INNER MONGOLIA CHAO'ER IMPROVED FOREST MANAGEMENT PROJECT

中信环境投资集团有限公司
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Monitoring Period	01-01-2010 to 31-12-2014
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

- The Inner Mongolia Chao'er Improved Forest Management Project (hereafter "the project") is to protect the once logging forest. The project is located in south region of the Greater Khingan Mountains, Hulun Buir City, Inner Mongolia Autonomous Region, P.R.C, and is implemented by Chao'er Forest Bureau (hereafter "project owner").

- The geographic coordinate of Chao'er Forest is 120° 17'52''~121° 37'50''E and 47° 35'21''~48° 10'13''N, the total area is 426,580ha, of which 421,901 ha is the forestry area, accounting 98.9% of the total area. The forest land area is 355,622 ha, and the forest coverage rate is 83.37%, mainly composed by mountainous regions, the project area has a complex geomorphologic characteristic. The elevation level of the region is ranged from 700~1,500m and the climate feature is cold temperate zone continental monsoon. The dominant tree species within the project area are Pinus and Brich. Prior to the implementation of the project, the forest was logged annually according to the timber production plan issued by Chao'er Forest Industrial Co., Ltd, a subsidiary of Inner Mongolia Forest Industry Group. In order to protect the ecological system, the local forest authority has tried to reduce the annual forest timber volume within the project area, which can be seen from the timber production plan, the commercial harvest is cancelled and only tending and managing is permitted.
- The proposed project is implemented by Wuyi Forestry Centre, which is affiliated to Chao'er Forest Bureau and is located in the south west part of it. The project has approximately 11,010ha commercial forest, whose ages ranging from sapling, middle age to mature forest. Before the implementation of the project, the forest within the project area was designed and planted as commercial forest, and logged annually according to the timber production plan issued by Chao'er Forest Industrial Co., Ltd. The main object of the project is to improve the forest coverage rate, protect local ecological environment, reduce carbon emissions and carbon sequestration by enhance the management level and converse logged to protected forest within the project area. The implementation of the project will result in significant carbon sequestration and improve the sustainable development of ecological system. The project is expected to generate 380,247t CO_2e emission reductions within the crediting period from 01/01/2010 to 31/12/2014 with the average annual emission reductions of 76,049 t CO_2e.
- From 2010, the project has strictly cancelled the once annual commercial timber harvest and only allowed the tending and managing. In order to control the annual forest timber volume and achieve reliable and verified carbon sequestration, a forest protection plan will be issued by local forest authority, and strictly executed by the project owner. The forest growth amount and forest second class investigation will be monitored by local forestry bureau periodically.

1.2 Sectoral Scope and Project Type

The project falls into Scope 14: Agriculture Forestry and Other Land use. It is improved forest management (IFM) project.

It is not a grouped project.

1.3 Project Proponent

Organization name	Chao'er Forest Bureau of Inner Mongolia Autonomous Region, P.R.China
Contact person	Shiping Yu
Title	Manager
Address	Ta'erqi Town, Yakeshi City, Inner Mongolia Autonomous Region.
Telephone	86-470-7798329 86-138 4803 9680
Email	Yushiping1109@163.com

1.4 Other Entities Involved in the Project

Organization name	China Green Carbon Foundation
Role in the project	Parter of the PP
Contact person	Jinliang Li
Title	Chief Engineer
Address	No. 18 Hepingli Dong jie, Dongcheng District, Beijing 100714, P.R. China.
Telephone	86-10-8423 9419 86-139 1132 3810
Email	603464047@qq.com

Organization name	CITIC Environment Investment Group Co., Ltd.
Role in the project	Project Consultant
Contact person	Yapeng Zhang
Title	Project Manager
Address	Room 3202, Jingcheng Mansion, 6 Xinyuan Nanlu, Chaoyang District, Beijing, China.
Telephone	86-10-84661887 86-139 1088 4161
Email	zhangyp5@citic.com

1.5 Project Start Date

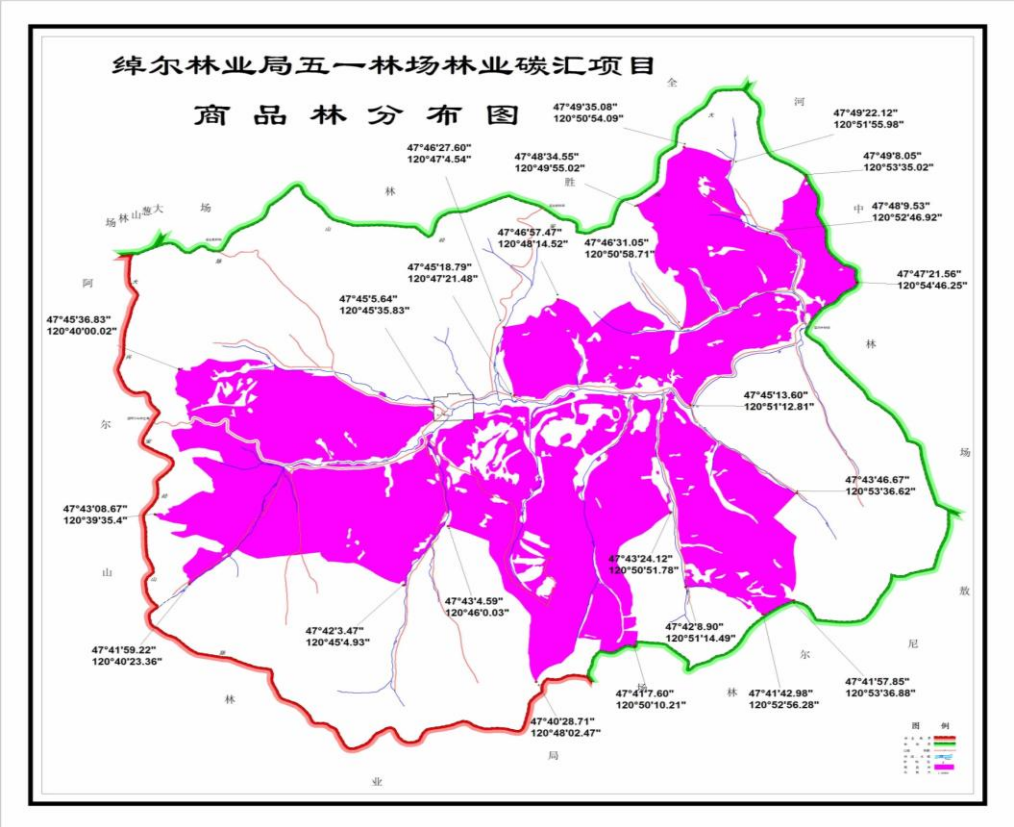
The Project Start Date is represented by the implementation of the forest protection project on 2010/01/01.

1.6 Project Crediting Period

The total length of the crediting period is 20 years, which starts from 01/01/2010, ends on 31/12/2029.

