

REDD Methodological Module

“Estimation of emissions from activity shifting for avoided planned deforestation” – LK-ASP

Version – April 2010

I. SCOPE, APPLICABILITY AND PARAMETERS

Scope

This module allows for estimating GHG emissions caused by the activity shifting leakage of planned deforestation carbon projects.

Applicability

The module is applicable for estimating the leakage emissions due to activity shifting from forest lands that are legally authorized and documented to be converted to non-forest land.

The module is mandatory if BL-PL has been used to define the baseline.

Under this situation, displacement of baseline activities can be controlled and measured directly by monitoring the the baseline deforestation agents or class of agents.

Required conditions¹

- Module BL-PL must have been used to define the baseline
- Baseline agents of deforestation may control multiple parcels of land within the country that could be used to make up for the generation of goods and/or services lost through implementation of the carbon project. In such cases, the project shall demonstrate that the management plans and/or land-use designations of other lands controlled by the baseline agent of deforestation have not materially changed as a result of the planned project (e.g., designating new lands as timber concessions, increasing harvest rates in lands already managed for timber, clearing intact forests for agricultural production, or increasing fertilizer use to enhance agricultural yields) because such changes could lead to reductions in carbon stocks or increases in GHG emissions. At each verification, documentation shall be provided covering the other lands controlled by the baseline agent where leakage could occur, including, at a

¹ Required conditions are full applicability criteria, non-compliance leads to non-applicability of the module and by extension non-applicability of the methodology

minimum, their location(s), area and type of existing land use(s), and management plans.

- Where only a class of agent can be identified the rate of land conversion from forest to non-forest by this class shall be shown to the same (plus or minus 10%) or on the same trajectory (plus or minus 10%) as before project implementation.
- Where Governments currently control the land and the deforestation agents are yet to be determined but will have government sanction, project developers must demonstrate that areas allotted nationally for land conversion through deforestation by Government agencies will not increase due to the potential for REDD projects. The purpose of this requirement is to demonstrate that the incentive of potential REDD projects has not caused Governments to greatly increase their plans for allowed deforestation. The rate of Government land allocation for land conversion via deforestation must be the same (plus or minus 10%) or on the same trajectory (plus or minus 10%) as before November 28th 2005 and in the year of reference for the planned deforestation REDD project. If the rate of allocation differs beyond the stipulation then this module shall not be used, and therefore the methodology can not be used.

Exclusionary conditions²

- If areas projected to be deforested in the baseline are not being converted to an alternative use but will be allowed to naturally regrow this module shall not be used and hence the methodology can not be used
- If deforestation is illegal / unsanctioned then this module shall not be used and therefore the methodology can not be used
- If shifted baseline activities cause changes in drainage conditions of peatland outside the project area then this module shall not be used and therefore the methodology can not be used
- Where there is a projection of deforestation by outside agents in the project area in the baseline period prior to planned deforestation, the module shall not be used and therefore the methodology can not be used

Parameters

This module provides procedures to determine the following parameter:

Parameter	SI Unit	Description
$\Delta C_{LK-ASP,planned}$	t-CO ₂ -e	Net CO ₂ -e emissions due to activity shifting leakage for

² Exclusionary conditions are full applicability criteria, non-compliance leads to non-applicability of the module and by extension non-applicability of the methodology

		projects preventing planned deforestation
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II. PROCEDURE

$$\Delta C_{LK-AS,planned} = \sum_{t=1}^{t^*} \sum_{i=1}^{M_B} (LKA_{planned,i,t} * \Delta C_{BSL,i}) \quad (1)$$

Where:

$\Delta C_{LK-AS,planned}$	Net CO ₂ emissions due to activity shifting leakage for projects preventing planned deforestation; t CO ₂ -e
$LKA_{planned,i,t}$	The area of activity shifting leakage in stratum i at time t ; ha
$\Delta C_{BSL,i}$	Net carbon stock changes in all pools in baseline stratum i ; t CO ₂ -e ha ⁻¹
t	1, 2, 3, ... t^* years elapsed since the start of the REDD project activity
i	1, 2, 3 ... M_B strata in the baseline scenario
M_B	The total number of strata in the baseline scenario

The approach is to calculate the total rate at which deforestation is forecast to occur across the land managed by the baseline agent of deforestation or class of deforestation agent^{3,4} (including the baseline projected deforestation within the project boundaries). By calculating the total rate of deforestation across all the lands managed by the agent or class it makes it possible to monitor possible activity shifting by agents/classes to other areas under their management. The predicted deforestation within the project boundary is then subtracted from the total deforestation rate across all the land managed by the baseline agent/class. This subtraction gives the rate we would expect if no leakage occurs. If this rate is subtracted from the total area of deforestation by the baseline agent of deforestation the result is the area of leaked deforestation.

