

MONITORING REPORT FOR REDUCED EMISSIONS FROM DEFORESTATION AND DEGRADATION IN COMMUNITY FORESTS

ODDAR MEANCHEY, CAMBODIA



Developed by Terra Global Capital and Pact

for

The Forestry Administration of the Royal Government of Cambodia

Project Title	Reduced Emissions from Deforestation and Degradation in Community Forests – Oddar Meanchey, Cambodia
Version	3-4
Report ID	V1-0
Date of Issue	Aug-26-2013
Project ID	904
Monitoring Period	28-February-2008 to 28-February-2012
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1 PROJECT DETAILS

1.1 Summary Description of Project

The project area consists of 13 discrete Community Forest areas scattered across the central section of Oddar Meanchey, ranging in size from 383 hectares to 18,164 hectares, adding up to a total project area of 56,050 hectares.

Over the course of its implementation period, the project will undertake ten project activities to reduce a number of drivers of degradation and deforestation. Five of these activities will take place inside the forests of the project area, and are therefore project activities. The other five activities are taking place outside of the project area and are, therefore leakage mitigation activities. The project activities are further described in the VCS PD. Each of the project and leakage mitigation activities is designed to target one or more of the identified deforestation drivers.

1.2 Sectoral Scope and Project Type

The project is an Avoided Unplanned Deforestation REDD Project, and follows VCS Methodology VM0006. The project is not a grouped project.

1.3 Project Proponent

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1.5 Project Start Date

Following the VCS definition of start date (the date on which activities that lead to the generation of GHG emission reductions or removals are implemented), the **project start date is February 28, 2008**. This is the date on which the original agreement between the TWG-F&E Secretariat and the CFI was signed, which committed the parties to the implementation of the project. This represents the first formal agreement for the implementation of the REDD project in Oddar Meanchey.

1.6 Project Crediting Period

The duration of the VCS project **crediting period is 30 years**, beginning on the project start date of February 28, 2008 and ending on February 28, 2037. The project crediting period is fixed at 30 years.

1.7 Project Location

Located in the northwestern corner of Cambodia (latitude 14°20' to 13° 8', longitude 102° 54' to 104° 43'), Oddar Meanchey has historically been rich in forest resources. The terrain in the province is lightly

undulating, with sporadic wet land depressions and small hills varying from 30 to 80 meters elevation up to the border with Thailand. The north and west of the area is characterized by a steep escarpment with higher hills of over 400 meters. The climate is monsoonal tropical with the rainy season extending between May and October and the dry season from November to April (Top et al. 2004a). Rainfall averages 1,300-1,500 mm per year.

The project area consists of 13 discrete parcels scattered across the central section of Oddar Meanchey (see Table 3 and Map 1). In each of these parcels, individual Community Forest Sites are located, ranging in size from 383 hectares to 17,848 hectares, adding up to a total project area of 56,050 hectares.

1.8 Title and Reference of Methodology

This project uses VCS Methodology VM0006, v1.0 “Carbon Accounting Methodology for Project Activities that Reduce Emissions from Mosaic Deforestation and Degradation”, approved in December 2010 and developed by Terra Global Capital, LLC. This project was validated prior to 30 September 2012, and is exempt from conforming to Section 4.5.3 of *AFOLU Requirements* v3.2 though it strictly addresses baseline scenario requirements for accounting GHG emissions released from carbon pools.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

A total of 10 discrete project activities will be implemented over the course of the project. Each of these activities are described in detail in the VCS PD. Each of these project activities have been implemented to some extent during this monitoring period. Full implementation of project activities will commence following first verification, according to the project workplan. The extent to which each of the project activities have been implemented during this monitoring period are described below.

Leakage is measured by the project according to the procedures described in VCS PD Section 3.10 and 3.11. Leakage mitigation activities are described in VCS PD Section 1.13.2. Non permanence risk has been assessed using the VCS Tool for AFOLU Non-Permanence Risk Analysis and Buffer Determination. The risk assessment has been validated by TUV-SUD. While not all of the risks identified in the risk assessment can be mitigated by the project, each of the project activities and leakage mitigation activities are designed to protect project permanence and mitigate all risk factors that can be mitigated through project design.

2.1.1 Reinforcing Land Tenure

Facilitation of CF agreements – All 13 CF groups received extensive training and facilitation support from Pact, CDA, and MCF to achieve the steps necessary for strengthening of the legal tenure, including management structure formation, development of by CF laws and regulations, and mapping and boundary demarcation. As a result, each of the 13 CF groups involved in the Oddar Meanchey project received renewable 15-year Community Forestry and Carbon Conservation Agreements under the Community Forestry Sub-Decree. Training courses were provided to each of the CFs in 2008 and 2009 to prepare them for the CF formalization process and provide relevant training. These trainings are outlined in Table 1 below.

Table 1. CF Development Process Training Courses

#	CF Name	Location	Course	Date
1	Ou Yeay Kaov	Ou Pok Village	Mapping	27-Apr-08
2	Ou Yeay Kaov	Ou Pok Village	Financial Training	21-May-08
3	Prey Srors	Chheu Slab Village	Financial Training	22-May-08
4	Dung Beng	Beng Village	Financial Training	12-Jun-08
5	Samaky	Tuol Svay Village	Financial Training	19-Jun-08
6	Sorng Rokavorn	Chhouk Meas Village	CF Formulation Process	6-Aug-08
7	Sorng Rokavorn	Chhouk Meas Village	Development of CF Management Structure	13-Aug-08
8	Romdoul Veasna	Romdoul Veasna Village	Financial Training	14-Aug-08
9	Prey Sorng	Lomtong Chas Village	Financial Training	3-Sep-08
10	Sangkrou Preychheu	Romchek Village	Financial Training	4-Sep-08
11	Andong Bor	Kantuy Chun Khang Kaeut Village	Financial Training	17-Sep-08
12	Ratanak Ruka	Anlong Veng Village	Financial Training	8-Oct-08
13	Prasat Phaong	Prasat Phaong Village	Financial Training	9-Oct-08
14	Phaav	Tnoal Kaeng Village	Development of CF Management Structure	29-Oct-08
15	Phaav	Thnol Keng Village	Financial Training	15-Oct-08
16	Ratanak Ruka	Baknim village	Facilitation Skill	06-Nov-08
17	Sorng Rokavorn	Tropeang Trav village	CF By-laws Development	23-Jan-09
18	Chhouk Meas	Chhouk Meas village	Nursery Management	15-Jan-09
19	Phaav	Thnol Keng village	CF By-laws Development	22-Jan-09
20	Romdoul Veasna	Bansayrak village	Nursery Management	14-Jan-09
21	Dung Beng	Yeay Tep village	Nursery Management	07-Feb-09
22	Sorng Rokavorn	Oddar Meanchey	Nursery Management	05-Feb-09
23	Sangkrou Preychheu	Anlong Veng village	Financial Training	18-Feb-09

The project has worked to strengthen land tenure both inside and outside of project areas. The Children's Development Association (CDA) has supported a number of participatory land use planning (PLUP) projects from 2010 to 2012. The PLUP actions have occurred in Trapaing Prasat Village (near Prey Srors CF) and Bak Nem Village (near Ratanak Ruka). These activities have involved conducting participatory zoning of agricultural land, residential land, forest land etc. The findings were formally approved by the

Department of Land Management and the District Governor. Though the project has not been active in securing land tenure in all of the communities involved, there is an understanding that some land in Oddar Meanchey is no longer an open frontier. PLUP documents including official maps are valuable to the validator.

Installation of boundary posts and signs– In 2008 and 2009, the project team supported boundary pole and sign installation in all of the community forests (CF). Each CF received approximately 100 boundary posts to demarcate their boundaries. A total of 2,000 small zinc signs were also distributed to mark boundaries. In addition, each CF received a larger 2m x 1m sign with a map of their CF for installation at the CF entrance. Finally, three large billboards explaining the project and showing the community forest boundaries were installed at main intersections in the province.



Figure 1. Example of signs illustrating CF boundaries placed at each CF entrance

Boundary conflict dispute resolution–During the course of the monitoring period there were numerous boundary conflicts occurring in and around the community forest areas. Most boundary conflicts are because of the unknown project boundaries, or unknowingness of the project. Most conflicts are from “outsiders” encroaching on the project area, as the communities themselves are involved in boundary demarcation, project actions, and protection. During the PRA 11 out of the 13 CF experienced boundary conflicts in the past. For each boundary conflict, specific measures were taken by the community to resolve the conflict. Boundary conflicts will continue to be an ongoing issue as 10 of the 13 CF indicated that they are currently experiencing boundary conflicts (as of August 2012). The project has provided support to the CFs to resolve some of these current conflicts by coordinating with authorities and by the CF Network to undertake advocacy efforts.

Trench digging along CF boundaries – In the case of Sorng Rokavorn CF, the MCF has supported construction of a trench along the border of the CF in order to reinforce the boundary. A trench is found to be much less ecologically invasive than a fence, as native fauna can easily cross. Almost all grazing is

from cattle which are unwilling to cross open trenches. Illegal harvested logs are almost exclusively transported by tractor or truck. The trench has proven to successfully reduce illegal logging as transportation vehicles are unable to cross without refilling the trench. So far, approximately 10 kilometers have been constructed. This successful activity will continue and more trenches will be established along CF boundaries as funds become available.

2.1.2 Land-use Plans

Planning –Commune council members, village leaders and resource users have worked in a collaborative fashion with PACT and the FA to develop long-term land use plans for each CF. Communities were asked about specific locations of natural resource use and extraction. Agriculture expansion, community growth, and natural resource use, extraction and management were mapped through participatory mapping with communities. Communities were specifically asked about High Conservation Value Areas (both culturally, and ecologically), locations of agriculture and specific agriculture practices, fire locations and management, trends and locations of specific NTFPs, wood use and extraction areas, and potential areas for Assisted Natural Regeneration. The suggestions and solutions from each CF will be put into specific management plans to meet the needs of the communities, creating a specific management plan for each. Maps are a key part of communities planning long term sustainable management and documented plans. Specific information recorded in the participatory maps include:

1. Agriculture areas in or around each community forest, (showing potential areas of agriculture expansion, and areas to focus on improved agriculture techniques)
2. Drivers of deforestation (areas or points where driver of deforestation is taking place currently/recently)
3. Forest fire prone areas (where fire is causing deforestation and degradation)
4. Areas designated for Assisted Natural Regeneration (ANR) treatments. These areas were also hand demarcated with a GPS in the field.
5. Areas where wood harvesting takes place. Specifically the areas that have been identified 1) for timber extraction and 2) for fuelwood/charcoal extraction, with a quantitative estimate (in ha) of the total area for each.
6. Areas where boundaries, use rights, or access is disputed (i.e. if there are disagreements on Protected Area boundaries between communities and government officials). Also included is a quantitative estimate (in ha) of the total forest area where disputes or other conflict exists.
7. Areas of High Conservation Value that are important because of cultural or ecological significance.

Using this information, detailed land-use plans for each CF will be created and incorporated into the CF bylaws. The project team has begun to discuss and outline the detailed responsibilities of each party in the land use planning process. This information has been inserted into the approved 30-year project implementation workplan. When funding is available for the full development of land-use plans, the workplan will guide the development of these plans. In addition, the cost of land use planning in all 13 CFs has been estimated. Land-use planning activities will be informed by a combination of the activities planned by project during the implementation period and consultations with CFs and experts from the FA.

2.1.3 Assisted Natural Regeneration

Demarcation of ANR areas – Specific areas of that are in need of ANR were demarcated in the field using the ANR SOP. Communities were asked to pick areas that have specific indicators of degradation,

and can be realistically managed by communities. For specifics on ANR demarcation and area identification see the ANR SOP. The project team has demarcated a total of 1,491 ha of ANR areas in collaboration with local communities. These areas contain low biomass do to anthropogenic activities and will grow into healthier forests with human assistance.

Planning for ANR activity implementation– Through community engagement (PRAs and HH surveys) community members have identified different tree species they would like to see in healthy forests. In addition, the project partners have consulted ecologists and foresters from the FA to select the trees to be planted and assisted to improve forest health. During the demarcation process, community members identified different states of degradation on which to conduct ANR techniques. These degraded states are specific strata where specified silvicultural techniques are implemented. See the ANR SOP for additional information on descriptions of the ANR activates.

Establishment of tree nurseries – Training on tree nursery establishment and management was conducted in Chhouk Meas and Romdoul Veasna CFs in 2009, but slowed due to lack of funding. Training on establishment and management of nurseries will continue after first verification, as the communities are anxious to improve forest health, and sustainably use forest resources. The FA also maintains a large tree nursery in Anlong Veng with over 10,000 seedlings produced annually. These nurseries will provide seedlings for enrichment planting in ANR areas as well as meet communities' needs for tree crops.





Figure 2. Photos of the tree nursery established in Anlong Veng CF

Biomass plot sampling – The project team has measured 15 biomass sampling plots within the designated ANR areas. Data from these plots had been compiled and analyzed in order to determine the baseline biomass of each stratum.

2.1.4 Forest Protection

Provision of monitoring equipment – All CFs have received cameras and GPS units to facilitate collection of monitoring data during patrols. Thirteen GPSs were distributed in total, one GPS unit to each CF group. Pact has acquired another 8 Garmin GPS units that will soon be distributed to the CF groups to assist them with patrolling and CF management. A total of 13 Nikon Coolpix S3000 13 cameras, one camera to each CF group, were distributed as well. Communities also received Patrol Log Books with a protocol in Khmer explaining how patrolling information should be recorded, as a way to assist communities document this information. Grid maps of CF areas were also provided to each CF group to assist them in recording geo-spatial data.

Forest patrolling - While forest patrol activities have been ongoing in all of the 13 CFs since the project start, the Project Team has been collecting patrol reports from local communities using SMS messaging technology since April 2012. These reports are submitted via the *Frontline Forms* application of Frontline SMS, an open-source mobile phone SMS communication interface. A central hub computer, currently located at the Pact office in Phnom Penh, receives the data submitted by the Frontline SMS system via a GSM modem. Data received by this system is being processed into monthly reports and shared with the communities. Field data sheets brought in to the PACT office by community leaders record data on patrol time and date, incidents of illegal activity, biodiversity sightings, and fuel used.

A Frontline Form specific to illegal logging activity has also been distributed to community users. This form allows for reporting on information such as the number of trees cut down in an illegal logging incident, what the illegal timber will be used for, whether the offender was apprehended, materials confiscated, and the action that was taken by the community in response to the illegal activity (i.e. given a warning, reported to authorities, signed a no-offence contract). Figure 3 shows a screenshot of the

Frontline SMS Form for illegal logging data recording. The information generated from these forms is shared with local forestry authorities.

Between April and August, 2012, 82 patrols were recorded. During these patrols, a total of 58 incidents of illegal activity were documented. Patrols of a similar nature were ongoing since the project start date, but were given that the Frontline SMS system was only put in place as of April 2012 this information was not recorded in a systematic way.