1.7 Project Location

The emission reduction of the project is from all the commercial forest of Wuyi Forestry Center, which is affiliated to Chao'er Forest Bureau and is located in the south west part of it. The location diagram of the project is listed in the following:



The boundary of the project (as stressed by the purple colour)

1.8 Title and Reference of Methodology

The methodology and tools applied by the project is:
VM0010 Methodology for Improved Forest Management: Conversion from Logged to Protected Forest, v1.2

VCS Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities
Tool for AFOLU Non-Permanence Risk Analysis and Buffer Determination
Tool for Calculation of the Number of Sample Plots for Measurements within A/R CDM Project Activities

1.9 Other Programs

- The project activity is not involved in any other emission trading program or mechanism that includes GHG allowance trading.
- The project has not sought or received another form of GHG related environmental credit.
- The project has not registered under any other GHG programs.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

- The project starts from 01/01/2010, this monitoring period lasts five year ending on 31/12/2014. During this monitoring period, the project activity operates smoothly without any events that may impact the GHG emission reductions or removals and monitoring.

As for the non-permanent risk, please refer to the separate annex of “Inner Mongolia Chao’er Improved Forest Management Project Non-Permanence Risk Report”.

2.2 Deviations

2.2.1 Methodology Deviations

There is no methodology deviation applicable to the project activity during this monitoring period.

2.2.2 Project Description Deviations

There is no project description deviations applied during this monitoring period.

2.3 Grouped Project

This project is not relevant to the grouped project; there is no new instance of the project activity.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data / Parameter	$V_{l,j,l,sp}$
Data unit	m^3
Description	Merchantable volume for tree l of species j in sample plot sp in straum i
Source of data	The local volume table, which lists the volumes corresponding to the DBH.
Value applied:	Please refer to the ER spreadsheet for details.
Justification of choice of data or description of measurement methods and procedures applied	The volume calculated from the volume table of the dominant tree species of Greater Khingan Mountains in Inner Mongolia Province, which is issued by the local Forest Management Bureau. The volume table lists the relationship between the DBH and volume. Based on the volume table, the volume can be easily obtained if DBH is available. What needs to do is to measure the DBH with band tape, and then applied the DBH to the volume table to get the results.
Purpose of the data	Calculation of baseline emissions
Comments	-

Data / Parameter	CF_j
Data unit	tc • tdm^{-1}
Description	Carbon fraction of dry matter for species j
Source of data	Either the default value 0.5 tC·t d.m-1 or species specific values from the literature must be used. The same value, however, must be used in all instances where this parameter is used.
Value applied:	Default value of 0.5 tC·t $d.m^{-1}$ is applied for this project
Justification of choice of data or description of measurement methods and procedures applied	The default value of 0.5 tc • tdm^{-1} is recommended by the methodology.
Purpose of the data	Calculation of baseline emissions and project emissions.
Comments	-

Data / Parameter	D_j
Data unit	tdm • m^{-3}
Description	Basic wood density of species j in tdm • m^{-3}
Source of data	Must be chosen with priority from higher to lower preference as follows: a) National species-specific or group of species-specific values (eg,

<table>
<tr><td></td><td>from National GHG inventory);
b) Species-specific or group of species-specific values from neighbouring countries with similar conditions. When species-specific data from neighbouring countries is of higher quality, being more representative of the species in the project scenario, it may be preferable to use these values than lower quality national data;
c) Global species-specific or group of species-specific (eg, IPCC 2006 INV GLs AFOLU Chapter 4 Tables 4.13 and 4.14).
Species-specific wood densities may not always be available, and may be difficult to apply with certainty in the typically species rich forests of the humid tropics, hence it is acceptable practice to use wood densities developed for forest types or plant families or species groups.

For the project activity, a) is adopted. The value from the GHG inventory of land use change and Forestry from the “the second national information notice on China’s climate change” is applied to the project activity.</td></tr>
<tr><td>Value applied:</td><td><table><tr><td>Dominant tree speces</td><td>D_j</td></tr><tr><td>Pinus</td><td>0.490</td></tr><tr><td>Brich</td><td>0.443</td></tr></table></td></tr>
<tr><td>Justification of choice of data or description of measurement methods and procedures applied</td><td>The value from the national forestry GHG inventory is adopted.</td></tr>
<tr><td>Purpose of the data</td><td>Calculation of baseline emissions and project emissions.</td></tr>
<tr><td>Comments</td><td>-</td></tr>
</table>

Data / Parameter	BCEF
Data unit	tdm • m^{-3}
Description	Biomass conversion and expansion factor applicable to wood removals in the project area
Source of data	The source of data must be chosen with priority from higher to lower preference as follows: a) Existing local forest type-specific; b) National forest type-specific or eco-region-specific (eg, from national GHG inventory); c) Forest type-specific or eco-region-specific from neighbouring countries with similar conditions. Sometimes (c) might be referable to (b); d) Global forest type or eco-region-specific (eg, IPCC 2006 INV Ls AFOLU Chapter 4 Table 4.5). Alternatively:

<table>
<tr><td></td><td>BCEFR = BEFR * D
Where BCEF values are not directly available, they can be calculated as Biomass Expansion Factor (BEF)* basic wood density (D).
Application of this equation requires caution because basic wood density and biomass expansion factors tend to be correlated. If the same sample of trees was used to determine D, BEF or BCEF, conversion will not introduce error, therefore, it is acceptable to use this equation. If, however, basic wood density is not known with certainty, transforming one into the other might introduce error, as BCEF implies a specific but unknown basic wood density, therefore, all conversion and expansion factors must be derived or their applicability checked locally.

For the project activity, b) is adopted. The value from the GHG inventory of land use change and Forestry from the “the second national information notice on China’s climate change” is applied to the project activity.</td></tr>
<tr><td>Value applied:</td><td><table>
<tr><td>Dominant tree speces</td><td>BEF</td><td>D</td><td>BCEF=(BEF*D)</td></tr>
<tr><td>Pinus</td><td>1.416</td><td>0.490</td><td>0.694</td></tr>
<tr><td>Brich</td><td>1.586</td><td>0.443</td><td>0.703</td></tr>
</table></td></tr>
<tr><td>Justification of choice of data or description of measurement methods and procedures applied</td><td>The value from the national forestry GHG inventory is adopted.</td></tr>
<tr><td>Purpose of the data</td><td>Calculation of baseline emissions and project emissions.</td></tr>
<tr><td>Comments</td><td>-</td></tr>
</table>

Data / Parameter	OF,SLF,WW
Data unit	Kg kg^{-1}
Description	*OF* = Fraction of wood products that will be emitted to the atmosphere between 3 and 100 years after production; *SLF* = Fraction of wood products that will be emitted to the atmosphere within 3 years of production; and *WW* = Fraction of extracted biomass effectively emitted to the atmosphere during production Wood waste fraction (WW): Winjum et al 1998 indicate that the proportion of extracted biomass that is oxidized (burning or decaying) from the production of commodities to be equal to 19% for developed countries, 24% for developing countries. Short-lived fraction (SLF) Winjum et al 1998 give decay rates for proportions of wood products, which were converted to with short-term (<3 yr) uses