STEP 1: Determine the baseline rate of forest clearance for the deforestation agent

Two options exist for estimating the baseline rate of forest clearance by the deforestation agent. Only if a historic trend analysis (Option 1.1) is not feasible shall Option 1.2 be used:

³ Defined in Module BL-PL

⁴ Note the difference between baseline deforestation on land managed by the baseline agent/class, and the baseline deforestation in Model BL-PL "D%" projected from proxy areas that do not necessarily need to be under the management of the baseline agent/class

Option 1.1: Baseline deforestation rate based on historic deforestation trend

With this approach, the baseline annual deforestation rate by the baseline deforestation agent/class of agent can be estimated by extrapolating the historical annual trend using a linear regression. Survey the deforestation agent or class of deforestation agent⁵ and examine official records⁶ to determine the total area deforested by the deforestation agent or class of deforestation agent each year over the previous five years within the country. To use this option, *annual* data for a minimum of five years and a maximum of ten years must be used to create linear regression. The results of the analysis must produce a statistically significant regression with a $p \leq 0.05$ and an adjusted r^2 of ≥ 0.75 otherwise “Option 1.2 historical average” must be used.

$$WoPR_{i,t} = a + b * t \quad (2)$$

Where:

<i>WoPR</i>	Rate of deforestation by the baseline agent or most likely class of agent of the planned deforestation in the absence of the project in stratum <i>i</i> ; ha year ⁻¹
<i>a</i>	Estimated intercept of the regression line; ha
<i>b</i>	Slope of the linear regression; ha yr ⁻¹
<i>t</i>	1, 2, 3, ... <i>t</i> [#] years elapsed since the start of the planned deforestation reference period

Option 1.2: Baseline deforestation rate based on historic deforestation average

Under this approach, the baseline annual deforestation rate by the baseline deforestation agent/class of agent is assumed to be equal to the average deforested area, during the 5 years prior to the project start date.

Survey the deforestation agent or class of deforestation agent⁷ and, if available, examine official records⁸ to determine the total area deforested by the deforestation agent or class of deforestation agent each year over the previous five years within the country.

⁵ Class of deforestation agent defined in BL-PL

⁶ Official records may include permits for concessions or permits to deforest for agricultural/commercial purposes

⁷ Class of deforestation agent defined in BL-PL

⁸ Official records may include permits for concessions or permits to deforest for agricultural/commercial purposes

$$WoPR_i = \sum_{ag=1}^{ag} \frac{HistHa_{i,ag}}{5} \quad (3)$$

Where:

$WoPR$	Rate of deforestation by the baseline agent or most likely class of agent of the planned deforestation in the absence of the project in stratum i ; ha year ⁻¹
$HistHa_{i,ag}$	The number of hectares of forest cleared by the baseline agent or likely class of agent of the planned deforestation in the five years prior to project implementation in stratum i by agent ag within the country; ha
i	1, 2, 3 ... M_B strata in the baseline scenario
ag	1, 2, 3 ... ag agents of deforestation in the baseline scenario

Where a specific agent has been identified and there is no history of deforestation and no verifiable plans for controlled lands and future-controlled lands then $WoPR$ should be set to planned baseline rate for the project ($D\%_{planned} * A_{planned}$ from the planned deforestation baseline module).

Where only a class of deforestation agent can be identified official records and/or remotely sensed imagery paired with ground truthing of agent of historical deforestation shall be used to define $WoPR$.