Action taken (check all that apply):

- Warning/education
- Offenders details recorded
- Re-offense contract/thumbprint
- Photograph taken
- No action

Figure 3. Frontline SMS illegal logging entry form (and translation)

Table 2. SMS Forest Patrol Reports April – August 2012

Community Forestry Group	Number of Patrols Reported				
	April	May	June	July	August
Andong Bor					
Chhouk Meas	1		1		
Dong Beng		1			3
Ou Yeay Keo	3	6	2		2
Phaav		5		2	3
Prey Srong	2	5			
Prey Srors					
Samaky	1	2	1	1	4
Sangkroun Preychheu		1	3	1	2
Song Rokavorn	12	3	8	4	2

Ratanak Ruka					
Romdoul Veasna					
Rolus Thom	1				
Total patrols	20	23	15	8	16

Table 3. Hours spent patrolling for each CF April – August 2012

Community Forestry Group	Time Spent Patrolling				
	April	May	June	July	August
Andong Bor					
Chhouk Meas	8.3		6.3		
Dong Beng		7			23.36
Ou Yeay Keo	12	32	11		11.1
Phaav		21.4		9.4	15.3
Prey Srong	23.13	34.5			
Prey Srors					
Samaky	4.3	11.05	4.3	5.1	28.2
Sangkroun Preychheu		24	46.3	5	12.30
Srong Rokavorn	120	26.34	88	44	20.30
Ratanak Ruka					
Romdoul Veasna					
Rolus Thom	6.2				
Total time spent patrolling	173.93	61.39	138.6	54.1	111.36

Table 4. Illegal logging activities reported via SMS April – August 2012

Community Forestry Group	Illegal Logging Activities Reported				
	April	May	June	July	August
Andong Bor					
Chhouk Meas			1		
Dong Beng		1			3
Ou Yeay Keo	3	6	2		1
Phaav		2		1	
Prey Srong		2			
Prey Srors					
Samaky	1				1

Community Forestry Group	Illegal Logging Activities Reported				
	April	May	June	July	August
Sangkrou Preychheu		1	3	1	1
Sorng Rokavorn	12	3	8	4	
Ratanak Ruka					
Romdoul Veasna					
Rolus Thom	1				
Total incidents reported	17	15	14	6	6

Table 5. Incidence of fire reported via SMS April – August 2012

Community Forestry Group	Incidence of Fire				
	April	May	June	July	August
Andong Bor					
Chhouk Meas					
Dong Beng		1			
Ou Yeay Keo	1	2			
Phaav		2			
Prey Sorng					
Prey Srors					
Samaky					2
Sangkrou Preychheu					
Sorng Rokavorn					
Ratanak Ruka					
Romdoul Veasna					
Total fires sighted	1	5	0	0	2

2.1.5 Fuel-efficient Stoves

Research – The project team conducted research on the types of stoves currently being used in the project area as part of the project's household survey, in which 285 families were surveyed. The research found that the stoves currently being used are three stones used as a stove, the New Lao stove, Neang Kongrey stove, Traditional Lao stove, Traditional Lao Kampong Chhnang stove, and the seam stove. It found that approximately 20% of CF members were using the New Lao stove; the stove promoted by the project. The study also determined the percentage of each stove being used by the different CF groups, and the percentage of each stove being used by different strata groups, including usage by CF members and non-members.

2.1.6 Livestock Protection

Research - The project team conducted research to determine the susceptibility of livestock owned by communities in the CFs to diseases transmitted by mosquitoes. The burning of fuelwood continues to be the main strategy to protect animals from mosquitoes in the project area. After consulting with local veterinarians, it was found that there is not a big threat to livestock from mosquito born diseases in Cambodia. Nevertheless, mosquito bites can cause discomfort and irritation which could potentially affect livestock productivity. Animals which are already weak or malnourished may be particularly affected. Mosquito transmitted diseases that do persist are given below:

Livestock	Disease
Poultry	Fowl Pox
Pigs	Japanese Encephalomyelitis
Horses	Equine Infectious Anemia (often associated with Trypanosoma)
Cattle	Anaplasmosis (more often transmitted by ticks), although this has not yet been identified among cattle in Cambodia as it is thought that they may be resistant.

Research was also undertaken to analyze the effectiveness and cultural acceptability of using netting as a substitute for smoke. Smoke has been traditionally used to ward off insects from livestock pens and holding areas, which leads to a significant use of fuel wood from forest areas. Households in all 13 communities were consulted on the potential to reduce fuelwood consumption through provision of netting for cows. This research will inform the implementation of appropriate livestock protection programs which will be implemented according to the workplan following verification.

Implementation - Mosquito born diseases was found to not be a significant treat to livestock, and the inherent need to burn wood was found to be more of a cultural norm. The participatory rural appraisal focused on indentifying barriers to change (cultural, physical, social, economical etc). The Project Team's awareness raising is focused around providing alternative options for livestock protection, agricultural extension, addressing barriers to change and advise on other supporting measures. These include:

- Improved hygiene around the area where livestock are kept to remove stagnate water, e.g. clean clogged areas and encourage community members to ensure rain barrels are always covered.
- The use of a low concentration insecticide
- Keeping animals away from stagnant pools of water, or moving corral locations
- The use of natural repellents e.g. eucalyptus oil
- The use of mosquito traps
- The incorporation of natural predators
- Extension – technical training and support around these new strategies
- Address barriers to change
- Advise on other supporting measures i.e. surveillance, regulation, incentives (e.g. livestock reimbursement fund for animals that die of insect illness during the first 5 years of the project), support from community leaders etc.

These options have been communicated to community members addressing current beliefs, practices and attitudes. This will continue to be done through workshops, posters, flyers, radio etc. As more funding becomes available different means of communication may be used for different groups and some communities may need more attention than others.

2.1.7 Agricultural Intensification

Research - The project team has conducted research on the availability of agricultural expertise in Oddar Meanchey province. The core competencies of the various agricultural organizations working in the province were assessed, a summary of this information is provided in the table below. In addition, documents related to the topic have been compiled. These documents comprise the latest research on agricultural intensification in REDD+ projects developed by UN-REDD and other institutions, and will be used to design and inform agricultural interventions in the OM CF project areas.

Table 6. Agricultural expertise of organizations in Oddar Meanchey

Organization	Year Established	Offices	Agricultural Programs
Farmer Livelihood Development (FLD)	2010	Phnom Penh, Samrong Oddar Meanchey	Helps establish Village Savings and Loan Associations, supports Micro and Small Enterprise(MSE) development, works to improve agricultural productivity and food security, nutritional programs
Partnership for Development in Kampuchea (Padek)	1980	Phnom Penh, Samrong Oddar Meanchey	Food security and income generation, help farmers build small scale agricultural infrastructure (dam, canal, water-gate and culvert), help establish community agricultural committees, provide training on agricultural techniques (Systems of Rice Intensification (SRI), vegetable growing, livestock “raising, caring and feeding techniques”, fish raising and extension); Formation of Self Help Groups “SHG” and provide Working Capital Assistance “WCA”
Rural Community and Environment Development Organisation (RCEDO)	1998	Swey Sisaphon, Banteay Meanchey. Samrong, Oddar Meanchey	Drills water wells and Equip Hand Pumps, these pumps supply clean and readily available water to village families for farming and drinking. Supports agricultural production by providing skills training and supporting small scale agricultural income generation projects
Action For Development (AFD)	2004	Anlong Veng, Oddar Meanchey	Supports food security and livelihood projects
Union Aid Abroad (APHEDA)	1984	Sydney Australia	Conducts 3,4, and 6 month training programs on fish farming technology, vegetable growing and nutritional security.
ZOA Refugee Care, Cambodia	1993	Anlong Veng, Oddar Meanchey	Food security projects, provides capacity building training on technical aspects of agriculture, assists with organizational development of rural agricultural organizations

2.1.8 Natural Resource Management Projects

Irrigation systems - The CDA has supported the development of irrigation systems in 3 CFs indented to improve the efficiency of water use and the production from small-scale agricultural plots. The specific irrigation activities implemented by the CDA are as follows:

CF	Type of system	Area irrigated
Prey Srors	Wind powered pump	100 ha
Romdoul Veasna	2 small dams	100 ha
Ratanak Ruka	Small dam	500 ha

2.1.9 NTFP Development

Resin enterprise development - The project team has provided support to four CFs for resin enterprise development; 1) Samaky CF, 2) Sorng Rokavorn CF, 3) Sangkrous Preychheu CF, and 4) Phaav CF. This support has included training to enterprise group members on group formation, participatory value chain assessment, and business planning and marketing. Following the trainings, four monitoring/coaching visits were conducted in each of the four CFs to assess the progress and development of resin enterprises in the CFs. Resin is intended to be developed under the project as a sustainable income supplement for the CF communities.

Table 7. Resin enterprise trainings

#	CF Name	Location	Course	Date
1	Samaky	Ou Sramor village	Resin Enterprise Capacity Assessment	8 Dec 2010
2	Sorng Rokavorn	Tomnup Thmey village	Resin Enterprise Capacity Assessment	21 Dec 2010
3	Sangkrous Preychheu	Ou Tameng village	Resin Enterprise Capacity Assessment	9 Dec 2010
4	Phaav	Chrok village	Resin Enterprise Capacity Assessment	7 Dec 2010
5	Samaky	Ou Sramor village	Resin M & E	20 Jan 2011
6	Sorng Rokavorn	Tomnup Thmey village	Resin M & E	19 Jan 2011
7	Sangkrous Preychheu	Ou Tameng village	Resin M & E	20 Jan 2011
8	Phaav	Chrok village	Resin M & E	19 Jan 2011

2.1.10 Fire Prevention

Community consultations - During Participatory Rural Appraisal (PRA) exercises conducted in all 13 CF areas, communal discussions took place regarding the issue of fires in the CFs. Specific topics discussed were the causes (natural and anthropogenic) of forest fires, fire-prone locations, seasonal variability, and techniques and activities that could be implemented to reduce the incidence of fire. As a result, the CF communities came to a better understanding on fire cause, frequency, damage incurred, and location. The communities also discussed strategies and resources to limit fire in the project area. These discussions will in part influence the specific fire prevention activities that will be undertaken by the communities in their CFs. Incidence of fire is being recorded using the SMS monitoring system that has been in place since April 2012.

2.2 Project Description Deviations

There has been one deviation from the Project Description. Specifically, the Leakage Area was modified to remove an Economic Land Concession (ELC) that was not identified during validation and reported in the Project Description. This deviation is fully explained in Section 3.2.3 of the monitoring report.

2.3 Grouped Project

This project is not a grouped project. The 13 community forest areas are fixed at this time.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

The tables below contain a list of all the information that was gathered at validation.

Data/parameter [EA 1]:	$nrFNFtransitions$
Data unit:	Count
Description:	Number of forest/non-forest transitions among land classes or forest strata, meaning transitions in which either the “from” or the “to” class are non-forests
Source of data:	Field measurement
Value applied:	4
Justification of choice:	Upon deforestation, a forest type transitions into either bare soil, burned area, wet soil, or agriculture
Any comment:	

Data/parameter [EA 2]:	$\Delta area_{projectAreaWithoutANR,projectScenario}(t,i)$
Data unit:	[ha yr-1]
Description:	Hectares undergoing transition i within the project area, excluding the ANR area, under the project scenario for year t
Sources of data:	Land-use change model
Value applied:	See spreadsheet submitted to validator
Justification of choice:	Calculated using the land use change model
Any comment:	

Data/parameter [EA 3]:	$\Delta area_{projectAreaWithoutANR,baselineScenario}(t,i)$
Data unit:	[ha yr-1]
Description:	Hectares undergoing transition i within the project area, excluding the ANR area, under the baseline scenario for year t
Sources of data:	Land-use change model
Value applied:	See Table 43 of the PD.
Justification of choice:	Calculated using the land use change model
Any comment:	

Data/parameter [EA 4]:	$\Delta area_{projectAreaWithANR,baselineScenario}(t,i)$
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Data unit:	[ha yr ⁻¹]
Description:	Hectares undergoing transition i within the leakage area under the project scenario for year t .
Sources of data:	Land-use change modeling
Value applied:	See spreadsheet
Justification of choice:	Calculated using the land use change model
Any comment:	

Data/parameter [EA 5]:	$\Delta area_{leakageArea, projectScenario}(t, i)$
Data unit:	[ha yr ⁻¹]
Description:	Hectares undergoing transition i within the leakage area under the project scenario for year t
Sources of data:	Land-use change modeling
Value applied:	See spreadsheet
Justification of choice:	Calculated using the procedures described in the methodology
Any comment:	

Data/parameter [EA 6]:	$\Delta area_{leakageArea, baselineScenario}(t, i)$
Data unit:	[ha yr ⁻¹]
Description:	Hectares undergoing transition i within the leakage area under the baseline scenario during year t
Sources of data:	Land-use change modeling
Value applied:	
Justification of choice:	See methodology
Any comment:	

Data/parameter [EA 7]:	$nrANRstrata$
Data unit:	Count
Description:	Number of strata within the project area on which ANR activities are proposed
Sources of data:	Field survey with community members, soil maps, land-cover maps
Value applied:	1
Justification of choice:	The number of ANR strata (i.e., 1) was selected based on the ANR management plan designed by the project proponents.
Any comment:	A suite of ANR activities is implemented on degraded forest.

Data/parameter [EA 8]:	$NAI(i)$
Data unit:	[Mg DM ha ⁻¹ yr ⁻¹]
Description:	Net annual increment due to natural regeneration and succession for the "from" class of transition i
Sources of data (*):	Values from peer-reviewed literature
Value applied:	See Table 35 in the PD.
Justification of choice:	Followed the procedures further described in the methodology

Any comment:	To be updated during monitoring.
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Data/parameter [EA 9]:	Locations of discrete project parcels
Data unit:	Digital boundaries
Description:	Locations of all individual discrete project parcels in electronic format
Sources of data:	Project design decision
Value applied:	Shapefile is available to verifier
Justification of choice:	
Any comment:	UTM 48N / WGS84 projection

Data/parameter [EA 10]:	Geographical location of reference region
Data unit:	Digital boundaries
Description:	Geographical locations of the reference region in electronic format
Sources of data:	GIS analysis
Value applied:	Shapefile is available to verifier
Justification of choice:	
Any comment:	UTM 48N / WGS84 projection

Data/parameter [EA 11]:	Description of LULC classes and forest strata
Data unit:	Narrative
Description:	Detailed description of the LULC classes and forest strata used for classification, including criteria and thresholds used, pictures, seasonality, and any other aspect determining the carbon stock differences
Sources of data:	Field survey, literature
Value applied:	See Section 3.4.1 in the PD.
Justification of choice:	
Any comment:	

Data/parameter [EA 12]:	Description of drivers of deforestation
Data unit:	Narrative
Description:	Detailed description of the drivers of deforestation, including the agents of deforestation, main socio-economic features, underlying motivation, population size, and future development of population size and driving variables
Sources of data:	Field survey, literature
Value applied:	See Section 1.10.1 of the PD.
Justification of choice:	
Any comment:	

Data/parameter [EA 13]:	Historical LULC and forest strata transition matrix
Data unit:	[ha yr ⁻¹]
Description:	Matrix of historical land transition rates between LULC classes and forest strata

Sources of data:	Remote sensing analysis
Value applied:	See spreadsheet
Justification of choice:	
Any comment:	

Data/parameter [EA 14]:	$FW_{baseline}$
Data unit:	$[m^3 yr^{-1}]$
Description:	Annual volume of fuelwood gathered in the baseline scenario
Sources of data (*):	Participatory rural appraisals conducted by project proponents
Value applied:	22,629.33
Justification of choice:	Emission reductions from avoided degradation were excluded due to insufficient accuracy and emission reductions from fuel-efficient woodstoves are included. Therefore, $FW_{baseline}$ was measured using social assessments.
Any comment:	

Data/parameter [EA 15]:	ρ_{wood}
Data unit:	$[Mg DM m^{-3}]$
Description:	Basic wood density
Sources of data:	GPG-LULUCF
Value applied:	Relevant species in GPG-LULUCF Table 3A.1.9
Justification of choice:	
Any comment:	

Data/parameter [EA 16]:	BEF_2
Data unit:	[-]
Description:	Biomass expansion factor for converting volumes of extracted roundwood to total aboveground biomass (including bark)
Sources of data:	Literature (UNDP/MOE Cambodia 2003) combined with inventory data
Value applied:	1.74
Justification of choice:	National study
Any comment:	

Data/parameter [EA 17]:	CF
Data unit:	$[Mg C (Mg DM)^{-1}]$
Description:	Carbon fraction of dry matter in wood
Sources of data:	IPCC
Value applied:	0.5
Justification of choice:	Default value
Any comment:	

Data/parameter [EA 18]:	$area_{baseline,fire}(i)$
Data unit:	$[ha yr^{-1}]$

Description:	Forest area in the project area affected by disturbances from forest fires in forest stratum i
Sources of data (*):	Participatory rural appraisals conducted by project proponents
Value applied:	{408,592} for $i = 1$ and 2 Where $i = 2$ represents strata receiving induced by hunters and $i = 2$ is fire induced to clear the understory
Justification of choice:	
Any comment:	

* lower-ranked options may only be used if higher-ranked options are not available.

Data/parameter [EA 19]:	E
Data unit:	
Description:	Average combustion efficiency of the above-ground tree biomass
Sources of data (*):	IPCC
Value applied:	0.5
Justification of choice:	Default factor
Any comment:	

* lower-ranked options may only be used if higher-ranked options are not available.