<table>
<tr><td></td><td>(applicable internationally) as below:
Sawnwood 0.12
Woodbase panels 0.06
Other industrial roundwood 0.18
Paper and Paperboard 0.24
Additional oxidized fraction (OF)
Winjum et al 1998 gives annual oxidation fractions for each class of wood products split by forest region (boreal, temperate and tropical).
This methodology projects these fractions over 95 years to give the additional proportion that is oxidized between the 3rd and 100th years after initial harvest:

<table>
<tr><td rowspan="2">Wood Product Class</td><td colspan="3">OF</td></tr>
<tr><td>Boreal</td><td>Temperate</td><td>Tropical</td></tr>
<tr><td>Sawnwood</td><td>0.39</td><td>0.62</td><td>0.86</td></tr>
<tr><td>Woodbase panels</td><td>0.62</td><td>0.86</td><td>0.98</td></tr>
<tr><td>Other industrial roundwood</td><td>0.86</td><td>0.98</td><td>0.99</td></tr>
<tr><td>Paper and paperboard</td><td>0.39</td><td>0.62</td><td>0.99</td></tr>
</table>
</td></tr>
<tr><td>Source of data</td><td>The source of data is published paper of Winjum et al .1998.</td></tr>
<tr><td>Value applied:</td><td>WW:24%
SLF: 0.12
OF: 0.62</td></tr>
<tr><td>Justification of choice of data or description of measurement methods and procedures applied</td><td>The default value is applied as recommended by the methodology.</td></tr>
<tr><td>Purpose of the data</td><td>Calculation of baseline emissions.</td></tr>
<tr><td>Comments</td><td>-</td></tr>
</table>

Data / Parameter	$V_{EX,j,I,BSL}$
Data unit	$M^3\ ha^{-1}$
Description	Mean volume of extracted timber per unit area for species *j* in stratum *i*
Source of data	The timber harvest plan sets the allowable mean extracted volume

	from the merchantable volume of timber in the forest inventory (*Vj,i|BSL*), based on legal limits.
Value applied:	Please refer to the ER calculation spreadsheet for details.
Justification of choice of data or description of measurement methods and procedures applied	$V_{EX,j,I,BSL}=V_{j,I,BSL}$*Extrated Rate
Purpose of the data	Calculation of baseline emissions.
Comments	-

Data / Parameter	$A_{i,P}$
Data unit	ha
Description	Area covered by stratum I over land parcel P
Source of data	Geodetic coordinates and/or Remote Sensing data and/or legal parcel records
Value applied:	Please refer to the ER calculation sheet for details.
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of the data	Calculation of baseline emissions and project emissions.
Comments	-Be assumed ex-ante that land parcel boundaries and strata areas must not change over time.

Data / Parameter	$A_{1,i,P}$
Data unit	ha
Description	The area of stratum *i* in land parcel *p* that was harvested 1 year ago
Source of data	Geodetic coordinates,GIS Files or legal parcel records
Value applied:	Please refer to the ER calculation spreadsheet for details.
Justification of choice of data or description of measurement methods	N/A

and procedures applied	
Purpose of the data	Calculation of baseline emissions and project emissions.
Comments	-

Data / Parameter	$A_{2\text{-}10,i,P}$
Data unit	ha
Description	The area of stratum *i* in land parcel *p* that was harvested between 2 and 10 year ago
Source of data	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	Please refer to the ER calculation spreadsheet for details.
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of the data	Calculation of baseline emissions and project emissions.
Comments	-

Data / Parameter	$A_{11\text{-}20,i,P}$
Data unit	ha
Description	The area of stratum *i* in land parcel *p* that was harvested between 11 and 20 year ago
Source of data	Geodetic coordinates,GIS Files or legal parcel records
Value applied:	Please refer to the ER calculation spreadsheet for details.
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of the data	Calculation of baseline emissions and project emissions.
Comments	-

Data / Parameter	A_{t^*}
Data unit	ha

Description	Cumulative area harvested until time t*
Source of data	Geodetic coordinates, GIS Files or legal parcel records
Value applied:	Please refer to the ER calculation spreadsheet for details.
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of the data	Calculation of baseline emissions and project emissions.
Comments	-

Data / Parameter	$A_{s,p}$
Data unit	ha
Description	area of sample plot sp
Source of data	Recording and archiving of size of sample plots
Value applied:	0.06ha
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of the data	Calculation of project emissions.
Comments	-

Data / Parameter	G_{gi}
Data unit	g kg-1 dry matter burnt
Description	Emission factor for stratum I for gas g
Source of data	Defaults can be found in Volume 4, Chapter2, of the IPCC 2006 Inventory Guidelines in table 2.5
Value applied:	Not applicable to the project activiey, as no fire occurs during the monitoring period,
Justification of choice of data or description of	N/A

measurement methods and procedures applied	
Purpose of the data	Calculation of project emissions.
Comments	-

Data / Parameter	t_{VAL}
Data unit	dimensionless
Description	Two-sided Student. s t-value, at infinite degrees of freedom in the first iteration and at degrees of freedom equal to (n-1) in subsequent iterations, for the required confidence level; dimensionless
Source of data	Student's t-distribution table
Value applied:	Confidence level: Df ∞ → 95% 1.960 Df-degree of freedom
Justification of choice of data or description of measurement methods and procedures applied	-
Purpose of the data	Calculation of project emissions.
Comments	95% confidence level is prescribed in methodology VM0010 version 1.2.

Data / Parameter	E
Data unit	$Td.m.ha^{-1}$
Description	Acceptable margin of error (i.e. one-half the confidence interval in estimation of biomass stock within the project boundary; in units used for Si)
Source of data	A default value equal to 10% of the mean biomass stock within the project boundary.
Value applied:	0.9960
Justification of choice of data or description of measurement methods and procedures applied	-

Purpose of the data	Calculation of project emissions.
Comments	

3.2 Data and Parameters Monitored

Data / Parameter	Illegal Logging PRA Results
Data unit	/
Description	A participatory rural appraisal (PRA) of the communities surrounding the project area must be completed to determine if there is the potential for illegal extraction of trees from the project area.
Source of data	PRA
Description of measurement methods and procedures to be applied	The PRA must evaluate whether timber harvest may be occurring in the project area and must consist of semi-structured interviews / questionnaires. If ≥ 10% of those interviewed/surveyed believe that illegal logging may be occurring within the project boundary then the limited on- the-ground illegal logging survey must be triggered An additional output of the PRA must be a depth of penetration of illegal logging pressure. A maximum distance must be recorded for penetration into the forest from access points (such as roads, rivers, already cleared areas) for the purpose of harvesting timber.
Frequency of monitoring/recording	Every two years
Value applied:	No illegal logging occurs during the monitoring period within the project boundary.
Monitoring equipment	Not applicable.
QA/QC procedures to be applied	Not applicable.
Purpose of data	For the calculation of project emissions.
Calculation method	Interview/Survey.
Comments	Ex ante estimation must be made of illegal logging in the with-project case. If the belief is that zero illegal logging will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent illegal logging.

