissions reduction (*2, p.37).

Estimation of GHG emission reduction

It is estimated that due to the implementation of the project, deforestation will decline by 50% for the period 2011 – 2015 and 90% after 2015 in the project area. For the first period, 35% of the deforestation is expected to be displaced outside the project area, a figure that declines to 5% after 2015. The estimated emission reduction in emissions under the project scenario is calculated as follows:

$$E = \sum_t REL_t \times S_t \times (1 - L_t)$$

Where:

E is emissions under project scenario (tCO₂)

REL_t is REL at year t (tCO₂/year)

S_t is effectiveness of project activities at year t

L_t is rate of leakage at year t

GHG emissions reduction was estimated as follows (p.11):

Source of applied biomass data	GHG emission reductions (ton CO2)			
	Option 1		Option 2	
	2011 - 2020	2011 - 2025	2011 - 2020	2011 - 2025
FFPRI	1,170,546	3,251,908	11,741,149	21,055,583
Kyushu Univ.	1,348,166	3,759,105	13,516,528	24,250,739
Top. et al (2004) ⁴	1,482,919	3,906,875	14,970,909	26,671,978

Leakage

In order to restrict leakage and maintain biodiversity co-benefits in and around the project site, it is necessary to promote alternative livelihoods for local communities, such as making use of NTFP-resin, beekeeping, medical plants and rattan, etc. Resin is an important commercial forest product during the season when villagers are short of rice. Training on the sustainable management of useful tree species can be provided to reduce tree damage. The preservation of these tree species will contribute to the preservation of animals that depend on these trees, and alternative livelihoods should be developed so that villagers don't have to poach wild animals in the forest area (*2, p.70).

Monitoring

GIS data should be gathered from official information linked with forest change, such as logging allocations per year, concessions, community forestry, etc (*2, p.53).

Reporting

No information

Verification

For verifying the method for estimating the change of forest area, comparing with the results of other projects will be useful. Regarding biomass, comparative analysis using existing surveys or other REDD+ activities should be conducted (*2, pp.53-54).

Risks and risk management

No information

Progress and plans

No information

Links:

Project-related documents

Others

- [Ministry of Environment, Japan / Global Environment Centre Foundation \(Nov. 2011\); Feasibility study programme on New Mechanism and CDM in 2011](#)
- [Chris Lang \(March 2011\); Can REDD save Prey Long forest in Cambodia? \(REDD-monitor\)](#)