Data/parameter [EA 20]:	P
Data unit:	
Description:	Average proportion of mass burnt from the above-ground tree biomass
Sources of data:	GPG-LULUCF Table 3A.1.12
Value applied:	42.2
Justification of choice:	
Any comment:	Fixed for the entire crediting period

Data/parameter [EA 21]:	$\Delta B_{forestFires}$
Data unit:	[Mg DM ha ⁻¹]
Description:	Biomass consumption for forest fires
Sources of data:	GPG-LULUCF Table 3A.1.13
Value applied:	11.47
Justification of choice:	
Any comment:	Fixed for the entire crediting period

Data/parameter [EA 22]:	$\Delta area_{baseline,cropland}(i)$
Data unit:	[ha yr ⁻¹]
Description:	Forest area converted from forest stratum i to cropland in the project area under baseline conditions at the start of the project
Sources of data (*):	Social assessments conducted by project proponents
Value applied:	300
Justification of choice:	The remote sensing images have a significant confusion between bare

	soil and agricultural land. Therefore, remote sensing analysis was deemed inaccurate to quantify areas converted into cropland.
Any comment:	

Data/parameter [EA 23]:	$\Delta area_{baseline, settlement}(i)$
Data unit:	[ha yr ⁻¹]
Description:	Average forest area converted from forest stratum <i>i</i> to settlements in the reference region under baseline conditions
Sources of data (*):	Social assessments conducted by project proponents
Value applied:	68
Justification of choice:	The resolution of the remote sensing images used was too small to distinguish forests cleared into settlements from any other land-use transition.
Any comment:	

Data/parameter [EA 24]:	$CT_{baseline}$
Data unit:	[m ³ yr ⁻¹]
Description:	Annually extracted volume of harvested timber roundwood for commercial on-sale
Sources of data (*):	Participatory rural appraisals conducted by project proponents
Value applied:	0
Justification of choice:	
Any comment:	

Data/parameter [EA 25]:	$DT_{baseline}$
Data unit:	[m ³ yr ⁻¹]
Description:	Annually extracted volume of timber for domestic and local use, roundwood
Sources of data (*):	Participatory rural appraisals conducted by project proponents
Value applied:	46155.86
Justification of choice:	
Any comment:	

Data/parameter [EA 26]:	$nrDrivers$
Data unit:	Count
Description:	Number of drivers of deforestation or forest degradation
Sources of data:	Selection procedure described in "Analyze the Agents and Drivers of Deforestation" in the methodology
Value applied:	8
Justification of choice:	Two of the 10 identified drivers were excluded geographically from the reference region.
Any comment:	

Data/parameter [EA 27]:	$size_{projectArea}$
Data unit:	[ha]
Description:	Total project area
Sources of data:	Field measurement
Value applied:	56,050
Justification of choice:	
Any comment:	

Data/parameter [EA 28]:	AP
Data unit:	[ha]
Description:	Sample plot size (constant for all strata)
Sources of data:	GPG-LULUCF 2003 , local biomass inventory protocols or Pearson et al. (2005)
Value applied:	0.25
Justification of choice:	A standard square plot of 50 m x 50 m was used.
Any comment:	

Data/parameter [EA 29]:	$area(i, t)$
Data unit:	[ha]
Description:	Total area of class or stratum i during time t
Sources of data:	Remote sensing analysis and stratification procedure
Value applied:	See Table 25 of the PD.
Justification of choice:	
Any comment:	

Data/parameter [EA 30]:	Q_i
Data unit:	[Mg DM ha ⁻¹]
Description:	Approximate average value of the aboveground tree biomass of class or stratum i
Sources of data:	Peer-reviewed literature
Value applied:	See Table 34 of the PD.
Justification of choice:	Followed description in the methodology
Any comment:	To be updated during monitoring

Data/parameter [EA 31]:	p
Data unit:	
Description:	Desired level of precision
Sources of data:	Project design decision
Value applied:	10%
Justification of choice:	
Any comment:	

Data/parameter [EA 32]:	α
Data unit:	
Description:	Minimal confidence level for the biomass stock density measured with a biomass inventory
Sources of data:	Project design decision
Value applied:	95%
Justification of choice:	
Any comment:	To be updated during monitoring

Data/parameter [EA 33]:	st_i
Data unit:	[Mg DM ha ⁻¹]
Description:	Ex-ante expected standard deviation of the aboveground biomass of class or stratum i
Sources of data:	Peer-reviewed literature, reports, or preliminary measurements
Value applied:	See Table 34 of the PD.
Justification of choice:	
Any comment:	

Data/parameter [EA 34]:	$cost_i$
Data unit:	[-]
Description:	Cost to sample stratum i
Sources of data:	Estimated from preliminary sampling in different forest strata
Value applied:	1
Justification of choice:	Costs are identical for all strata
Any comment:	

Data/parameter [EA 35]:	$nrTrees(i, p)$
Data unit:	Count
Description:	Number of trees in sample plot p of LULC class or forest stratum i
Sources of data:	Field measurements
Value applied:	See Spreadsheet
Justification of choice:	
Any comment:	

Data/parameter [EA 36]:	$f_{allometric}(y)$
Data unit:	Equation
Description:	Allometric relationship to convert DBH into biomass
Sources of data (*):	Equation "D" in Chave et al. 2005
Value applied:	
Justification of choice:	Equation "D" in Chave et al. (2005) was found to be conservative in both evergreen and deciduous forest types as verified using destructive sampling techniques derived from forests near the project area. A detailed report on the verification of the allometric equation is

	available to the verifier.
Any comment:	

Data/parameter [EA 37]:	$DBH(t, i, p)$
Data unit:	[cm]
Description:	DBH of tree t within plot p of LULC class or forest stratum i
Sources of data:	Field measurements
Value applied:	See Spreadsheet
Justification of choice:	
Any comment:	

Data/parameter [EA 38]:	$\theta(i, p)$
Data unit:	Degrees
Description:	Slope of the land of plot p of LULC class or forest stratum i (see section 8 in Pearson et al., 2005).
Sources of data:	Field measurement
Value applied:	See Spreadsheet
Justification of choice:	Measured in sampling plots
Any comment:	Almost all of the project area is located on flat terrain.

Data/parameter [EA 39]:	$f_{belowground}(y)$
Data unit:	Equation
Description:	Relationship between aboveground and belowground biomass, such as a root-to-shoot ratio
Sources of data (*):	Equation from Pearson et al., 2005
Value applied:	$BBD = e^{(-1.0587 + 0.8836 \ln ABD)}$ Where ABD = belowground biomass, and BBD = belowground biomass
Justification of choice:	
Any comment:	

Data/parameter [EA 40]:	$nrDecompClasses$
Data unit:	1=sound; 2=intermediate; 3=rotten
Description:	Number of decomposition classes
Sources of data:	Field observations
Value applied:	3
Justification of choice:	
Any comment:	

Data/parameter [EA 41]:	$D(d, i, p)$
Data unit:	[m]
Description:	Sum of diameters in biomass class d of sampling plot p of LULC class

	or forest stratum i
Sources of data:	Field measurements
Value applied:	See Biomass Inventory Database
Justification of choice:	
Any comment:	

Data/parameter [EA 42]:	L
Data unit:	[m]
Description:	Length of the transect
Sources of data:	Project design decision
Value applied:	50
Justification of choice:	
Any comment:	

Data/parameter [EA 43]:	$\rho_{DW}(d)$
Data unit:	[kg.DM m ⁻³]
Description:	Basic density of dead wood in the density class d
Sources of data:	GPG LULUCF
Value applied:	GPG LULUCF Tables 3A.1.9-1 and 3A.1.9-2
Justification of choice:	
Any comment:	

Data/parameter [EA 44]:	$D_{referenceRegion,baselineScenario,DF}(t)$
Data unit:	[ha yr ⁻¹]
Description:	Rate of deforestation within the reference region for year t
Sources of data:	Linear interpolation of remote sensing data
Value applied:	See Figure 17 in the PD.
Justification of choice:	Followed procedures in the methodology
Any comment:	To be updated at the baseline update

Data/parameter [EA 45]:	$D_{referenceRegion,baselineScenario,DG}(t)$
Data unit:	[ha yr ⁻¹]
Description:	Rate of degradation within the reference region for year t
Sources of data:	<i>Not applicable</i>
Value applied:	<i>Not applicable</i>
Justification of choice:	<i>Not applicable</i>
Any comment:	

Data/parameter [EA 46]:	GWP_{N2O}
Data unit:	
Description:	Global Warming Potentials for N ₂ O
Sources of data:	IPCC

Value applied:	310
Justification of choice:	IPCC default value
Any comment:	Fixed for the entire crediting period

Data/parameter [EA 47]:	GWP_{CH_4}
Data unit:	
Description:	Global Warming Potentials for CH ₄
Sources of data:	IPCC
Value applied:	21
Justification of choice:	IPCC default value
Any comment:	Fixed for the entire crediting period

Data/parameter [EA 48]:	ER_{N_2O}
Data unit:	Proportion
Description:	Emission ratios for N ₂ O
Sources of data:	Table 3A.1.15 in IPCC GPG-LULUCF 2003
Value applied:	0.007
Justification of choice:	IPCC default value
Any comment:	Fixed for the entire crediting period

Data/parameter [EA 49]:	ER_{CH_4}
Data unit:	Proportion
Description:	Emission ratios for CH ₄
Sources of data:	Table 3A.1.15 in IPCC GPG-LULUCF 2003
Value applied:	0.012 (IPCC default value)
Justification of choice:	
Any comment:	Fixed for the entire crediting period

Data/parameter [EA 50]:	r
Data unit:	Proportion
Description:	Carbon-to-Nitrogen ratio of the wood
Sources of data (*):	A measured value based on leaf litter analyses,
Value applied:	100
Justification of choice:	Conservative value allowed by methodology
Any comment:	Fixed for the entire crediting period

Data/parameter [EA 51]:	$size_{referenceRegion}$
Data unit:	[ha]
Description:	Total size of the reference region
Sources of data:	Project design decision
Value applied:	The total size of the reference region is 621,860 ha
Justification of choice:	Followed the procedure in the methodology

Any comment:	Fixed for the entire crediting period
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Data/parameter [EA 52]:	$\Delta area_{historical}(CS_1 \rightarrow CS_2, t_1 \rightarrow t_2)$
Data unit:	[ha]
Description:	Area of transition from LULC class or forest stratum 1 to 2 from time 1 to 2 during the historical reference period
Sources of data:	Remote sensing analysis
Value applied:	See spreadsheet submitted to validator
Justification of choice:	
Any comment:	

Data/parameter [EA 53]:	$area_{historical}(CS_1, t_1)$
Data unit:	[ha]
Description:	Total area of LULC class or forest stratum 1 during time 1
Sources of data:	Remote sensing analysis
Value applied:	See Table 25 of the PD.
Justification of choice:	
Any comment:	

Data/parameter [EA 54]:	$f_{scarcity}(t)$
Data unit:	
Description:	Forest scarcity factor used to reduce the historical deforestation rate as a function of remaining forest cover [-]
Sources of data:	Methodology
Value applied:	$f_{scarcity}(t) = \frac{1}{1 + e^{sc_1 \left(sc_2 - \frac{area(t, nonForest)}{size_{projectArea}} \right)}}$
Justification of choice:	
Any comment:	

Data/parameter [EA 55]:	sc_1
Data unit:	
Description:	First shape factor for the forest scarcity equation; steepness of the decrease in deforestation rate (greater is steeper)
Sources of data:	Statistical fitting procedure
Value applied:	20
Justification of choice:	This scarcity function was calibrated using observations from Meyfroidt and Lambin (2008). The shape factors were set so that deforestation starts to decrease when around 50% of the current forest area in the project area is deforested, and completely stops when around 80% of the forest area has disappeared. This pattern was reported by Meyfroidt and Lambin (2008) in neighboring Vietnam. Deforestation rates started decreasing when 50% of forest cover remained, and halted in 1991-1993 at around 25% forest cover. Due to its cultural and ecological similarity to Cambodia, the forest transition trends

	observed in Vietnam are a valid reference for the situation in Cambodia.
Any comment:	

Data/parameter [EA 56]:	sc_2
Data unit:	0.7
Description:	Second shape factor for the forest scarcity equation; relative deforested area at which the deforestation rate was 50% of the initial deforestation rate
Sources of data:	Statistical fitting procedure
Value applied:	
Justification of choice:	
Any comment:	

Data/parameter [EA 57]:	$area(t, nonForest)$
Data unit:	[ha]
Description:	Total area that is not forest within the project area at time t after project start
Sources of data:	Land use change model
Value applied:	See spreadsheet
Justification of choice:	
Any comment:	

Data/parameter [EA 58]:	$effectiveness_{DG}(a, d)$
Data unit:	
Description:	The relative effectiveness of project action a in reducing the forest degradation caused by driver d
Sources of data:	Pilot projects, social assessments
Value applied:	See Table 44 of the PD.
Justification of choice:	
Any comment:	

Data/parameter [EA 59]:	$nrActivities$
Data unit:	Count
Description:	Total number of project activities
Sources of data:	Project design decision
Value applied:	5
Justification of choice:	Estimated based on the allocated funds, the capacity of implementing organization, and the motivation of participating communities
Any comment:	Fixed for the entire crediting period

Data/parameter [EA 60]:	$rate(a, t)$
Data unit:	Count

Description:	Adoption rate or relative degree of activity for activity a during year t. A value of 100% indicates that the activity cannot be more efficient in reducing deforestation or forest degradation than estimated.
Sources of data:	Project design decision
Value applied:	See Table 47 of the PD.
Justification of choice:	
Any comment:	

Data/parameter [EA 61]:	$nrFireClasses$
Data unit:	Count
Description:	Number of forest strata in which fire breaks were installed
Sources of data:	Project design decision
Value applied:	2
Justification of choice:	
Any comment:	To be updated at baseline update

Data/parameter [EA 62]:	$area_{biomassLoss}(i)$
Data unit:	$[ha\ yr^{-1}]$
Description:	Total annual area of forest stratum i that was cleared
Sources of data:	Project design decision
Value applied:	0
Justification of choice:	
Any comment:	

Data/parameter [EA 63]:	$area_{fireBiomassLoss}(i)$
Data unit:	$[ha\ yr^{-1}]$
Description:	Annual area of forest stratum i that was cleared by using prescribed burning
Sources of data:	Project design decision
Value applied:	0
Justification of choice:	No area will be cleared by using prescribed burning.
Any comment:	

Data/parameter [EA 64]:	$nrStrata$
Data unit:	Count
Description:	Number of forest strata
Sources of data:	Project design decision
Value applied:	2
Justification of choice:	Two strata were identified: evergreen forest and deciduous forest.
Any comment:	To be updated at baseline update

Data/parameter [EA 65]:	$area_{projectAreaWithANR,projectScenario}(t,i)$
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Data unit:	[ha]
Description:	Area of land on which ANR activities were planned under the project scenario for year t and in stratum i
Sources of data:	Project design decision
Value applied:	5,355
Justification of choice:	
Any comment:	To be updated during monitoring

Data/parameter [EA 66]:	Locations of ANR activities
Data unit:	Digital boundaries
Description:	Locations of all individual parcels on which ANR activities are planned in electronic format
Sources of data:	Project design decision
Value applied:	
Justification of choice:	
Any comment:	Shapefile is provided to the verifier

Data/parameter [EA 67]:	$area_{biomassLoss,ANR}(t, i)$
Data unit:	[ha]
Description:	Area of biomass removed within ANR stratum i during year t
Sources of data:	Project design decision
Value applied:	0 ha
Justification of choice:	
Any comment:	To be updated once ANR management plan is finalized

Data/parameter [EA 68]:	$area_{fireBiomassLoss,ANR}(t, i)$
Data unit:	[ha]
Description:	Area of biomass removed using prescribed burning within ANR stratum i during year t
Sources of data:	Project design decision
Value applied:	0
Justification of choice:	No prescribed burning will be executed inside of the project area
Any comment:	

Data/parameter [EA 69]:	$nrCDrivers$
Data unit:	Count
Description:	Number of geographically constrained drivers
Sources of data:	Literature/ Participatory rural appraisals
Value applied:	3
Justification of choice:	
Any comment:	