Data / Parameter	Results of the limited Illegal Logging Survey
Data unit	/
Description	/
Source of data	Limited on-the-ground illegal logging Survey
Description of measurement methods and procedures to be applied	Sampled by surveying multiple transects of known length and width across the access-buffer area to check whether new tree stumps are evident or not. The access-buffer area shall be equal in area to at least 1% of $A_{DIST\_IL,i}$.
Frequency of monitoring/recording	Must be repeated each time the PRA indicates a potential for illegal logging.
Value applied:	N/A (According to the PRA during these monitoring period, there is not a potential for illegal logging activities, therefore, this parameter does not needed during this monitoring period)
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of data	For the calculation of project emissions.
Calculation method	-
Comments	Ex ante an estimation must be made of illegal logging in the with-project case. If the belief is that zero illegal logging will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring and policies are in place to prevent illegal logging.

Data / Parameter	$A_{burn,l,t}$
Data unit	Ha
Description	Area burnt in stratum l at time t
Source of data	Geodetic coordinates and/or Remote Sensing data
Description of measurement methods and procedures to be applied	N/A
Frequency of monitoring/recording	At least every five years
Value monitored:	0 (As indicated in the notice issued by the Chao'er Forest industrial Cooperation in 2014, the Wuyi forestry centre has been awarded ¥10,000 Yuan for their continuous 5 years' distinguished forest operation & management

	without any fire accident.)
Monitoring equipment	Not applicable.
QA/QC procedures to be applied	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management must be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of the data	Calculation of project emissions
Calculation method	Not applicable, as no fires accrued during the monitoring period.
Comments	Ex-ante estimation of areas burned must be based on historic incidence of fire in the Project region.

Data / Parameter	$A_{dist,i,\ t}$
Data unit	Ha
Description	Area disturbed in stratum I at time t
Source of data	Geodetic coordinates and/or Remote Sensing data
Description of measurement methods and procedures to be applied	N/A
Frequency of monitoring/recording	At least every five years
Value monitored:	0 (As indicated in the statement issued by the local authority at the end of 2014, not any non-fire natural disturbance occurred during this monitoring period.)
Monitoring equipment	Not applicable.
QA/QC procedures to be applied	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management must be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of the data	Calculation of project emissions
Calculation method	Not applicable, as not any non-fire disturbance occurred during this monitoring period.
Comments	Ex-ante estimations of areas disturbed must be based on historic incidence of natural disturbance in the Project region.

Data / Parameter	$A_{Dist\_IL,i}$
Data unit	Ha

Description	Area potentially impacted by illegal logging in stratum I
Source of data	GIS delineation and ground truthing
Description of measurement methods and procedures to be applied	ASIST_IL,I must be composed of a buffer from all access points(access buffer), such as roads and rivers or previously cleared areas. The width of the buffer must be determined by the depth of degradation penetration as defined as a PRA output.
Frequency of monitoring/recording	At least every five years
Value monitored:	0 (As specified in the statement issued by the Forest protection brigade of Chao'er Forest Public Security Bureau in 2014, no significant illegal logging occurred in Wuyi forestry centre during the last 7 years.)
Monitoring equipment	Not applicable.
QA/QC procedures to be applied	ADIST_IL,i must be composed of a buffer from all access points (access buffer), such as roads and rivers or previously cleared areas. The width of the buffer must be determined by the depth of degradation penetration as defined as a PRA output.
Purpose of the data	Calculation of project emissions
Calculation method	Not applicable, as no illegal logging occurred during the monitoring period.
Comments	Ex ante a limited survey can be used to determine a likely depth of degradation penetration.

Data / Parameter	$C_{DIST\_IL,i,t\|PRJ}$
Data unit	tCO_2e
Description	biomass carbon of trees cut and removed through illegal logging in stratum i at time t
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	The sampling plan must be designed using plots systematically placed over the buffer zone so that they sample at least 3% of the area of the buffer zone (ADIST_IL,i). The diameter of all tree stumps will be measured and conservatively assumed to be the same as the DBH. Where the stump is a large buttress, several individuals of the same species nearby must be located and a ratio of the diameter at DBH to the diameter of buttress at the same height above ground as the measured stumps must be determined. This ratio will be applied to the measured stumps to estimate the likely DBH of the cut tree. The aboveground carbon stock of each harvested tree will be estimated using the allometric regression equations chosen for forest growth in the project

	scenario. The mean aboveground carbon stock of the harvested trees is conservatively estimated to be the total emissions and to all enter the atmosphere.
Frequency of monitoring/recording	Repeated each time limited sampling of ADIST_IL, indicates illegal logging
Value monitored:	0 (As specified in the statement issued by the Forest protection brigade of Chao'er Forest Public Security Bureau in 2014, no significant illegal logging occurred in Wuyi forestry centre during the last 7 years.)
Monitoring equipment	Not applicable.
QA/QC procedures to be applied	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management must be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of the data	Calculation of project emissions
Calculation method	Not applicable, as no illegal logging occurred during the monitoring period.
Comments	If species-specific equations are used and species cannot be identified from stumps then it must be assumed that the harvested species is the species most commonly harvested. A PRA must be used to determine the most commonly harvested species.

Data / Parameter	A_{Pi}
Data unit	Ha
Description	Total area of illegal logging sample plots in stratum i
Source of data	Ground measurement
Description of measurement methods and procedures to be applied	A sampling plan must be designed using multiple sample plots systematically placed across the buffer zone so that they sample at least 3% of the area of the buffer zone.
Frequency of monitoring/recording	Not more than five years.
Value monitored:	0 (As specified in the statement issued by the Forest protection brigade of Chao'er Forest Public Security Bureau in 2014, no significant illegal logging occurred in Wuyi forestry centre during the last 7 years.)
Monitoring equipment	Not applicable.
QA/QC procedures to be applied	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management must be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.

Purpose of the data	Calculation of project emissions
Calculation method	Not applicable, as no illegal logging occurred during the monitoring period.
Comments	Ex ante estimation should be made of area of plots. This should be set to exactly 3% of the buffer zone ADIST_IL,i

Data / Parameter	PMP_i
Data unit	*%*
Description	Merchantable biomass as a proportion of total aboveground tree biomass for stratum I within the project boundaries.
Source of data	Within each stratum divide the summed merchantable biomass (defined as total gross biomass of a tree 15 cm DBH or larger) by the summed total of aboveground three biomass.
Description of measurement methods and procedures to be applied	Not applicable, as the leakage factor of this project is zero, it is unnecessary to calculate PMP_i .
Frequency of monitoring/recording	Not more than five years.
Value applied:	Not applicable, as the leakage factor of this project is zero, it is unnecessary to calculate PMP_i .
Monitoring equipment	Not applicable.
QA/QC procedures to be applied	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management must be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or form the IPCC GPG LULUCF 2003, is recommended.
Purpose of data	For the calculation of the project emissions.
Calculation method	Not applicable.
Comments	Ex-ante a time zero measurement must be made of this factor. The timber harvest plan sets the allowable mean extracted volume from the merchantable volume of timber in the forest inventory ($V_{j,i\|BSL}$), based on legal limits.