STEP 2 Estimate the new rate of forest clearance by the baseline agent of deforestation with project implementation if no leakage is occurring

Subtract the total project area of planned baseline deforestation from the historic rate of deforestation to calculate the new rate.

$$NewR_i = WoPR_i - (D\%_{planned,i,t} * A_{planned,i}) \quad (4)$$

Where:

$NewR$	New calculated rate of forest clearance in stratum i by the baseline agent of the planned deforestation where no leakage is occurring; ha year ⁻¹
$WoPR$	Rate of deforestation by the baseline agent of the planned deforestation in stratum i in the absence of the project; ha year ⁻¹
$D\%_{planned,i,t}$	Projected annual proportion of land that will be deforested in stratum i at year t ; % year ⁻¹
$A_{planned,i}$	Total area of planned deforestation over the baseline period for stratum i ; ha
i	1, 2, 3 ... M_B strata in the baseline scenario
t	1, 2, 3, ... t years elapsed since the projected start of the REDD project activity

STEP 3: Monitor all areas deforested by baseline agent of deforestation through the years in which planned deforestation was forecast to occur

All areas deforested by the baseline agent or class of agent of deforestation should be monitored. Areas of deforestation may be in the project region or anywhere in the host country. There is no requirement to track international leakage.

$$LKA_{planned,i,t} = A_{defLK,i,t} - NewR_i \quad (5)$$

Where:

$LKA_{planned,t}$ The area of activity shifting leakage in stratum i at time t ; ha

$NewR$ New calculated rate of forest clearance by the baseline agent of the planned deforestation in stratum i where no leakage is occurring; ha year⁻¹

$A_{defLK,t}$ The total area of deforestation by the baseline agent of the planned deforestation in stratum i at time, t ; ha year⁻¹

i 1, 2, 3 ... M_B strata in the baseline scenario

t 1, 2, 3, ... t^* years elapsed since the projected start of the REDD project activity

If $NewR$ exceeds $A_{defLK,t}$ then $LKA_{planned,t}$ should be set as zero as positive leakage is not considered under the VCS.

III. DATA AND PARAMETERS NOT MONITORED (DEFAULT OR MEASURED ONE TIME)

Data / parameter:	$HistHa_i$
Data unit:	ha
Used in equations:	2
Description:	Average annual area of deforestation by the baseline agent or class of agent of deforestation in stratum i for the 5 years prior to project implementation
Source of data:	Analysis of Remote Sensing data and/or legal records and/or survey information for lands owned or controlled or previously owned or controlled by the baseline agent of deforestation
Measurement procedures (if any):	
Any comment:	

IV. DATA AND PARAMETERS MONITORED

Data / parameter:	$A_{planned,i}$
Data unit:	Ha
Used in equations:	4
Description:	Total area of planned deforestation over the entire project lifetime for stratum i
Source of data:	GPS coordinates and/or Remote Sensing data and/or legal parcel records
Measurement procedures (if any):	N/A
Monitoring frequency	Must be examined at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
QA/QC Procedures	
Any comment:	Ex-ante, $A_{planned,i}$ shall be determined as described in BL-PL

Data / parameter:	$A_{defLK,i,t}$
Data unit:	Ha
Used in equations:	5
Description:	The total area of deforestation by the baseline agent or class of agent of the planned deforestation in stratum i at time t
Source of data:	Analysis of Remote Sensing data and/or legal records and/or survey information for lands owned or controlled or previously owned or controlled by the baseline agent of deforestation,
Measurement procedures (if any):	
Monitoring frequency:	Must be reexamined at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
QA/QC procedures:	
Any comment:	Legal records will include government permits to deforest including concession licenses Ex-ante, project proponents shall determine and justify the likelihood of leakage based on characteristics of the baseline agent or class of agent

V. PARAMETERS ORIGINATING IN OTHER MODULES

Data / parameter:	$\Delta C_{BSL,i}$
Data unit:	t CO ₂ -e ha ⁻¹
Used in equations:	1
Description:	Net carbon stock changes in all pools in the baseline stratum i ;
Module parameter originates in:	BL-PL
Any comment:	

Data / parameter:	$D\%_{planned,i,t}$
Data unit:	% year ⁻¹

Used in equations:	4
Description:	Projected annual proportion of land that will be deforested in stratum i at year t
Module parameter originates in:	BL-PL
Any comment:	