Data/parameter [EA 70]:	$leakage_{constrained}(d)$
Data unit:	
Description:	Leakage cancellation rate for avoiding deforestation/degradation of driver d from geographically constrained drivers
Sources of data:	Calculation
Value applied:	See Table 53 of the PD.
Justification of choice:	Estimated using the “leakage cancellation rate” procedure in the methodology
Any comment:	To be updated at the baseline update

Data/parameter [EA 71]:	$FW_{baseline}$
Data unit:	$[m^3 yr^{-1}]$
Description:	Biomass (dry matter) of fuel-wood collected by project participants under the baseline scenario
Sources of data (*):	Social appraisals in the project area
Value applied:	22,629
Justification of choice:	
Any comment:	

Data/parameter [EA 72]:	$FW_{allowed}$
Data unit:	$[m^3 yr^{-1}]$
Description:	Biomass (dry matter) of allowed fuel-wood collection in the project area under the project scenario
Sources of data:	Management plans
Value applied:	14709
Justification of choice:	
Any comment:	35% less than baseline

Data/parameter [EA 73]:	$nrfuelWoodReductionActions$
Data unit:	Count
Description:	The number of project activities that reduce the need for fuel-wood.
Sources of data:	Project design decision
Value applied:	2
Justification of choice:	Two project activities are planned: promotion of fuel-efficient wood-stoves and livestock prevention from insects.
Any comment:	

Data/parameter [EA 74]:	$adoption(i)$
Data unit:	
Description:	Adoption rate of project activity i which reduces fuel-wood consumption
Sources of data:	Literature/ pilot studies

Value applied:	70 %
Justification of choice:	Conservatively estimated based on a prediction of the willingness of local communities to adopt the alternative practice
Any comment:	

Data/parameter [EA 75]:	$efficiency(i)$
Data unit:	
Description:	Rate at which project activity i reduces fuel-wood consumption
Sources of data:	Literature/ pilot studies
Value applied:	44%
Justification of choice:	Although modern wood stoves are proved to be 75% more efficient than traditional stoves, the conservative estimate of 44% efficiency was applied.
Any comment:	To be updated during monitoring

Data/parameter [EA 76]:	$\Delta area_{settlement,baseline}$
Data unit:	[ha yr ⁻¹]
Description:	Area that would be converted to settlements by participating communities under the baseline scenario
Sources of data (*):	Remote sensing analysis in the project area before start of the crediting period
Value applied:	68
Justification of choice:	
Any comment:	To be updated at baseline update

Data/parameter [EA 77]:	$\Delta area_{settlement,project}$
Data unit:	[ha yr ⁻¹]
Description:	Area that will be converted to settlements by participating communities under the project scenario
Sources of data:	Literature
Value applied:	0
Justification of choice:	Estimated area that will be converted to cropland based on an understanding of the area required per household dwelling when participatory land use plans are in place and the anticipated population increase
Any comment:	To be updated during monitoring

Data/parameter [EA 78]:	$\Delta area_{settlement,allowed}$
Data unit:	[ha yr ⁻¹]
Description:	Area that will be converted to settlements after within the project area under the project scenario
Sources of data:	Project design decision
Value applied:	0
Justification of choice:	No conversion to settlement is allowed within the project area.

Any comment:	To be updated at baseline update
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Data/parameter [EA 79]:	$\Delta area_{cropLand,baseline}$
Data unit:	[ha yr ⁻¹]
Description:	Area that would be converted to cropland by participating communities under the baseline scenario
Sources of data (*):	Social appraisals in the project area before start of the crediting period
Value applied:	300
Justification of choice:	
Any comment:	

Data/parameter [EA 80]:	$\Delta area_{cropLand,project}$
Data unit:	[ha yr ⁻¹]
Description:	Area that will be converted to cropland by participating communities under the project scenario
Sources of data:	Literature/pilot studies
Value applied:	0
Justification of choice:	Estimated based on the understanding of cropland area required per household when support for agricultural intensification is provided and anticipated increase in population
Any comment:	To be updated during monitoring

Data/parameter [EA 81]:	$\Delta area_{cropLand,allowed}$
Data unit:	[ha yr ⁻¹]
Description:	Area that will be converted to cropland after within the project area under the project scenario
Sources of data:	Project design decision
Value applied:	0
Justification of choice:	Land-use plans prohibit forest area to be converted to cropland
Any comment:	

Data/parameter [EA 82]:	Geographical location of the leakage belts
Data unit:	Shape file
Description:	Exact geographical location of the leakage belt(s) in electronic form
Sources of data:	
Value applied:	Shape file is provided to verifier
Justification of choice:	
Any comment:	

Data/parameter [EA 83]:	$size_{leakageArea}$
Data unit:	[ha]
Description:	Size of the leakage area
Sources of data:	

Value applied:	116,806
Justification of choice:	Selected based on the procedure in the methodology
Any comment:	

Data/parameter [EA 84]:	Historical fire significance of emissions from small-scale fires
Data unit:	Narrative
Description:	Test whether the CH ₄ emissions from fires were significant during the past five years in the project area and leakage belts
Sources of data (*):	Social appraisals or remote sensing analysis
Value applied:	
Justification of choice:	Selected based on the procedure in the methodology
Any comment:	Social appraisals from all 13 community forests indicate that fire has been, and continues to be, a significant occurrence throughout the project area. Remote sensing from 1994 to 2008 supports the social appraisals. Remote sensing also shows that fire is much more of common disturbance in deciduous and mixed forest than in evergreen forest. To be updated at baseline update

Data/parameter [EA 85]:	<i>leakage_{unconstrained}(croplandconversion)</i>
Data unit:	Proportion
Description:	Leakage cancellation rate for avoiding deforestation/degradation from migrants clearing forest area for cropland conversion [-]
Sources of data:	Project area circumstances
Value applied:	50%
Justification of choice:	Migrants unable to settle and encroach within the project area are likely to shift to the land immediately surrounding the project. The majority of these migrants will stay within the leakage belt, and we estimate conservatively that migrant encroachment and resulting deforestation within the leakage area will cancel approximately 50% of avoided deforestation within the project area.
Any comment:	To be updated at baseline update

Data/parameter [EA 86]:	<i>nrEmissions</i>
Data unit:	Count
Description:	Total number of sources of GHG emissions considered
Sources of data:	Project area circumstances
Value applied:	3
Justification of choice:	Three emission sources are considered: fertilizer, biomass removed from ANR strata, biomass removed from for fire breaks
Any comment:	Fixed for the entire crediting period

Data/parameter [EA 87]:	Description of event, condition, or circumstance affecting land-use dynamics
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Data unit:	Narrative
Description:	A description of a potential change affecting the land-use
Sources of data:	Literature
Value applied:	Significant military activity, significant mining activity, changes in land-use policy, social unrest increasing pressure on forest areas, drastic increases in in-migration
Justification of choice:	
Any comment:	

Data/parameter [EA 88]:	x
Data unit:	Year
Description:	Number of years of long term persistent increase/decrease in forest carbon stock used in definition of forest degradation, and forest regeneration.
Sources of data:	Theoretical thresholds
Value applied:	Currently 10 years
Justification of choice:	
Any comment:	

Data/parameter [EA 89]:	y
Data unit:	
Description:	Minimum percentage of change in forest carbon stock used in definition of forest degradation, and forest regeneration
Sources of data:	Theoretical threshold
Value applied:	10%
Justification of choice:	
Any comment:	

Data/parameter [EA 90]:	t
Data unit:	Year
Description:	Measurement time period for estimating persistent increase/decrease in forest carbon stock used in definition of forest degradation, and forest regeneration
Sources of data:	Theoretical thresholds
Value applied:	10
Justification of choice:	Value used from VCS standards
Any comment:	

Data/parameter [EA 91]:	$V_{ex,h,ty,j}$
Data unit:	$[M^3 Yr^{-1}]$
Description:	The volume of timber extracted from within the project boundary during harvest h by species j and wood product class ty
Sources of data (*):	Social assessments conducted by project proponents
Value applied:	387.96

Justification of choice:	
Any comment:	

Data/parameter [EA 92]:	<i>nrLyingWood</i>
Data unit:	[-]
Description:	Total number of lying dead wood pieces on a transect line within a sample plot.
Sources of data:	Field measurement
Value applied:	See Spreadsheet
Justification of choice:	
Any comment:	

3.2 Additional Description of Parameters Monitored

3.2.1 Fire Monitoring

Fires are still used as a land-clearing tool, and commonly follow the path of deforestation. During the PRA communities expressed that fires do not occur in evergreen forest. Remote sensing analysis from MODIS FIRMS confirms that fire is not common in evergreen, except when used as a land-clearing tool. PRAs and remote sensing show that large and small-scale fire is a common occurrence in deciduous forest. Figure 4 shows the frequency of MODIS detectable fires. There is a high occurrence of large-fire south of Prey Srong and Sangkrou Preychheu in evergreen forest, due to human induced fire used to clear land. This anthropogenic fire occurs after trees are felled, and mirrors the path of deforestation.

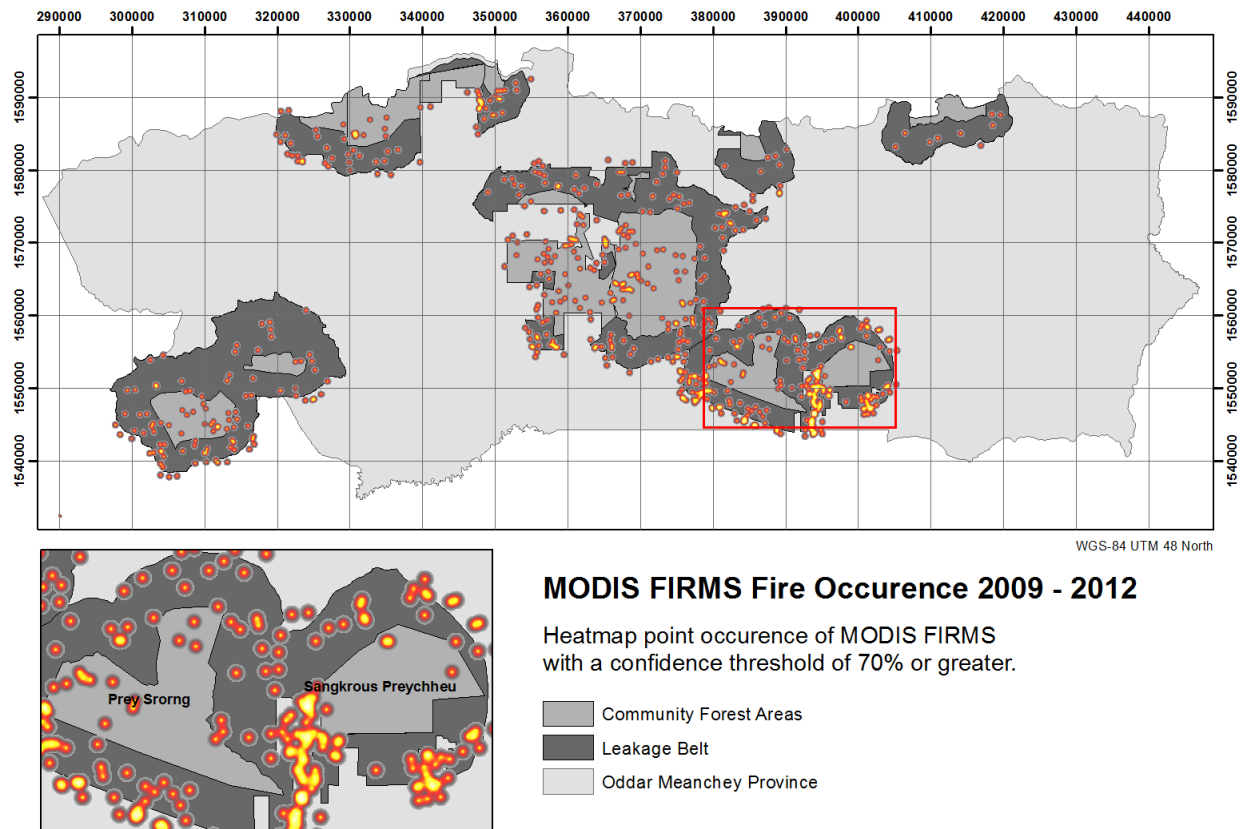


Figure 4. Fires since project start

The project area and leakage belts were evaluated for occurrence of forest fire for a period beginning in 2004 to 2012 using MODIS FIRMS. There is an apparent downward trend of the occurrence of small scale forest fires in the project, see Figure 5. The social assessment conducted in the project area indicated that small scale fire rarely becomes crown fire and loss of carbon from such fires can be considered minimal. The remote sensing analysis showed that approximately 1,600 ha of areas experienced small scale fire during 2008 to 2012 (i.e., since project start date) and estimated emissions from CH₄ was calculated to be about 15,642 tCO₂e. This amount is less than 5% of the net GHG emissions reduction from the project area over the same period of time. Additionally, post project extent of areas experiencing small scale fire have been lower than that from the post-project periods i.e. small scale fires are occurring less and less in recent years compared to pre-project historic fire frequency. Therefore, the CH₄ emissions from fire due to project activity were considered insignificant. Because there is no increase in small-scale fires the proportion of project area and leakage belts that were affected by small-scale fires is found to be zero, i.e. no different than historical data.

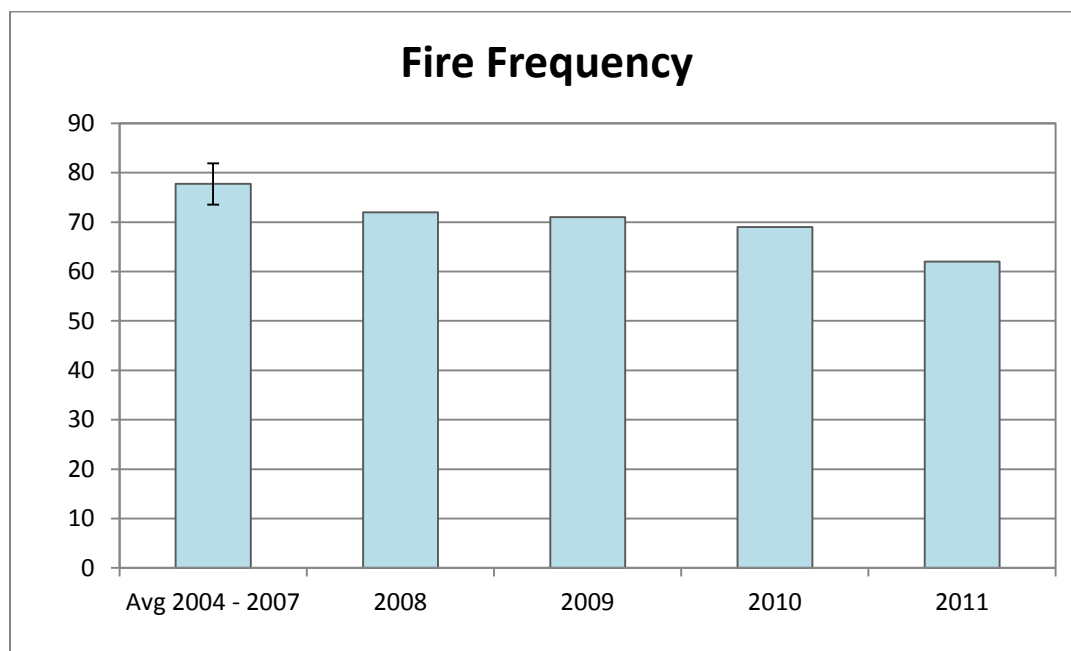


Figure 5. Comparison of fire frequency prior to project inception to annual frequencies post inception.

Land cover change was not detected in the areas that experienced small-scale fire, but only that of large-scale fire. Biomass loss due to small scale fires is conservatively calculated to be 10%. The methodology calculated biomass loss from small-scale fire as the difference in stock between “from” and “to” class or 10% of the stock, whichever is greater. Since there is no difference in mean biomass stock, a conservative 10% is used.