Data / Parameter	A_i
Data unit	Ha
Description	Area covered by stratum i
Source of data	Geodetic coordinates and/or Remote Sensing data and/or legal parcel records.
Description of measurement methods and procedures to be applied	/
Frequency of monitoring/recording	The data is from the national second class forest investigation, which is updated every 10 years.
Value monitored:	Please refer to the ER spreadsheet for details.
Monitoring equipment	N/A
QA/QC procedures to be applied	/
Purpose of the data	Calculation of baseline and project emissions
Calculation method	The value is from the national second class forest investigation, which is design and implemented by the designated qualified entities.
Comments	In the baseline scenario strata areas must not change through time. In the project scenario it must be assumed *ex-ante* that stand boundaries and strata areas must not change through time. *Ex post* adjustments of the project scenario strata may be needed if unexpected disturbances occur during the project crediting period, severely affecting different parts of an originally homogenous stratum. This disturbance will be delineated as a separate stratum for the purpose of monitoring the carbon stock changes.

3.3 Monitoring Plan

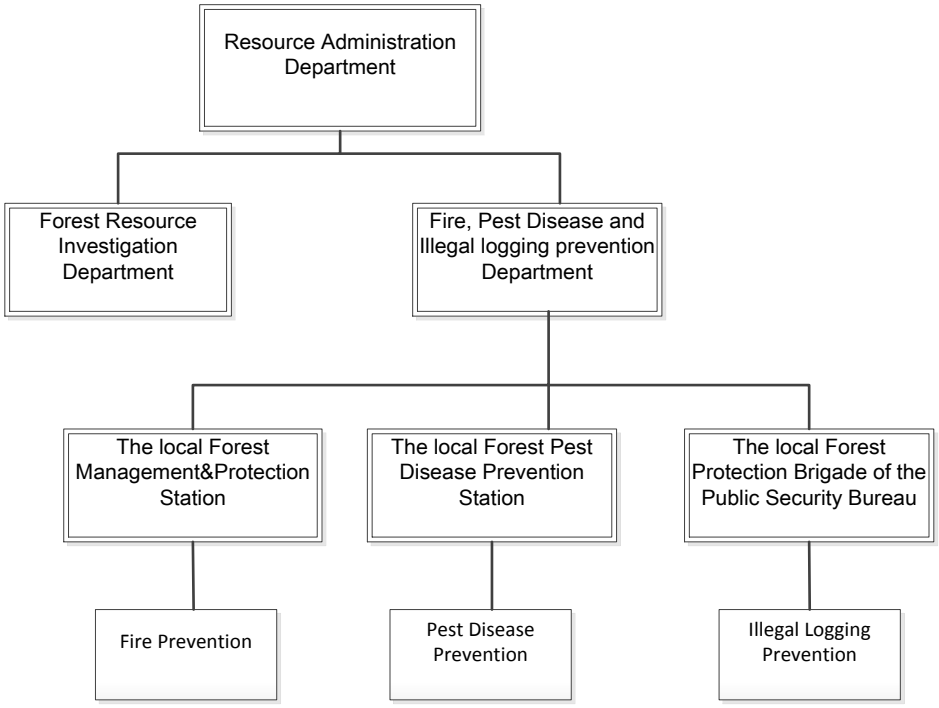
The resources administration department is assigned to be fully responsible for the carbon sequestration. They will coordinate with other departments (such as forest resource investigation department and fire, pest disease & illegal logging prevention) to provide all the necessary supports for the monitoring.

The forest investigation department will implement the sample monitoring with their professional skills.

The forest volume of the samples will be calculated by the table volume issued by the local forest authority based on the DBH.

Also, the prevention of fire, pest disease and illegal logging will be carried out by separate organizations.

The structure diagram is listed in the following:



All data collected as part of monitoring are archived electronically and kept at least for 2 years after the end of the project crediting period. All the forest investigation is implemented according to the primary technical code for the forest resource planning, design and investigation issued by the State Forestry Administration in 2003.

Data archiving took both electronic and paper forms, and copies of all data are available to be provided to each project participant.

This archives include:

Copies of all original sample spots recording sheet (includes the detailed information of the spot location, latitude), forest volume table,

Estimates of the carbon stock changes in all pools and non-CO_2 GHG and corresponding calculation spreadsheets;

GIS products; and

Copies of the measuring and monitoring reports.

Carbon stocks are measured according to the volume table equations with field sampling based on forest inventory methods. Various sources exist to assist with the design of a verifiable

forest field inventory based on best practice for sampling, data management and analysis (Box 3). In the project area the inventory plan is specified as below:

The design of a verifiable forest field inventory based on best practice for sampling, data management and analysis are selected from the Box 3 of the methodology. The sample size estimation methods, allocation among strata and uncertainty consideration is based on the most recent version of the tool for the "Calculation of the number of sample plots for measurements within A/R CDM project activities" (version 02.1.0) approved by the CDM Executive Board. The calculation process is shown below:

Parameter	Unit	Description
n	dimensionless	Number of sample plots required for estimation of biomass stock within the project boundary
n_i	dimensionless	Number of sample plots allocated to stratum I for estimation of biomass stocks within the project boundary.

The sample plot is 0.06ha with the radius of 13.82m and at least 5 samples is selected in every stratum, As the sample size should be less than 100, then the total sample plot area should be less than 6 ha, which is small than 5% of the total project are(11,010*5%=550.5ha). Therefore, the following simplified equation can be used for estimating the number of sample plots:

$$n = (\frac{t_{VAL}}{E})^2 * (\sum_i \omega_i * S_i)^2 \quad (1)$$

Where:

n: Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless

$t_{VAL:}$ Two-sided Student's t-value at infinite degrees of freedom for the required confidence level; dimensionless

E: Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary; tdm (or tdm • ha-1), i.e. in the units used for Si

ω_i: Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless

S_i:estimated standard deviation of biomass stock in stratum i; t d.m. (or tdm • ha-1)

i 1, 2, 3, ⋯biomass stock estimation strata within the project boundary

After the estimation of total number of sample plots (n), allocation of number of sample plots among strata is calculated as:

$$n_i = n * \frac{\omega_i * S_i}{\sum_i \omega_i * S_i} \quad (2)$$

where:

$n_{i:}$ Number of sample plots allocated to stratum i; dimensionless

n: Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless

ω_i: Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area);dimensionless

S_i: Estimated standard deviation of biomass stock in stratum i; t d.m. (or t d.m • ha-1)

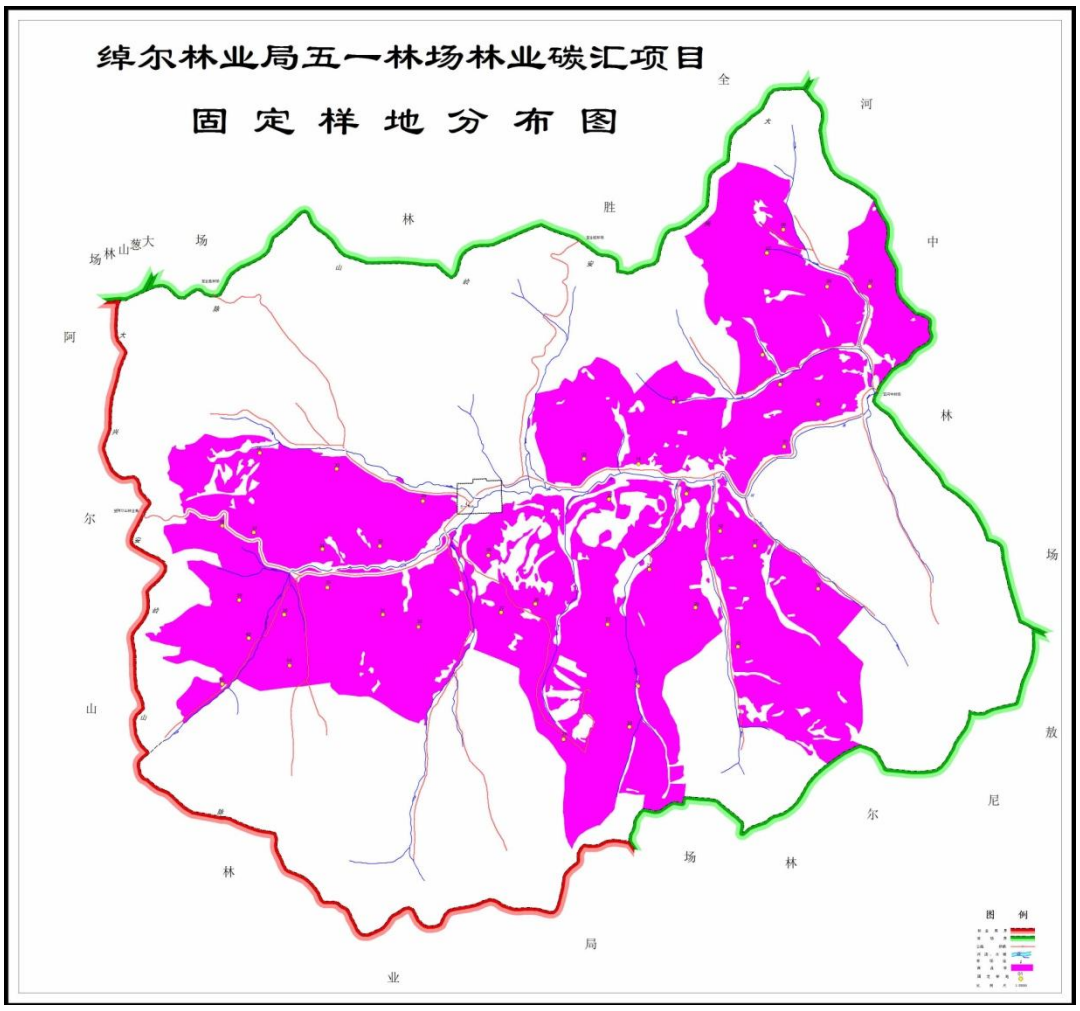
i1, 2, 3,⋯ biomass stock estimation strata within the project boundary

For the project actibity:
Based on the data of biomass stocks in a carbon pool in the project scenario, the estimation of number of sample plots required is shown in the table below:

I.D	Stratum	Species	Area (ha)	Unit Carbon Stock (t CO_2)	Deviation factor	s_i	w_i	w_i*s_i	n_i	Adjusted ni
1	PROJ-1	Brich	1,313	73.4176	0.6	44.05	12%	5.25	6.4	6
2	PROJ-2	Pinus	9,697	106.7008	0.3	32.01	88%	28.19	34.6	35

Where the confidence level is 95% as required in the methodology VM0010 ver 1.2 and Df is ∞, therefore, t_{VAL} is 1.96.

As indicates in the table above, the total sample plots is 41, with brich and pinus of 6 and 35 respectively.
Then the 41sample plots are distributed at random in the project area, the details is listed in the following:



The following data analysis also shows that the precision level of the sample carbon stock is 92.1%, larger than 90%, there is no need to deduct the emissions.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The net carbon stock change to be converted to emissions is equal to the carbon stock change as a result of timber harvest plus the carbon stock change resulting from conversion and retirement of wood products minus carbon sequestration from forest regrowth after harvest.

In order to generate the annual carbon stock change in the baseline scenario, the total net change in carbon stocks for parcels within is multiplied by the area of forest in the particular age class (ie, years since harvest in the baseline).

The annualized calculation vary between years 1,2-10;11-20; and all years since the start of the project activity, depending on which decay functions apply.

Therefore, the net change in carbon stock from wood products and logging slash across all

parcels within the first year of harvest in the baseline is calculated as:

$$\Delta C_{NET,BSL(1)} = \sum_{i=1}^{M}\sum_{p=1}^{p} A_{1,i,p} * \left(\left(\frac{\Delta C_{DWSLASH,i,p,BSL}}{10}\right) + \Delta C_{WP0,i,p,BSL} + (\Delta C_{WP100,i,p,BSL}/20)\right) \quad (3)$$

The net change in carbon stock from wood products and logging slash across all parcels in the years 2-10 since harvest in the baseline are calculated as:

$$\Delta C_{NET,BSL(2-10)} = \sum_{i=1}^{M}\sum_{p=1}^{p} A_{2-10,i,p} * \left(\left(\frac{\Delta C_{DWSLASH,i,p,BSL}}{10}\right) + (\Delta C_{WP100,i,p,BSL}/20)\right) \quad (4)$$

The net change in carbon stock from wood products across all parcels in the years 11-20 since harvest in the baseline are calculated as:

$$\Delta C_{NET,BSL(11-20)} = \sum_{i=1}^{M}\sum_{p=1}^{p} A_{11-20,i,p} * (\Delta C_{WP100,i,p,BSL}/20) \quad (5)$$

The net change (sequestration) in carbon stock due to forest regrowth across all parcels in all years since harvest in the baseline scenario are calculated as:

$$\Delta C_{NET,BSL(1+)} = \sum_{i=1}^{M}\sum_{p=1}^{p} A_{i,p,t^*} * (-\Delta C_{RG,i,p,BSL}) \quad (6)$$

Therefore, the net change in carbon stock across all parcels harvested over each year of the project crediting period in the baseline scenario since the start of the project activity is calculated as:

$$\Delta C_{NET,BSL,t^*} = \Delta C_{NET,BSL(1)} + \Delta C_{NET,BSL(2-10)} + \Delta C_{NET,BSL(11-20)} + \Delta C_{NET,BSL(1+)} \quad (7)$$