3.2.2 Land Transitions

Table 8. Project Area without ANR: Cover Transitions (values are hectares per year)

From	To	2009	2010	2011	2012
DCD	BAR	415	415	415	274
EVG	BAR	162	162	162	63
BAR	DCD	0	0	0	180
BAR	EVG	0	0	0	35

Table 9. Project Area - Area with ANR: Cover Transitions (values are hectares per year)

From	To	2009	2010	2011	2012
DCD	BAR	130	130	130	148
EVG	BAR	115	115	115	88
BAR	DCD	0	0	0	106
BAR	EVG	0	0	0	0

Table 10. Leakage Area: Cover Transitions (values are hectares per year)

From	To	2009	2010	2011	2012
DCD	BAR	3,409	3,409	3,409	2,393
EVG	BAR	738	738	738	488
BAR	DCD	1,599	1,599	1,599	5,306
BAR	EVG	386	386	386	386

3.2.3 Leakage Area

The Leakage Area was modified to remove an Economic Land Concession (ELC) that was not identified during validation. This edit was conducted to conform to the methodology requirement in section II.3.2.1 point (5) that all ELCs be removed from the leakage belt area. The edit represents a methodology deviation and was conducted in accordance to the VCS Standard on methodology deviations “Where the deviation does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology, the deviation shall be described and justified in the monitoring report. This shall include a description of when the changes occurred and the reasons for the changes.”

The ELC was not originally included in documentation received during the preparation of the Project Document. Extensive deforestation activities within the ELC were detected during analysis of remote sensing imagery from 2010 to 2012. This area was subsequently identified as the Samrong Rubber Industry PPT Ltd. per documentation showing the Forestry Administration approved ELC. This documentation was provided to the validator. This ELC is located near the Prey Srong and Sangkrou Preychheu Community Forest areas. The ELC is held by the Samrong Rubber Industry PTT Ltd which has a contract with the Ministry of Agriculture, Forestry, and Fisheries since 12 May 2006. Activities in the area started at the end of 2006, but they have been more active in the period of 2009-2012. They started to grow rubber in 2007.

The ELC boundary was digitized using infrastructure roads visible in the latest available imagery at the time (IRS multispectral from 13 March 2012) as delimiters. The original leakage area of 116,806 hectares was reduced to 114,968 hectares after clipping out the Samrong ELC boundary. The new leakage area is still in compliance with all methodology requirements.

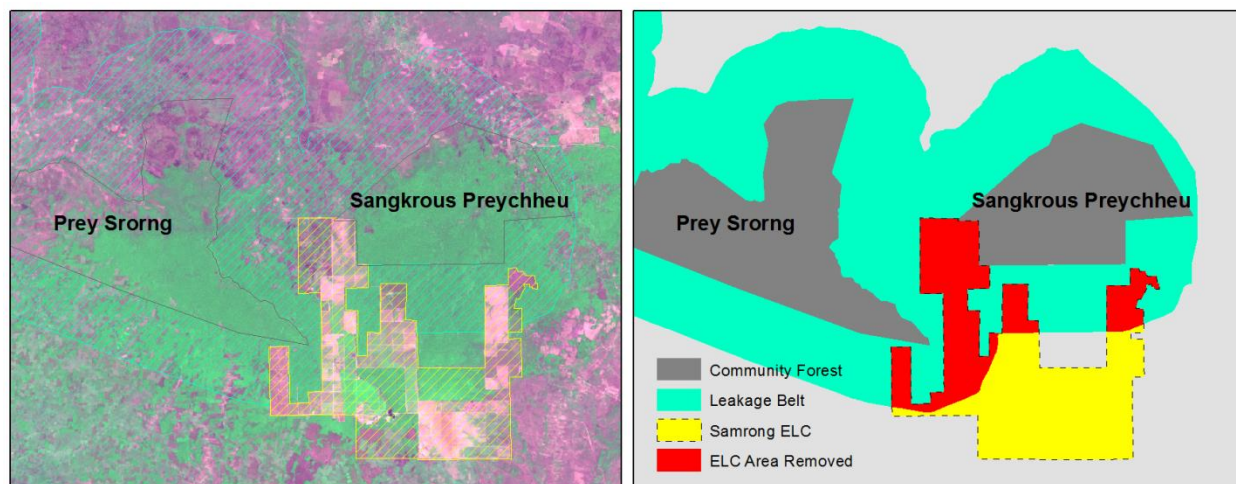


Figure 6. Digitized boundary of the Samrong Rubber PPT Ltd. ELC and subsequent area removed from the leakage belt. Imagery on left is IRS Multispectral from 13 March 2012.

3.3 Data and Parameters Monitored

The tables below contain a list of all the information that has been recorded about the actions that occurred in the project and leakage areas.

Data/parameter [MN 1]:	Locations of discrete project parcels
Data unit:	Digital boundaries
Description:	Locations of all individual discrete project parcels in electronic format
Sources of data:	Project design decision
Description of methods:	All necessary meta-data correctly displaying the files are included.
Frequency of monitoring:	Every 2 years after the validation of the project
Value applied:	Digital files in kml format. No change in project area.
Monitoring equipment:	GPS
QA/QC procedures:	
Calculation method:	None
Any comment:	

Data/parameter [MN 2]:	$size_{projectArea}$
Data unit:	[ha]
Description:	Total project area
Sources of data:	Field measurement
Description of methods:	GIS was used to calculate the area
Frequency of monitoring:	Every 2 years after the validation of the project
Value applied:	56,050 ha

Monitoring equipment:	
QA/QC procedures:	none
Calculation method:	
Any comment:	No change in project area

Data/parameter [MN 3]:	Historical LULC and forest strata transition matrix
Data unit:	[ha yr ⁻¹]
Description:	Matrix of historical land transition rates between LULC classes and forest strata
Sources of data:	Remote sensing analysis
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	No change in baseline LULC transition rates
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix available to verifier
Calculation method:	
Any comment:	Historical baseline already validated.

Data/parameter [MN 4]:	$\Delta area_{projectAreaWithoutANR,projectScenario}(t,i)$
Data unit:	[ha yr ⁻¹]
Description:	Hectares undergoing transition i within the project area, excluding the ANR area, under the project scenario for year t . [ha yr ⁻¹].
Sources of data:	Remote sensing analysis
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	See tables under 3.2.2 for summary, LULC Tables v1-0.xlsx for detailed transition matrices.
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix available to verifier
Calculation method:	
Any comment:	

Data/parameter [MN 5]:	$\Delta area_{projectAreaWithoutANR,baselineScenario}(t,i)$
Data unit:	[ha yr ⁻¹]
Description:	Hectares undergoing transition i within the project area, excluding the ANR area, under the baseline scenario for year t . [ha yr ⁻¹].

Sources of data:	Land-use change modeling
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	See Table 43 in the PD.
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix from validation available to verifier
Calculation method:	
Any comment:	

Data/parameter [MN 6]:	$\Delta area_{projectAreaWithANR,baselineScenario}(t, i)$
Data unit:	[ha yr ⁻¹]
Description:	Hectares undergoing transition i within the project area with ANR activities under the baseline scenario for year t .
Sources of data:	Land-use change modeling
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	See spreadsheet presented during validation.
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix from validation available to verifier.
Calculation method:	
Any comment:	

Data/parameter [MN 7]:	$\Delta area_{leakageArea,projectScenario}(t, i)$
Data unit:	[ha yr ⁻¹]
Description:	Hectares undergoing transition i within the leakage area under the project scenario for year t
Sources of data:	Remote sensing analysis
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	See tables under 3.2.2 for summary, LULC Tables v1-0.xlsx for detailed transition matrices.
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis was carried out and confusion matrix was created.

Calculation method:	
Any comment:	

Data/parameter [MN 8]:	$\Delta area_{leakageArea,baselineScenario}(t,i)$
Data unit:	[ha yr ⁻¹]
Description:	Hectares undergoing transition <i>i</i> within the leakage area under the baseline scenario during year <i>t</i>
Sources of data:	Land-use change modeling
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	Not relevant
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix available to verifier
Calculation method:	
Any comment:	ANR monitoring begins after verification

Data/parameter [MN 9]:	Household count
Data unit:	Count
Description:	Number of households participating in project
Sources of data:	Official records and census data
Description of methods:	Project proponent provided values from CF membership details.
Frequency of monitoring:	Annually after the validation of the project
Value applied:	7,092
Monitoring equipment:	
QA/QC procedures:	Cross-validated. Pact contacted CF leaders to confirm and clarify population data.
Calculation method:	
Any comment:	

Data/parameter [MN 10]:	Household size
Data unit:	Count
Description:	Average size of a household in the project area
Sources of data:	Applied value represents the data gathered from Social assessments.
Measurement procedures:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	5.58

Monitoring equipment:	
QA/QC procedures:	The applied value is reasonably close to the value reported by the Cambodia Census of 2008, in which an average household size of 4.8 was reported for the Oddar Meanchey province.
Calculation method:	
Any comment:	

Data/parameter [MN 11]:	$FW_{baseline}$
Data unit:	$[m^3 yr^{-1}]$
Description:	Annual volume of fuelwood gathering in the baseline scenario
Sources of data (*):	Social assessments
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	22,629
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 12]:	ρ_{wood}
Data unit:	$[Mg DM m^{-3}]$
Description:	Basic wood density.
Sources of data:	GPG-LULUCF Table 3A.1.9.
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	GPG-LULUCF Table 3A.1.9.
Monitoring equipment:	
QA/QC procedures:	none
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 13]:	BEF_2
Data unit:	$[-]$
Description:	Biomass expansion factor for converting volumes of extracted roundwood to total aboveground biomass (including bark).

Sources of data:	Literature
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	
Monitoring equipment:	
QA/QC procedures:	Value used that lead to conservative results
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 14]:	$area_{baseline,fire}(i)$
Data unit:	[ha yr ⁻¹]
Description:	Forest area in the project area affected by disturbances from forest fires in forest stratum i
Sources of data (*):	Social assessments
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 15]:	$\Delta area_{baseline,cropland}(i)$
Data unit:	[ha yr ⁻¹]
Description:	Forest area converted from forest stratum i to cropland in the project area under baseline conditions at the start of the project
Sources of data (*):	Social assessments
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	300
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 16]:	$\Delta area_{baseline, settlement}(i)$
Data unit:	[ha yr ⁻¹]
Description:	Average forest area converted from forest stratum <i>i</i> to settlements in the reference region under baseline conditions
Sources of data (*):	Social assessments
Description of methods:	See methodology for further guidance on remote sensing
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	68
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 17]:	$CT_{baseline}$
Data unit:	[m ³ yr ⁻¹]
Description:	Annually extracted volume of harvested timber round-wood for commercial on-sale
Sources of data (*):	Social assessments
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	0
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 18]:	Timber price
Data unit:	Local currency
Description:	Prices of timber on local markets
Sources of data:	PRA
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	Average of 494,000 riels per m ³ ; estimate varied from 400,000 to 2,000,000 for one cubic meter as impacted by the timber quality.

Monitoring equipment:	
QA/QC procedures:	Timber price was cross validated with the price of timber found in 2010 household survey.
Calculation method:	
Any comment:	

Data/parameter [MN 19]:	$DT_{baseline}$
Data unit:	$[m^3 yr^{-1}]$
Description:	Annually extracted volume of timber for domestic and local use, roundwood
Sources of data (*):	Social assessments
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	46,155.86
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 20]:	$nrDrivers$
Data unit:	Count
Description:	Number of drivers of deforestation or forest degradation
Sources of data:	
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	8
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 21]:	$area(i, t)$
Data unit:	[ha]
Description:	Total area of class or stratum i during time t

Sources of data:	Remote sensing analysis
Description of methods:	
Frequency of monitoring:	Monitored at verification event.
Value applied:	See LULC Tables v1-0.xlsx.
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis was carried out and a confusion matrix is available to the validator.
Calculation method:	
Any comment:	Was effectively monitored.

Data/parameter [MN 22]:	$nrTrees(i,p)$
Data unit:	Count
Description:	Number of trees in sample plot p of LULC class or forest stratum i
Sources of data:	Measured in sampling plots
Description of methods:	
Frequency of monitoring:	Measured for verification.
Value applied:	See biomass inventory spreadsheet
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in biomass inventory SOP
Calculation method:	
Any comment:	

Data/parameter [MN 23]:	$DBH(t,i,p)$
Data unit:	[cm]
Description:	DBH of tree t within plot p of LULC class or forest stratum i
Sources of data:	Measured in sampling plots
Description of methods:	Measured at 1.3 m above the ground for trees with DBH > 5 cm.
Frequency of monitoring:	Measured for verification.
Value applied:	See biomass inventory spreadsheet
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in biomass inventory SOP
Calculation method:	
Any comment:	

Data/parameter [MN 24]:	$\theta(i,p)$
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Data unit:	degrees
Description:	Slope of the land of plot p of LULC class or forest stratum i
Sources of data:	Measured in sampling plots
Description of methods:	See section 8 in Pearson et al., 2005
Frequency of monitoring:	Measured for verification.
Value applied:	See biomass inventory spreadsheet
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in biomass inventory SOP
Calculation method:	
Any comment:	

Data/parameter [MN 25]:	$f_{allometric}(y)$
Data unit:	
Description:	Allometric relationship to convert DBH into biomass
Sources of data (*):	Peer-reviewed literature
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	Equation "D" in Chave et al. 2005
Monitoring equipment:	
QA/QC procedures:	Verify allometric relationship with destructively sampled trees
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 26]:	$D(d, i, wp, p)$
Data unit:	[cm]
Description:	Diameter of piece wp of lying wood along the transect in decomposition class d (1=sound, 2=intermediate, 3=rotten) of sampling plot p of LULC class or forest stratum i .
Sources of data:	Measured in sampling plots
Description of methods:	
Frequency of monitoring:	Measured for verification.
Value applied:	See biomass inventory spreadsheet
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in biomass inventory SOP
Calculation method:	

Any comment:	
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Data/parameter [MN 27]:	$\Delta area_{historical}(CS_1 \rightarrow CS_2, t_1 \rightarrow t_2)$
Data unit:	[ha yr ⁻¹]
Description:	Area of transition from LULC class or forest stratum 1 to 2 from time 1 to 2 during the historical reference period
Sources of data:	Remote sensing analysis
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	See PD
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix from validation available to verifier.
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 28]:	$area_{historical}(CS_1, t_1)$
Data unit:	[ha]
Description:	Total area of LULC class or forest stratum 1 during time 1
Sources of data:	Remote sensing analysis
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	See PD
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix from validation available to verifier.
Calculation method:	
Any comment:	Not required during current monitoring period.

Data/parameter [MN 29]:	$D_{referenceRegion,baselineScenario,DF}(t)$
Data unit:	[ha yr ⁻¹]
Description:	Rate of deforestation within the reference region for year t .
Sources of data:	
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is

	applied.
Value applied:	See PD
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix from validation available to verifier.
Calculation method:	Linear interpolation of remote sensing data
Any comment:	Not required during current monitoring period

Data/parameter [MN 30]:	$D_{referenceRegion,baselineScenario,DG}(t)$
Data unit:	[ha yr ⁻¹]
Description:	Rate of forest degradation within the reference region for year t .
Sources of data:	Linear interpolation of remote sensing data
Description of methods:	
Frequency of monitoring:	None
Value applied:	
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	Degradation is not included in the project

Data/parameter [MN 31]:	$area(t, nonForest)$
Data unit:	[ha]
Description:	Total area that is not forest within the project area at time t after project start.
Sources of data:	Remote sensing analysis
Description of methods:	
Frequency of monitoring:	Monitored for verification.
Value applied:	See LULC Tables v1-0.xlsx for detailed transition matrices.
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix from validation available to verifier.
Calculation method:	
Any comment:	

Data/parameter [MN 32]:	$effectiveness_{DG}(a, d)$
Data unit:	

Description:	The relative effectiveness of project action a in reducing the forest degradation caused by driver d
Sources of data:	Pilot projects, social assessments
Description of methods:	
Frequency of monitoring:	
Value applied:	Not Relevant
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	Degradation is not included in the project

Data/parameter [MN 33]:	$rate(a, t)$
Data unit:	Count
Description:	Adoption rate or relative degree of activity for activity a during year t. A value of 100% indicates that the activity cannot be more efficient in reducing deforestation or forest degradation than estimated
Sources of data:	Project design decision
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures on recording project activities in methodology
Calculation method:	
Any comment:	Not required during current monitoring period

Data/parameter [MN 34]:	Forest patrolling labor
Data unit:	[hrs]
Description:	Labor hours used for forest patrolling
Sources of data:	Records of implemented activities
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	36 minutes per month for every 100 ha (average). See Table 3.
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures on recording project activities in methodology
Calculation method:	

Any comment:	Calculated only for CF with active forest patrols for April – August 2012.
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Data/parameter [MN 35]:	Description of fire prevention measures
Data unit:	Text
Description:	Information on fire prevention measures
Sources of data:	Records of implemented activities
Description of methods:	Record dates of implementation of fire prevention measures, type of activity, and location (lat/lon coordinates)
Frequency of monitoring:	Annually after the validation of the project
Value applied:	See section 2.1.10
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures on recording project activities in methodology
Calculation method:	
Any comment:	

Data/parameter [MN 36]:	$area_{biomassLoss}(i)$
Data unit:	[ha yr ⁻¹]
Description:	Total annual area of LULC class i that was cleared
Sources of data:	Records of implemented activities
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	0
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures on recording project activities in methodology
Calculation method:	
Any comment:	See section 2.1.10. No areas were cleared in this monitoring period.