The net carbon stock change in the baseline scenario must be converted to net greenhouse gas emissions and is calculated as:

$$GHG_{NET,BSL,t^*} = \Delta C_{NET,BSL,t^*} * \frac{44}{12} \quad (8)$$

The baseline emission process has been demonstrated in the PD of the project, the outcome during this crediting period is listed in the following:

Year	$\triangle C_{NET,BSL(1+)}$(tc)	$\triangle C_{NET,BS,t}$(tc)	Conversion factor	[1]$GHG_{NET,BSL,t}$（tCO_2）
1	1,045.04	4,103.25	3.67	15,045.26
2	2,090.07	3,821.69	3.67	14,012.88
3	3,135.11	3,540.14	3.67	12,980.50
4	4,180.15	3,258.58	3.67	11,948.11
5	5,225.18	2,977.02	3.67	10,915.73

[1]As stated in the PD, the baseline of planned timber harvest is demonstrated and further confirmed by the timber production plan. During this monitoring period, the project activity operates smoothly without any events that may impact the GHG emission reductions or removals and monitoring, therefore, the baseline emissions keep constant, the same as in the PD.

4.2 Project Emissions

The net greenhouse gas emissions in the project scenario will be equal to emissions resulting from forest disturbance (both illegal logging and natural disturbances) minus carbon sequestration through ongoing forest growth.

$$\Delta C_{AB,t,PRJ} = \left(\sum_{i=1}^{M}\left(A_i * \frac{C_{AB,i,t2,PRJ} - C_{AB,i,t1,PRJ}}{T}\right)\right) * \frac{44}{12} \quad (9)$$

Based on the IPCC 2006 Inventory Guidelines, estimation of greenhouse gas emissions from biomass burning must be calculated as:

$$\Delta C_{DIST-FR,t,PRJ} = \sum_{i=1}^{M} A_{burn,i,t} * B_{i,t,PRJ} * COMF_i * G_{g,i} * 10^{-3} * GWP_{CH4} \quad (10)$$

As there is no fire occurred during the monitoring period, $\Delta C_{DIST-FR,t,PRJ}$ is equal to 0.

It is conservatively assumed that the natural disturbance is a stand-replacing disturbance, and that the biomass change as a result of the natural disturbance ($\Delta C_{DIST,t,PRJ}$) is emitted in the year of disturbance.

$$\Delta C_{DIST,t,PRJ} = \sum_{i=1}^{M}\left(A_{dist,i,t} * \sum_{j=1}^{J}\{C_{AB,j,i,BSL}\}\right) * \frac{44}{12} \quad (11)$$

As indicates by the relevant statement issued by the local authority, no natural disasters occurred during the monitoring period, $\Delta C_{DIST,t,PRJ}$ is equal to zero.

Illegal logging

A participatory rural appraisal (PRA) of the communities surrounding the project area must be completed to determine if there is the potential for illegal extraction of trees from the project area. If this assessment finds no potential pressure for these activities then illegal logging ($\Delta C_{DIST_{IL},i,t,PRJ}$) can be assumed to be zero and no monitoring is needed.

If the results of the PRA suggest that there is a potential for illegal logging activities, then limited field sampling must be undertaken.

Therefore, where the PRA or the limited sampling indicate no illegal logging occurring:

$$\Delta C_{DIST-IL,t,PRJ} = 0$$

Where the PRA and the limited sampling indicate degradation is occurring, net carbon stock change as a result of illegal logging must be calculated as:

$$\Delta C_{DIST-IL,t,PRJ} = \sum_{i=1}^{M}\left(A_{DIST-IL,j} * \frac{C_{DIST-IL,i,t,PRJ}}{AP_i}\right) \quad (12)$$

Therefore, net greenhouse gas emissions in the project scenario in year t, is calculated as:

$$\Delta C_{NET,t,PRJ} = \left(\Delta C_{DIST-FR,t,PRJ} + \Delta C_{DIST,t,PRJ} + \Delta C_{DIST-IL,t,PRJ}\right) - \Delta C_{AB,t,PRJ} \quad (13)$$

The net greenhouse gas emissions across in the project scenario since the start of the project activity is calculated as:

$$GHG_{NET,PRJ} = \sum_{t=1}^{t^*} \Delta C_{NET,t,PRJ} \quad (14)$$

$\triangle C_{DIST\text{-}FR,t,PRJ}$,$\triangle C_{DIST,t,PRJ}$,$\triangle C_{DIST\_IL,I,t,PRJ}$ are zero during the monitoring period, on-going growth rate is measured by the project owner based on the sample data, the details are listed below:

Year	$^{\triangle}C_{DIST\text{-}FR,t,PRJ}(tCO_2)$	$^{\triangle}C_{DIST,t,PRJ}(tCO_2)$	$^{\triangle}C_{DIST\_IL,I,t,PRJ}(tCO_2)$	$^{\triangle}C_{AB,t,PRJ}(tCO_2)$	$^{2}{}^{\triangle}C_{NET,t,PRJ}(tCO_2)$
1	0	0	0	85,785.69	-85,785.69
2	0	0	0	85,785.69	-85,785.69
3	0	0	0	85,785.69	-85,785.69
4	0	0	0	85,785.69	-85,785.69
5	0	0	0	85,785.69	-85,785.69

[2] Actually, the total carbon stock change and total GHG emissions from 2010 to 2014 is calculated based on the monitored growth during these five years from 2010 to 2014. In order to calculate the annual carbon stock change and annual GHG emission, the total carbon stock change is averaged by these five years. This method is also commonly accepted in forestry. As stated in P169-171 of the professional college textbook "forest resource operation and management" published by Chinese Forest Press in 2001,the forest growth is divided into average growth and current annual increment, the latter is usually difficult to measure and have a high error, therefore, the former is commonly used to determine the forest growth. The results of carbon stock change are the same if calculated by these two methods, but the current annual increment is unavailable for the project, so the total carbon stock change is averaged to obtain the annual carbon stock change.

4.3 Leakage

Activity shifting leakage

The project does not involve in the activity shifting leakage due to the following reasons:

- It can be found from the historical records, that the trends in harvest volumes paired with records from the with- project time period showing no deviation from historical trends;

  As indicates by the historical timber production completion records from 2008 to 2014, the total extracted volume of Chao'er Forestry Industrial Co., Ltd is decreasing paired with the plan from the with-project time period. In 2008, 2010 and 2014 the total timber production of Chao'er Forestry Industry Co., Ltd is 275,600 m^3, 225,500m^3, and 143,900m^3, with the drop rate of 44.42%, obviously, the project owner doesn't make up for the decrease of the project activity from other lands.

- Forest management plans prepared ≥24 months prior to the start of the project showing harvest plans on all owned lands paired with records from the with-project time period showing no deviation from management plans.