Data/parameter [MN 37]:	$area_{fireBiomassLoss}(i)$
Data unit:	[ha yr ⁻¹]
Description:	Annual area of forest stratum i that was cleared by using controlled burning
Sources of data:	Records of implemented activities
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	0

Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures on recording project activities in methodology
Calculation method:	
Any comment:	See section 2.1.10. No areas were cleared in this monitoring period.

Data/parameter [MN 38]:	<i>nrStrata</i>
Data unit:	Count
Description:	Number of forest strata
Sources of data:	Project design decision
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	2
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	Not required during current monitoring period

Data/parameter [MN 39]:	<i>adoption(i)</i>
Data unit:	Proportion
Description:	Adoption rate of project activity <i>i</i> which reduces fuel-wood consumption
Sources of data:	Social assessments
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	See section 2.1.5. No woodstoves were distributed during the current monitoring period.

Data/parameter [MN 40]:	<i>efficiency(i)</i>
Data unit:	Proportion
Description:	Rate at which project activity <i>i</i> reduces fuel-wood consumption
Sources of data:	Field measurements

Description of methods:	Measure efficiency in at least 10 randomly selected households. Only to be included if activities that reduce fuel-wood consumption are implemented.
Frequency of monitoring:	Every 2 years after the validation of the project
Value applied:	
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	See section 2.1.5. No woodstoves were distributed during the current monitoring period.

Data/parameter [MN 41]:	$\Delta area_{settlement,baseline}$
Data unit:	[ha yr ⁻¹]
Description:	Area that would be converted to settlements by participating communities under the baseline scenario
Sources of data:	Remote sensing analysis in the reference region after the start of the crediting period
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	68
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix from validation available to verifier
Calculation method:	
Any comment:	Not updated during current monitoring period

Data/parameter [MN 42]:	Description of agricultural intensification
Data unit:	Narrative
Description:	Detailed description of the implemented agricultural intensification projects
Sources of data:	Records of implemented activities
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	See Section 2.1.7
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures on recording project activities in methodology
Calculation method:	

Any comment:	
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Data/parameter [MN 43]:	Area under agricultural intensification
Data unit:	[ha]
Description:	Size of the area of agricultural intensification separated for each agricultural intensification measure
Sources of data:	Participatory rural appraisals
Description of methods:	Calculate based on areas of fertilized cropland in the leakage and project areas.
Frequency of monitoring:	Annually after the validation of the project
Value applied:	0
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Agricultural intensification has not been implemented yet. See Section 2.1.7 for details.

Data/parameter [MN 44]:	Yields under agricultural intensification
Data unit:	[Mg ha ⁻¹]
Description:	Harvested yield for agricultural intensification practices
Sources of data:	Participatory rural appraisals
Description of methods:	Only to be included if agricultural intensification activities are implemented.
Frequency of monitoring:	Annually after the validation of the project
Value applied:	0
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Agricultural intensification has not been implemented yet. See Section 2.1.7 for details.

Data/parameter [MN 45]:	Agricultural outreach activity
Data unit:	Narrative
Description:	A detailed description of the different activities and meetings done for agricultural outreach
Sources of data:	Records of implemented activities
Description of methods:	Dates, reports of demonstration meetings or agricultural outreach and extension activities for agricultural intensification practices described in

	Section 2.1.7
Frequency of monitoring:	Annually after the validation of the project
Value applied:	Reports are available. See Section 2.1.7 for details.
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures on recording project activities in methodology
Calculation method:	
Any comment:	

Data/parameter [MN 46]:	Fuel-efficient stoves acquired
Data unit:	Count
Description:	Number of fuel-efficient stoves acquired per year
Sources of data:	Participatory rural appraisals.
Description of methods:	Only to be included if fuel-efficient stoves are introduced.
Frequency of monitoring:	Annually after the validation of the project
Value applied:	0
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Fuel-efficient stoves have not been introduced yet.

Data/parameter [MN 47]:	Fuel-efficient stoves used
Data unit:	Count
Description:	Number of fuel-efficient stoves effectively used by project participants
Sources of data:	Participatory rural appraisals.
Description of methods:	Only to be included if fuel-efficient stoves are introduced.
Frequency of monitoring:	Every 2 years after the validation of the project
Value applied:	
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Fuel-efficient stoves have not been introduced yet.

Data/parameter [MN 48]:	<i>nrANRstrata</i>
Data unit:	Count
Description:	Number of strata within the project area on which ANR activities are proposed

Sources of data:	Field measurement
Description of methods:	The number of ANR strata is dependent on the ANR management plan designed by the project proponents. Only to be included if ANR activities are implemented.
Frequency of monitoring:	Once at first verification
Value applied:	6
Monitoring equipment:	
QA/QC procedures:	See ANR SOP
Calculation method:	
Any comment:	See Section 2.1.3

Data/parameter [MN 49]:	Locations of ANR activities
Data unit:	Digital boundaries
Description:	Locations of all individual parcels on which ANR activities are planned in electronic format
Sources of data:	Project design decision
Description of methods:	Only to be included if ANR activities are implemented.
Frequency of monitoring:	Once at first verification
Value applied:	2012_verification_anr_wgs84_utm48n.shp
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	

Data/parameter [MN 50]:	Geographical location of the leakage belts
Data unit:	Digital boundaries
Description:	Exact geographical location of the leakage belt(s) in electronic form
Sources of data:	Project design decision/GIS analysis
Description of methods:	
Frequency of monitoring:	Once at first verification
Value applied:	Original leakage area of 116,806 hectares reduced to 114,968 hectares.
Monitoring equipment:	
QA/QC procedures:	See methodology
Calculation method:	
Any comment:	Leakage belt modified to account for an Economic Land Concession (Samrong Industry PTT Ltd Rubber Plantation) not recorded at

	validation despite establishment date of 12 May 2006. Boundary of this concession was clipped from the validation leakage belt. No other changes were made. See Section 3.2.3 for full description.
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Data/parameter [MN 51]:	$size_{leakageArea}$
Data unit:	[ha]
Description:	Size of the leakage area
Sources of data:	
Description of methods:	
Frequency of monitoring:	Once at first verification
Value applied:	114,968
Monitoring equipment:	
QA/QC procedures:	See methodology
Calculation method:	
Any comment:	Areas sanctioned as planned conversions were excluded. See MN 50.

Data/parameter [MN 52]:	Description of ANR activities
Data unit:	Narrative
Description:	Detailed description regarding the ANR activities, including dates and locations
Sources of data:	Records of implemented activities
Description of methods:	Provided dates, locations (Digital boundaries), areas, and types of biomass removal (coppicing, removal of invasive species, thinning), and dates, locations (Digital boundaries or geographic coordinates), areas, species, and planting density of enrichment planting
Frequency of monitoring:	Annually after the validation of the project
Value applied:	See Section 2.1.3
Monitoring equipment:	
QA/QC procedures:	See ANR SOP
Calculation method:	
Any comment:	For description of activities see ANR SOP, for activities carried out so far see Section 2.1.3

Data/parameter [MN 53]:	$NAI(i)$
Data unit:	[Mg C ha ⁻¹ yr ⁻¹]
Description:	Net annual biomass increment for forest stratum i under the baseline scenario.
Sources of data:	Estimate within the biomass inventory plots outside of the ANR area

Description of methods:	Only to be included if ANR activities are implemented.
Frequency of monitoring:	Every 2 years after the validation of the project
Value applied:	None
Monitoring equipment:	
QA/QC procedures:	See biomass inventory SOP
Calculation method:	
Any comment:	ANR silvicultural activities have not been implemented yet.

Data/parameter [MN 54]:	$\Delta C(t, i)$
Data unit:	[Mg C ha ⁻¹ yr ⁻¹]
Description:	Increase in forest biomass in ANR forest stratum i at time t .
Sources of data:	Estimate within the biomass inventory plots inside of the ANR area
Description of methods:	
Frequency of monitoring:	Every 2 years
Value applied:	Not applicable
Monitoring equipment:	
QA/QC procedures:	See biomass inventory SOP
Calculation method:	
Any comment:	ANR silvicultural activities have not been implemented yet.

Data/parameter [MN 55]:	ANR tree survival rate
Data unit:	Proportion
Description:	Survival rate of planted or regenerating trees as an ANR activity
Sources of data:	Estimate within the biomass inventory plots inside of the ANR area
Description of methods:	
Frequency of monitoring:	Every 5 years after the validation of the project
Value applied:	Not applicable
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	ANR silvicultural activities have not been implemented yet.

Data/parameter [MN 56]:	$area_{fireBiomassLoss,ANR}(t, i)$
Data unit:	[ha]
Description:	Area of biomass removed by controlled burning within ANR stratum

	i during year t
Sources of data:	Records of implemented activities
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	0
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures on recording project activities in methodology
Calculation method:	
Any comment:	Fire will not be used as a management tool in ANR areas.

Data/parameter [MN 57]:	$area_{biomassLoss,ANR}(t, i)$
Data unit:	[ha]
Description:	Area of biomass removed within ANR stratum i during year t , by coppicing, removing of invasive species, or thinning
Sources of data:	Records of implemented activities
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	0
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures on recording project activities in methodology
Calculation method:	
Any comment:	ANR silvicultural activities have not been implemented yet.

Data/parameter [MN 58]:	$area_{projectAreaWithANR,projectScenario}(t, i)$
Data unit:	[ha]
Description:	Amount of land on which ANR activities are planned under the baseline scenario for year t and in stratum i
Sources of data:	Records of implemented activities
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	0
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures on recording project activities in methodology
Calculation method:	
Any comment:	ANR activities are an innovative approach to forest management in Oddar Meanchey. The FA and the CFMCs confirm that no ANR has taken place in OM in the past, and ANR would not have been

	implemented without the project.
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Data/parameter [MN 59]:	<i>nrFireClasses</i>
Data unit:	Count
Description:	Number of LULC classes in which fire breaks were installed
Sources of data:	Records of implemented activities
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	2
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures on recording project activities in methodology
Calculation method:	
Any comment:	

Data/parameter [MN 60]:	<i>size_{projectArea}</i>
Data unit:	[ha]
Description:	Total size of all strata, e.g. the total project area
Sources of data:	Project design decision
Description of methods:	
Frequency of monitoring:	Once at verification
Value applied:	56,050
Monitoring equipment:	
QA/QC procedures:	See methodology
Calculation method:	
Any comment:	

Data/parameter [MN 61]:	Evidence of land-tenure strengthening
Data unit:	Narrative
Description:	Information and data on land-tenure strengthening
Sources of data:	Records of implemented activities
Description of methods:	Records of dates and reports of all meetings with stakeholders regarding land-tenure status strengthening, original agreements strengthening the land-tenure status, dates when the land-tenure status strengthening agreements were signed, and dates and reports of all meetings with stakeholders regarding forest and land-use plans
Frequency of monitoring:	Annually after the validation of the project
Value applied:	See Section 2.1.1

Monitoring equipment:	
QA/QC procedures:	See methodology
Calculation method:	
Any comment:	

Data/parameter [MN 62]:	Fire prevention labor
Data unit:	[hrs]
Description:	Labor hours used to implement the measure fire prevention measure
Sources of data:	Records of implemented activities obtained from participatory rural appraisals (PRAs)
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	11.25 hrs. per month
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	Fire prevention consultation has been completed. Only Sorng Rokavorn has effectively carried out fire prevention measures. In this Community Forest 4-5 people spend 2-3 hours per month on fire suppression activities.

Data/parameter [MN 63]:	NTFP harvest rate		
Data unit:	[m ³ yr ⁻¹] or [kg yr ⁻¹]		
Description:	Annual volumes of non-timber forest products extracted		
Sources of data:	Social Assessments		
Description of methods:	Estimated among participating communities and communities living in the leakage area through a Participatory Rural Appraisal		
Frequency of monitoring:	Annually after the validation of the project		
Value applied:			
	NTFP	Harvest Rate (unit/year)	Unit
	Bamboo	5,310	(canes)
	Bamboo shoots	17,681	(kg)
	Bark	1,100	(bundle)
	Fish	6,451	(Kg)
	Flowers	786	(Kg)
	Forest/wild vegetables	1,748	(Kg)
	Fruits	4,880	(Kg)

	Ginger	2,566	(Kg)
	Hard resin	4,553	(Kg)
	Honey	46	(Liters)
	Mushrooms	9,506	(Kg)
	Poles	96	(cubic meters)
	Rattan	26,593	(Canes)
	rattan bud	1,271	(Kg)
	Resin	23,173	(Liters)
	Thatch grass	10,419	(bundle)
	Traditional medicine	908	(Kg)
	Vines	3,015	(bundle)
	Wild Potato	6,658	(Kg)
	Wildlife	240	(Kg)
Monitoring equipment:			
QA/QC procedures:			
Calculation method:			
Any comment:			

Data/parameter [MN 64]:	Local NTFP price		
Data unit:	Riel		
Description:	Price of non-timber forest products on local markets		
Sources of data:	Social Assessments		
Description of methods:	Estimated among participating communities and communities living in the leakage area through a Participatory Rural Appraisal		
Frequency of monitoring:	Every 5 years after the validation of the project		
Value applied:	Bamboo	Unit Price (Riel/unit)	Unit
	Bamboo shoots	1,286	(canes)
	Bark	1,259	(kg)
	Fish	5,572	(bundle)
	Flowers	8,358	(Kg)
	Forest/wild vegetables	5,250	(Kg)
	Fruits	3,183	(Kg)
	Ginger	3,223	(Kg)
	Hard resin	2,333	(Kg)
	Honey	7,727	(Kg)

	Mushrooms	19,417	(Liters)
	Poles	11,858	(Kg)
	Rattan	13,367	(cubic meters)
	rattan bud	855	(Canes)
	Bamboo	3,092	(Kg)
	Resin	2,057	(Liters)
	Thatch grass	2,262	(bundle)
	Traditional medicine	3,042	(Kg)
	Vines	1,950	(bundle)
	Wild Potato	1,825	(Kg)
	Wildlife	21,143	(Kg)
Monitoring equipment:			
QA/QC procedures:			
Calculation method:			
Any comment:			

Data/parameter [MN 65]:	Location of timber harvesting
Data unit:	Digital boundaries
Description:	Location of timber harvested within the project area
Sources of data:	Management plans and social assessments
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	Multiple kml files are available to the validator.
Monitoring equipment:	
QA/QC procedures:	Boundaries were cross-checked by overlaying with remote sensing imagery.
Calculation method:	
Any comment:	

Data/parameter [MN 66]:	Timber harvesting rate
Data unit:	[m ³]
Description:	Volume of timber harvested within the project area
Sources of data:	Participatory rural appraisals
Description of methods:	Estimate among participating communities and communities living in the leakage area.
Frequency of monitoring:	Annually after the validation of the project

Value applied:	639 cubic meters.
Monitoring equipment:	PRA
QA/QC procedures:	See SOP for Participatory Rural Appraisals.
Calculation method:	
Any comment:	Timber was identified as “commercial timber, timber for local enterprises, and timber for domestic use.

Data/parameter [MN 67]:	Location of fuel-wood collection
Data unit:	Digital geographic coordinates
Description:	Location of fuel-wood collected within the project area
Sources of data:	Participatory rural appraisals
Description of methods:	Estimated among participating communities and communities living in the leakage area.
Frequency of monitoring:	Annually after the validation of the project
Value applied:	Multiple locations- see PRA maps.
Monitoring equipment:	
QA/QC procedures:	See SOP for Social Assessments
Calculation method:	
Any comment:	

Data/parameter [MN 68]:	Wood harvested for charcoal
Data unit:	[m ³]
Description:	Volume of green wood harvested for charcoal production within the project area per forest stratum
Sources of data:	Participatory rural appraisal
Description of methods:	Estimated wood volume extracted by each household were estimated for a twelve month period using PRA.
Frequency of monitoring:	Annually after the validation of the project
Value applied:	214,472
Monitoring equipment:	
QA/QC procedures:	Cross validated the type of wood used for charcoal production by asking clarification questions to local field agents. It was identified that the wood used for this purpose represents small and otherwise unused wood. From the PRA: “The villagers usually cut down small trees (live – approx. circumference of a leg, because it is easy to burn) outside the CF area and around their farmland and villages”.
Calculation method:	
Any comment:	

Data/parameter [MN 69]:	$leakage_{constrained}(d)$
Data unit:	
Description:	Leakage cancellation rate for avoiding deforestation/degradation of driver d
Sources of data:	Calculation
Description of methods:	
Frequency of monitoring:	. Leakage from geographically constrained drivers is estimated <i>ex-ante</i> and was not monitored since the baseline was not updated. Value from PD is applied.
Value applied:	See Table 53 in the VCS PD
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	See “leakage cancellation rate” in the methodology Section II.3.2.1
Any comment:	

Data/parameter [MN 70]:	$leakage_{unconstrained}(croplandconversion)$
Data unit:	Proportion
Description:	Leakage cancellation rate for avoiding deforestation/degradation from migrants clearing forest area for cropland conversion [-]
Sources of data:	Project area circumstances
Description of methods:	
Frequency of monitoring:	Leakage from geographically unconstrained drivers is estimated <i>ex-ante</i> and was not monitored since the baseline was not updated. Value from PD is applied.
Value applied:	See Table 53 in the VCS PD
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	Not updated during current monitoring period

Data/parameter [MN 71]:	$\Delta area_{settlement,project}$
Data unit:	[ha yr ⁻¹]
Description:	Area that has been converted to settlements by participating communities under the project scenario
Sources of data:	Social Assessments
Description of methods:	Expert knowledge, communication with communities, and social specialists in the field.

Frequency of monitoring:	Every 2 years after the validation of the project
Value applied:	340 ha yr ⁻¹
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	The majority of new homes in the area consist of individual homesteads, and not built up areas.

Data/parameter [MN 72]:	$\Delta area_{settlement, allowed}$
Data unit:	[ha yr ⁻¹]
Description:	Area that will be converted to settlements after within the project area under the project scenario
Sources of data:	Project design decision
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	N/A
Monitoring equipment:	
QA/QC procedures:	None
Calculation method:	
Any comment:	Not updated during current monitoring period

Data/parameter [MN 73]:	$\Delta area_{cropLand, baseline}$
Data unit:	[ha yr ⁻¹]
Description:	Area that would be converted to cropland by participating communities under the baseline scenario
Sources of data (*):	Social assessment
Description of methods:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	See PD.
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Not updated during current monitoring period

Data/parameter [MN 74]:	$\Delta area_{cropLand, project}$
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Data unit:	[ha yr ⁻¹]
Description:	Area that has been converted to cropland by participating communities under the project scenario
Sources of data:	Social Assessments
Description of methods:	
Frequency of monitoring:	Every 2 years after the validation of the project
Value applied:	3,378 ha yr ⁻¹
Monitoring equipment:	
QA/QC procedures:	Cross-checked with local sources.
Calculation method:	
Any comment:	

Data/parameter [MN 75]:	$\Delta area_{cropLand,allowed}$
Data unit:	[ha yr ⁻¹]
Description:	Allowable area that has been converted to cropland within the project area under the project scenario
Sources of data:	Project design decision
Description of methods:	
Frequency of monitoring:	The relative impact of leakage is quantified by <i>ex-ante</i> leakage cancellation factors and therefore was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	0
Monitoring equipment:	
QA/QC procedures:	None
Calculation method:	
Any comment:	Not updated during current monitoring period

Data/parameter [MN 76]:	Description of natural disturbance (except for fire)
Data unit:	Narrative, maps of the areas
Description:	A detailed description of the circumstances and impacts of a natural disturbance
Sources of data:	Field observations, Participatory Rural Appraisals
Description of methods:	Natural disturbances such as floods/earthquakes/pests were described by communities including date, location and area affected.
Frequency of monitoring:	Annually after the validation of the project
Value applied:	No significant natural disturbances were found. There is no digital boundaries/geographic locations and area within the project and leakage areas affected. The proportion of biomass lost during a

	disturbance, or decreases in biomass were not recorded as it was found to be insignificant.
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	

Data/parameter [MN 77]:	$\Delta area_{large\ scale\ fires}(t, i)$
Data unit:	[ha]
Description:	Area of large-scale fires detectable by medium-resolution satellite imagery in the project area or leakage belts
Sources of data:	Remote sensing analysis
Description of methods:	MODIS base FIRMS fire point frequency were evaluated and classified imagery following the peak burn season, IRS 2012, was assessed for number of hectares burned.
Frequency of monitoring:	Annually after the validation of the project
Value applied:	See "2.Calculate emissions sources.xlsm"
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix available to verifier
Calculation method:	
Any comment:	

Data/parameter [MN 78]:	Maps of the large-scale burned areas
Data unit:	Digital boundary
Description:	Maps of large-scale (10 ha) fires detectable by medium-resolution satellite imagery in the project area or leakage belts [ha]
Sources of data:	Remote sensing analysis
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	See "2.Calculate emissions sources.xlsm"
Monitoring equipment:	
QA/QC procedures:	Uncertainty analysis and confusion matrix available to verifier
Calculation method:	
Any comment:	

Data/parameter [MN 79]:	National, local and sectoral forest-use policies
Data unit:	Narrative

Description:	Describe any recent national, local and/or sectoral policies that are implemented that have affected or will affect allowable forest use
Sources of data:	legal documents, policy documents, etc.
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	Since May, 2012 there has been a moratorium on new economic land concessions nationwide in Cambodia. It remains to be seen if this moratorium will be effective in practice as halting the establishment of new economic land concessions or similar activities. The Prime Minister has also assigned his son to lead a nationwide effort to do land titling for rural people across the country with a team of young volunteers. This effort is not the same as establishing Community Forests, but is similar in that it seeks to clarify land tenure for disputed areas. In addition, the UN REDD program is now operationalized in Cambodia, with funding allocated and a management structure established. Similarly, Forest Carbon Partnership Facility has pledged support to be channeled through UNDP early next year. These additional resources flowing into Cambodia to may increase interest in forest protection and REDD in the future, and may, for example, lead to revisions in forestry or tenure laws which may have bearing on the project. The ELC is Samrong Rubber Industry PTT Ltd which has a contract with the Ministry of Agriculture, Forestry, and Fisheries since 12 May 2006. Activities in the area started at the end of 2006, but they have been more active in the period of 2009-2012. They started to grow rubber in 2007. This company has permission from MAFF to operate, but according to MAFF's ELC status report from 8 June 2012, the company has still not completed an EIA (Environment Impact Assessment). The total area of the ELC is 9,658 ha. A formal boundary file is not available, however the bounds of the concession are clearly visible and were traced. Subsequently the leakage area region was modified to exclude this concession.
Monitoring equipment:	
QA/QC procedures:	Cross-validated with multiple, independent sources.
Calculation method:	
Any comment:	Description provided by project proponent.

Data/parameter [MN 80]:	Changes of political, social or economic nature
Data unit:	Narrative
Description:	Describe significant changes of political, social or economic nature have occurred or will occur, making the current baseline estimates inaccurate
Sources of data:	Literature, Planning documents
Description of methods:	

Frequency of monitoring:	Annually after the validation of the project
Value applied:	Border dispute with Thailand. The border conflict centered on the Preah Vihear Temple has receded as the new Thai Prime Minister Yingluck has a pro-Cambodian stance. There is however ongoing problems with Cambodian rosewood collectors being shot and killed by Thai border patrols. These activities gives the Cambodian government a justification for stationing additional troops in Oddar Meanchey and constructing more "strategic" roads near the border. These military operations can threaten the Community Forests located along the border, as the military has significantly more authority than the Forestry Administration. Military camps have already been established in Andong Bor and Dung Beng.
Monitoring equipment:	
QA/QC procedures:	Cross-validate with multiple, independent, sources, if available
Calculation method:	
Any comment:	Description provided by project proponent.

Data/parameter [MN 81]:	Land-use opportunity cost
Data unit:	Narrative
Description:	The risk that alternative land uses on the land become much more attractive than the REDD project
Sources of data:	Participatory Rural Appraisals and Household Surveys
Description of methods:	Analyzed market effects such as a significant price rising of timber and non-woody products, or the increase of prices of agricultural commodities would increase the deforestation pressure on the current forest land
Frequency of monitoring:	Annually after the validation of the project
Value applied:	According to household surveys and PRAs in the CFs, the price of land increased 657,440 riels per hectare between 2010 and 2012, from 2,209,227riel to 2,866,667riel. This increase is equivalent to USD\$162.61. This increase in per hectare land value has not affected the integrity of the REDD project, but will be monitored throughout the life of the project.
Monitoring equipment:	
QA/QC procedures:	Cross-validated with multiple sources.
Calculation method:	
Any comment:	The land-opportunity cost has not impacted the REDD project

Data/parameter [MN 82]:	New Roads
Data unit:	Narrative
Description:	A description of the location and size of new roads that have been built since the last verification or roads that will be built before the following verification

Sources of data:	Remote Sensing analysis
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	48km of new road within project parcel boundaries
Monitoring equipment:	
QA/QC procedures:	Cross-validated with multiple, independent sources.
Calculation method:	
Any comment:	48km of new military roads have been created in 6 of the Community Forest areas. These roads have been digitized, and the shapefile (new_pp_roads_wgs84_utm48n.shp) is available to the verifier.

Data/parameter [MN 83]:	Other change affecting land-use
Data unit:	Narrative
Description:	A description of any potential change affecting the land-use in as set at validation or the previous baseline update
Sources of data:	Literature, Planning documents
Description of methods:	
Frequency of monitoring:	Annually after the validation of the project
Value applied:	None
Monitoring equipment:	
QA/QC procedures:	Cross-validated with multiple, independent sources.
Calculation method:	
Any comment:	Not updated during current monitoring period

Data/parameter [MN 84]:	Description of event, condition, or circumstance affecting land-use dynamics
Data unit:	Narrative
Description:	A description of a potential change affecting the land-use
Sources of data:	Literature
Description of methods:	A potential event, condition, or circumstance in the project area that is not covered in the list in Section III.4 of the PD that would trigger a baseline update.
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	None significant enough for a baseline update.
Monitoring equipment:	
QA/QC procedures:	Cross-validated with multiple, sources.
Calculation method:	

Any comment:	Not updated during current monitoring period
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Data/parameter [MN 85]:	Historical significance of emissions from small-scale fires
Data unit:	Narrative
Description:	Test whether the CH ₄ emissions from fires were significant in the project area and leakage belts during the past five years.
Sources of data:	Social assessments or remote sensing analysis
Description of methods:	Participatory rural appraisals and remote sensing analysis
Frequency of monitoring:	Every 10 years or every baseline update, whichever is more frequent
Value applied:	Historical Fires were found to be significant in deciduous forest. See Section 3.3 of the PD for further description.
Monitoring equipment:	
QA/QC procedures:	Cross-validate remote sensing analysis with social assessments.
Calculation method:	
Any comment:	

Data/parameter [MN 86]:	ER_{CH_4}
Data unit:	
Description:	Emission ratio for CH ₄
Sources of data:	Table 3A.1.15 in IPCC GPG-LULUCF (2003).
Description of methods:	Used default value of 0.012.
Frequency of monitoring:	Not included as the historical fire emissions are insignificant at this time (see previous).
Value applied:	0.012 (IPCC default value)
Monitoring equipment:	
QA/QC procedures:	None
Calculation method:	
Any comment:	

Data/parameter [MN 87]:	$\Delta C_{fire}(i)$
Data unit:	[tCO ₂ -eq ha ⁻¹]
Description:	Biomass lost due to small-scale fires
Sources of data:	Field inventories
Description of methods:	Since there is no difference in mean biomass stock, a conservative 10% is used.
Frequency of monitoring:	Every 5 years or at least once before every verification, whichever is more frequent

Value applied:	10%
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in biomass inventory SOP
Calculation method:	
Any comment:	Small scale fire did not cause land cover change as demonstrated by Remote Sensing Analysis. For a further description see Section 3.3 of the PD.

Data/parameter [MN 88]:	$fireExtent(t, i)$
Data unit:	
Description:	Proportion of project area and leakage belts that were affected by small-scale fires.
Sources of data:	Remote sensing data
Description of methods:	0
Frequency of monitoring:	Annually after the validation of the project
Value applied:	See "2.Calculate emissions sources.xlsm"
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	

Data/parameter [MN 89]:	x
Data unit:	Year
Description:	Number of years of long term persistent increase/decrease in forest carbon stock used in definition of forest degradation, and forest regeneration.
Sources of data:	
Measurement procedures:	Use degradation definition from VCS
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	
Monitoring equipment:	
QA/QC procedures:	None
Calculation method:	
Any comment:	Not updated during current monitoring period

Data/parameter [MN 90]:	y
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Data unit:	
Description:	Minimum percentage of change in forest carbon stock used in definition of forest degradation, and forest regeneration.
Sources of data:	
Measurement procedures:	Use degradation definition from VCS
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	
Monitoring equipment:	
QA/QC procedures:	None
Calculation method:	
Any comment:	Not updated during current monitoring period

Data/parameter [MN 91]:	t
Data unit:	Year
Description:	Measurement time period for estimating persistent increase/decrease in forest carbon stock used in definition of forest degradation, and forest regeneration.
Sources of data:	
Measurement procedures:	Use degradation definition from VCS
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	None
Monitoring equipment:	
QA/QC procedures:	None
Calculation method:	
Any comment:	Not updated during current monitoring period

Data/parameter [MN 92]:	Forest definition consistency
Data unit:	
Description:	The consistency of the selected forest definition with applicable compliance REDD schemes must be regularly evaluated.
Sources of data:	
Measurement procedures:	
Frequency of monitoring:	Was not monitored since baseline was not updated. Value from PD is applied.
Value applied:	None
Monitoring equipment:	

QA/QC procedures:	Primary publications or reports on compliance REDD schemes must be used
Calculation method:	
Any comment:	Not updated during current monitoring period

Data/parameter [MN 93]:	$V_{ex,h,ty,j}$
Data unit:	[m ³]
Description:	The volume of timber extracted from within the project boundary during harvest h by species j and wood product class ty
Sources of data:	Social assessments
Measurement procedures:	PRA
Frequency of monitoring:	Annually after the validation of the project
Value applied:	639
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	

Data/parameter [MN 94]:	$M_{SFi,t}$
Data unit:	[kg N yr ⁻¹]
Description:	Mass of synthetic fertilizer type i applied in year t
Sources of data:	Social assessments
Description of methods:	
Frequency of monitoring:	Every 2 years after the validation of the project
Value applied:	32 kg ha ⁻¹ yr ⁻¹ in rice fields and 12 kg ha ⁻¹ yr ⁻¹ in upland crop areas
Monitoring equipment:	
QA/QC procedures:	See QA/QC procedures in social assessment SOP
Calculation method:	
Any comment:	Value is the difference between the synthetic fertilizer applied during the project and the synthetic fertilizer applied during the baseline.

Data/parameter [MN 95]:	$M_{OFj,t}$
Data unit:	[kg N yr ⁻¹]
Description:	Mass of organic fertilizer type j applied in year t .
Sources of data:	Social assessments
Description of methods:	

Frequency of monitoring:	Every 2 years after the validation of the project
Value applied:	0
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	The project did not increase the amount of organic fertilizer applied as a part of project activity.

Data/parameter [MN 96]:	$\Delta A_{rice}(t)$
Data unit:	[ha]
Description:	Annual increase in harvested area of rice due to leakage prevention measures.
Sources of data:	Social Assessments.
Description of methods:	
Frequency of monitoring:	
Value applied:	0
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	The most recent social assessment reported a total of 23,780 ha of rice fields owned and cultivated by the participating communities which are less than the value reported earlier. The household survey of 2010 showed that average rice field was 3.2 ha per household among 7,971 households (at the time of survey) in the project area (i.e. total rice field of 25,586).

Data/parameter [MN 97]:	$t_{flooded,max}$
Data unit:	[days yr ⁻¹]
Description:	Maximal period of time a field is flooded
Sources of data:	Participatory rural appraisals
Description of methods:	Not monitored since rice production area did not increase.
Frequency of monitoring:	
Value applied:	None
Monitoring equipment:	
QA/QC procedures:	
Calculation method:	
Any comment:	

Data/parameter [MN 98]:	$EF_{rice,max}$
Data unit:	[kg CH ₄ ha ⁻¹ day ⁻¹]
Description:	Maximal emission factor for methane
Sources of data:	Literature
Description of methods:	Not monitored since rice production area did not increase.
Frequency of monitoring:	
Value applied:	
Monitoring equipment:	
QA/QC procedures:	None
Calculation method:	
Any comment:	

3.4 Description of the Monitoring Plan

The monitoring requirements for the project have been set by the VCS Methodology VM0006 (2010) and Voluntary Carbon Standard PD. Together, these documents set out monitoring, reporting and verification (MRV) requirements for carbon accounting. Monitoring activities will be aligned with project implementation activities and reporting requirements. While some monitoring activities will be conducted in an ongoing manner (i.e. documentation of project activities), other monitoring activities (such social and biomass assessments) will be conducted at set intervals and aligned with reporting and verification requirements set by the project methodology.

All parameters required to be monitored by the methodology have been monitored within this monitoring period. The Project Proponent confirms that there are no other land-based carbon projects present in the project area. A review of all publically available databases of projects indicates that there are currently no other land-based carbon projects registered under any other carbon trading scheme (including CCB, VCS, Plan Vivo, Carbon Fix and CDM) present in the project area.

3.4.1 Organizational Structure and Responsibilities

General organizational structure and responsibilities for monitoring of the project are outlined here.

Pact Cambodia. Pact is responsible for managing, outsourcing and collecting the results of (1) biomass inventory measurements, (2) social assessments, (3) recording action activity implementation, and (4) any other data required to be monitored under this methodology. Pact executed first-pass quality assurance and quality control (QA/QC) checks on all of the monitoring data collected. Pact maintains records of all field inventory and social appraisal data sheets and all other evidence demonstrating the correct execution of project implementation.

Forestry Administration. During these first five years of the project, the FA has been providing assistance in the annual field inventory measurements, social assessments, and in the review of the monitoring reports. The FA will be trained to become the responsible party for all monitoring requirements five years after validation of the project.

Technical Working Group. The Technical Working Group has reviewed and provided feedback on preliminary versions of the monitoring reports, and has verified all quality assurance and quality control (QA/QC) measures.

Terra Global Capital. Terra Global Capital is responsible for verifying that the required elements are monitored, overseeing or executing all modeling and calculations, and performing second-pass QA/QC checks. In addition, Terra Global Capital is responsible for developing the monitoring reports for the project.

Children's Development Organization. Children's Development Organization has assisted in field inventories, social appraisals and recording project activities.

Community Forestry Federation, Monk's Community Forests and the CFMCs. The communities involved in the REDD project have been collaborating through social appraisals, reporting natural disasters and challenges related to forest protection to the implementing organization.

Data Collection, Storage and Reporting

The project will draw upon multiple data sources and methods for monitoring, reporting and verification including a household survey, participatory rural appraisals (PRA), biodiversity assessment, biomass inventory, remote sensing, desktop review and project documentation.

Table 11. Monitoring data sources and methods

Category	Method/Data Source	Frequency	Reporting	Responsibility
Social Assessment	Participatory Rural Appraisal (PRA)	Every 2 years	VCS / CCB	CDA, TGC, Pact
	Household Survey (HHS)			
Biomass inventory	Sample plot field survey	[See SOP]	VCS	Pact, TGC
Land use land class (LULC) change	Remote sensing	Every 2 years	VCS	TGC
Biodiversity assessment	Field observation	Ongoing	CCB	CFMCs, Consultant
Project documentation	Activity reporting	Ongoing	VCS / CCB	CFMCs, CDA, Pact, TGC
Periodic social assessment		Ongoing or as needed		Potential Independent Party, Consultant

Standard Operating Procedures (SOPs) developed by TGC and Pact will be used to collect all data required for VCS. There are three levels of data collection tools including:

- Standard operating procedures (SOP)
- Protocols
- Data collection forms

The purpose of SOP's and Protocols is to provide a standardized and consistent basis for data collection, management and reporting. SOP's and protocols are therefore an important aspect of quality control and assurance.

Mobile handsets have been used as data collection tools to increase efficiency and reduce transaction costs in data collection, storage and processing, while increasing data quality assurance and control measures. Though only some data is collected in mobile handsets now, routine activity data (i.e. patrols) collected will be stored at three sites. These include the field CFMC level (hardcopy), then aggregated at the provincial level in a server administrated by CDA, then linked to another local server administrated by Pact, while a centralized server (administered by TGC) will hold all VCS data.

The data quality has been maximized and ensured during all aspects of the monitoring process through quality assurance and quality control (QA/QC) procedures. In monitoring field inventory data and data analysts, all individuals and institutions involved in evaluating the quality of analytical data have followed the rigorous QA/QC procedures developed for this project. These QA/QC procedures included specific criteria to evaluate the quality of analytical data that has been gathered. The QA/QC procedures have been an absolutely essential part of monitoring.

Responsibilities and frequencies for monitoring reporting are summarized in Table 12.

Table 12. Monitoring Reporting Responsibilities and Timeline

Report	Responsibility	Reporting to	Timeframe
Verification Report	Pact Cambodia / TGC	VCS Verifier	Every 2 years
Balanced Scorecard	Pact Cambodia	Pact Head Office	Every 6 months
Global Indicators	Pact Cambodia	Pact Head Office	TBC
Data Quality	Pact Cambodia	Pact Regional M & E	Annually
Activity Report	Pact Cambodia	FA	Quarterly / Annually
TBC	Pact Cambodia	External donors	As required
Activity Report	CDA / CFN / Monks CFA	Local Authorities	As required
Activity Report	CFMC	CDA & CFN	As required
Biodiversity Report	Biodiversity consultant	Pact Cambodia & FA	Annually
Evaluation Report	Independent evaluator	Pact Cambodia & FA	Every 3 years

3.4.2 Internal Auditing and Non-conformities

The Oddar Meanchey REDD project has involved a wide range of stakeholders at village, commune, district, provincial, and national levels. The success of this long-term project has been dependent on the ability of the stakeholders to effectively and amicably resolve problems and issues that have arisen during implementation.

During this monitoring period a few major studies were carried out on the OM REDD project, particularly focusing on community benefits. These studies were conducted and/or otherwise assessed by third party or using outsider knowledge. Using independent, third party, and otherwise outside monitoring will continue to be a part of the monitoring system to give valuable insight to potentially overlooked issues, and will help resolve any problems that have arisen during implementation.

Women Organizing for Change in Agriculture and Natural Resources Management (WOCAN) helped to conduct the project's gender assessment in April 2012. The audit and assessment aimed to ensure that the project team members have a good understanding of the gender issues related to project

implementation and that deliberate efforts are taken to address these issues. Many of the recommendations made have been included into the project.

The project has hosted PhD and Masters researchers from the University of Copenhagen (Denmark), University of Oxford (UK), and University of Gothenburg (Sweden). The articles and presentations resulting from these studies have increased the project partners' understanding on the social aspects of the project, as well as provided recommendations on avoiding potential pitfalls which could affect community benefits. The following thesis articles are now available:

- Community Forestry, REDD+ Networks and Power in Oddar Meanchey, Cambodia (Stuart Raetz, School of Global Studies, Social Science & Planning, RMIT University, Melbourne, Australia)
- Tenure Rights and Benefit Sharing Arrangements for REDD: A Case Study of Two REDD Pilot Projects in Cambodia (Donal Yeang, University of Wageningen, The Netherlands)
- Fell a Tree, Fell a Livelihood: Assessing the Importance of Non-timber forest products in Rural Cambodia (Christina Enders, University of Oxford, United Kingdom)
- Inclusion and Benefit Sharing in REDD+: The Case of Oddar Meanchey, Cambodia (Inge Boudewijn, Faculty of Forestry, Landscape and LIFE, University of Copenhagen, Denmark)
- The Challenge of Assessing Social Dimensions of Avoided Deforestation (Pasgaard, Maya, Faculty of Science, University of Copenhagen, Denmark)

For more information on project studies and how recommendations for community's benefits were incorporated into the project, see the CCB PIR.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The methodology requires that each monitoring report explicitly test the presence or absence of six conditions requiring a baseline update. None of the conditions listed below were found to be present during the monitoring period, and therefore a baseline update is not required. These conditions are tested and shown to be absent as follows.

1. New national, local and/or sectoral policies are implemented that affect allowable forest use.

Cambodia is moving forward in the implementation of REDD+ readiness activities at the national level, and is currently receiving funding from UN-REDD. These readiness activities have in no way affected the eligibility of project-level activities such as the Oddar Meanchey project. Further, no legal or regulatory changes have been enacted at the national or local level which materially affect the project or the allowable forest use. The primary agreements governing the implementation of the project (Sar.Chor.Nor. # 699, Community Forestry Sub Decree and CF Agreements) remain in effect.

2. A natural disturbance, such as a major crown fire, pests, tsunami, earthquake, volcanic disruption, landslide, flooding, etc. affecting more than 20% of the project area has occurred.

No natural disturbances have occurred within the project area during the monitoring period. The confirmation that there have been no disturbances can be shown through remote sensing analysis and verified through social assessments carried out in the project area.

3. Significant changes of a political, social or economic nature have occurred, making previous baseline estimates inaccurate.

Political tension has existed between Thailand and Cambodia since the fall of the Khmer Empire in the 15th century. In more recent years both sides have been interested in securing and strengthening

their border. The military clash over the Preah Vihear Temple in October 2008 created a cause for strengthening of the Cambodia military presence along the border. Though the military presence and the deforestation it causes are significant, the political situation has not changed since validation. For more information see MN80 in Section 3.2.

4. *A change in opportunity costs has occurred such that alternative land uses on the land become much more attractive than the REDD project due to market effects such as a significant price rising of timber and non-woody products, or the increase of prices of agricultural commodities would increase the deforestation pressure on the current forest land.*

The social assessments confirm the price of wood, land, or agricultural products have not significantly increased in price during the monitoring period. Though in some circumstances the price of the alternative land use has increased over time, the relative increase is not significant enough to drive land-use change. Project partners and experts in the field also confirm that there is no significant opportunity cost change.

5. *New roads were or will be constructed.*

New roads have been found in the project area, leakage belt and reference region. The expansion of the roads within the Oddar Meanchey is extensive though expected. New roads were identified through remote sensing imagery analysis from 2010 to 2012. The new roads in the project areas are representative of roads in the reference region. There is no significant increase in the project areas, and both deforestation from roads within the project area and leakage belts were accounted for in emission reductions. For more information on new roads in the project area, see MN 82 in the Section 3.2.

6. *Any other potential significant change relevant for the project region beyond the events already covered above and identified at validation.*

No additional significant changes relevant for the project region beyond the five conditions discussed above have been observed in the project area.

Table 13 shows baseline emissions from 2008 to 2012 estimated based on trends quantified through the methodology.

Table 13. Estimate of baseline GHG emissions during 2008-2012

Year	Project Area Without ANR	Project Area With ANR	Total
[-]	[tCO ₂ e]	[tCO ₂ e]	[tCO ₂ e]
2008	379,358	21,753	401,111
2009	396,157	22,544	418,701
2010	401,876	23,437	425,313
2011	400,080	29,551	429,631
Total	1,577,471	97,285	1,674,756

4.2 Project Emissions

Table 14 shows actual GHG emissions observed after project implementation (ex-post) from 2008 to 2012.

Table 14. Estimate of ex-post project GHG emissions during 2008-2012

YEAR	Project Area Without ANR	Project Area With ANR	Total
[-]	[tCO ₂ e]	[tCO ₂ e]	[tCO ₂ e]
2008	161,544	80,308	241,852
2009	161,544	80,308	241,852
2010	161,544	80,308	241,852
2011	32,710	42,949	75,659
Total	517,342	283,873	801,214

4.3 Leakage

Project leakage after project implementation (ex-post) from 2008 to 2012 is calculated and shown in Table 15.

Table 15. Estimate of ex-post GHG emissions from leakages

YEAR	Geographically Constrained Leakage	Geographically Unconstrained Leakage	Total
[-]	[tCO ₂ e]	[tCO ₂ e]	[tCO ₂ e]
2008	0	12,783	12,783
2009	0	25,566	25,566
2010	0	38,349	38,349
2011	0	51,132	51,132
Total	-	127,830	127,830

4.4 Summary of GHG Emission Reductions and Removals

This section summarizes the Ex-Ante estimation of GHG benefits for the current monitoring period.

The appropriate emission factors associated with the land cover transitions i.e. from one LULC class to another LULC class were calculated from the inventoried plots since verification. The uncertainty is expressed as the half-width of the 95% confidence interval around the mean of the difference between the carbon stocks between the LULC classes. The applicable emission factors and uncertainty discounting factor for applicable LULC are shown in Table 16.

Table 16. Emission factors and discounting factors for LULC transitions

LULC Transition	Emission Factor	HWCI	Average uncertainty	Discounting Factor
[-]	[tCO ₂ ha ⁻¹]	[tCO ₂ ha ⁻¹]	[%]	[-]
Evergreen to Deciduous	249.95	72.79	29.1%	0.71
Evergreen to Non-Forest	459.48	66.05	14.4%	1.00
Deciduous to Evergreen	-249.95	72.79	29.1%	0.71
Deciduous to Non-Forest	209.53	31.00	14.8%	1.00
Non-Forest to Evergreen	-459.48	66.05	14.4%	1.00
Non-Forest to Deciduous	-209.53	31.00	14.8%	1.00

Table 17. Overview of ex-post estimation of NERs during the monitoring period 2008-2012

YEAR	ΔGHG from avoided deforestation	ΔGHG from deforestation due to geographically constrained leakage	ΔGHG from avoided degradation	ΔGHG from avoided degradation due to geographically constrained leakage	GHG from leakage by unconstrained geographic drivers	ΔGHG from assisted natural regeneration	ΔGHG from changes in long lived wood products	GHG from improved cookstoves	GHG from Emission sources	NER	Risk Buffer	Buffer	VCU
[-]	[tCO ₂ e]	[tCO ₂ e]	[tCO ₂ e]	[tCO ₂ e]	[tCO ₂ e]	[tCO ₂ e]	[tCO ₂ e]	[tCO ₂ e]	[tCO ₂ e]	[tCO ₂ e]	[%]	[tCO ₂ e]	[tCO ₂ e]
2008	-217,814	0	0	-	12,783	58,555	-	-	-	146,476	17.00	27,074	119,402
2009	-234,613	0	0	-	25,566	57,764	-	-	-	151,283	17.00	30,064	121,219
2010	-240,332	0	0	-	38,349	56,870	-	-	-	145,113	17.00	31,188	113,924
2011	-367,370	0	0	-	51,132	13,399	-	-	-	302,840	17.00	60,175	242,665
Total	-1,060,129	-	0	0	127,830	186,587	0	0	-	745,712	-	148,502	597,210

5 ADDITIONAL INFORMATION

The following data and documents are available to the verifier:

- Biomass Inventory Data
- Participatory Rural Appraisal from 2012
- Classified Images 2010 and 2012
- ANR Biomass Data
- Gross Emission Reductions
- Shapefiles of project areas (kmz)
- Shapefiles of spatially explicit data collected during the PRA (kmz)
- Biomass Inventory SOP
- Participatory Rural Appraisal SOP
- Assisted Natural Regeneration SOP
- 13 CF Participatory Maps from 2012 PRA