  As indicates by the timber production plan issued by Chao'er Forestry Industrial Co., Ltd issued every year based on the overall national five-year-plan, the total timber production plan is decreasing. Take the plan of 2001, 2008 2010,2014 for example, the figure dropped from 299,700,275,600, 225,500 to 143,900, with a sharp drop rate of 47.79%. It is clear that the total timber production plan is decreasing instead of increasing, not affected by the reducing of the project activity.

Therefore, the timber plans and land-use designations of other lands controlled by the project owner have not changed as a result of the planned project (designating new lands as timber concessions or increasing harvest rates in lands already managed for timber).

Market leakage

Leakage due to market effects is equal to the net emissions from planned timber harvest activities in the baseline scenario multiplied by an appropriate leakage factor:

$$GHG_{LK,LtPF,t*} = LF_{ME} * GHG_{NET,BSL,t*} \quad (15)$$

According to the methodology, the leakage factor is defined as considering where in the country logging will be increased as a result of the decreased supply of the timber caused by the project. If the areas liable to be logged have a higher ratio of merchantable biomass to total biomass higher than the project area it is likely that the proportional leakage is higher and vice versa:

Therefore,

$LF_{ME} = 0$

If it can be demonstrated that no market-effects leakage will occur within national boundaries, that is if no new concessions are being assigned AND annual extracted volumes cannot be increased within existing national concessions AND illegal logging is absent (or de minimis) in the host country.

For the project,

- According to the 11th Five-year plan issued by State Forest Bureau (Guofa[2005]No.41), the annual extracted volume from 2006 to 2009 is 24,815.5*10^4 m^3, and the extracted volume of the project is 30.05*10^4 m^3, accounting 0.12% of the national extracted volume, which will not result in the significant national concession and illegal logging;

- The *Notice of the Review Opinion* published by the State Council, the extracted volume could not be increased within existing national concessions AND, Illegal logging is strictly forbidden and se verily punished.

Therefore,

$LF_{ME} = 0$

4.4 Net GHG Emission Reductions and Removals

Therefore, the project GHG credits are calculated as:

$$GHG_{CREDITS,LTPF,t*} = GHG_{NET,BSL,t*} - GHG_{NET,PRJ,t*} - GHG_{LK,,LtPF,t*}$$

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
Year 1	15,045.26	-85,785.69	0	100,830.95
Year 2	14,012.88	-85,785.69	0	99,798.57
Year 3	12,980.50	-85,785.69	0	98,766.19
Year 4	11,948.11	-85,785.69	0	97,733.81
Year 5	10,915.73	-85,785.69	0	96,701.43
Total	64,902.48	-428,928.46	0	**493,830.94**
Average	12,980.50	-85,785.69	0	**98,766.19**

4.4.1 Adjusted for uncertainty

Estimated greenhouse gas emissions and emission reductions from IFM activities have uncertainties associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors. It is assumed that the uncertainties associated with input data are available, either as default uncertainty values given in most recent IPCC guidelines, or as statistical estimates based on sampling.

Uncertainty at all times is defined at the 95% confidence interval where the estimated variance exceeds +/- 15 percent from the mean. Procedures including stratification and the allocation of sufficient measurement plots will help ensure that low uncertainty results and ultimately full crediting can result.

Uncertainties arising from the measurement and monitoring of carbon pools and greenhouse gases shall always be quantified. Errors in each pool shall be weighted by the size of the pool so that projects may reasonably target a lower precision level in pools that only form a small proportion of the total stock.

For both the baseline and the with-project case the total uncertainty is equal to the square root of the sum of the squares of each component uncertainty and is calculated at the time of reporting through propagating the error in the baseline stocks and the error in the project stocks. Therefore, total uncertainty for the project is calculated as:

$$U_{TOTAL,\,LtPF} = \sqrt{U^2_{PRJ} + U^2_{BSL}} \qquad (16)$$

If $U_{total|LtPF} \leq 0.15$ then no deduction will result for uncertainty.

If $U_{total|LtPF} > 0.15$ then the amount of greenhouse gas emission credits associated with IFM

activities will be deducted as follows:

$$\text{Credits}_{\text{total,LtPF}} = \text{GHG}_{\text{credits,LtPF}} \cdot (1 - \text{U}_{\text{total,LtPF}}) \quad (17)$$

4.4.2 Uncertainty for the Baseline Scenario

According to the methodology, the uncertainty in the baseline scenario is associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors, the calculation process follows the two rules below:

Rule A: Where uncertainties are to be combined by addition, the standard deviation of the sum will be the square root of the sum of the squares of the standard deviations of the quantities that are added with the standard deviations all expressed in absolute terms (this rule is exact for uncorrelated variables).

Using this interpretation, a simple equation can be derived for the uncertainty of the sum, that when expressed in percentage terms becomes:

$$U_{total} = \frac{\sqrt{(U_1 * E_1)^2 + (U_2 * E_2)^2 + ... + (U_n * E_n)^2}}{E_1 + E_2 + ... + E_n} \quad (18)$$

Where:

U_{total} is the percentage uncertainty in the sum of the quantities (half the 95% confidence interval divided by the total (i.e. mean) and expressed as a percentage);

Ei and Ui are the uncertain quantities and the percentage uncertainties associated with them, respectively

Rule B: Where uncertain quantities are to be combined by multiplication, the same rule applies except that the standard deviations must all be expressed as fractions of the appropriate mean values (this rule is approximate for all random variables).

A simple equation can also be derived for the uncertainty of the product, expressed in percentage terms:

$$U_{total} = \sqrt{U_1^2 + U_2^2 + ... + U_n^2} \quad (19)$$

Where:

U_{total} is the percentage uncertainty in the product of the quantities (half the 95% confidence interval divided by the total and expressed as a percentage);

Ui are the percentage uncertainties associated with each of the quantities.

The uncertainty are calculated per stratum by dividing the 95% confidence interval by the mean value of the uncertainty quantities. The corresponding standard deviation is calculated over the measured plot values of the uncertainty quantities. The 95% confidence interval is calculated based on the standard deviation and the t-value for n-1 degree of freedom of plots per stratum.

As the uncertainty in the baseline scenario is associated with parameters and coefficients including estimates of area, carbon stocks, regrowth and expansion factors, the calculation of the 4 parameters and coefficients are shown below:

1) Uncertainty of Area:

In the baseline scenario, the area of every stratum are quoted from the second class forestry investigation and forest right certificate, so no data are from measurement and monitoring. Therefore, it is deemed as 0 in the period of validation. It will be monitored in the period of verification.

2) Uncertainty of expansion factors:

The Sample size, Sample mean and Standard error of expansion factors are quoted from Forestry Part of China's greenhouse gas emissions list divided as tree species, and the details is listed in the following table.

For brich

Parameters	Sample size	Stand deviation	Stand error	Mean	U
BEF	39	0.337	0.054	1.586	6.89%
D	189	0.013	0.001	0.443	0.45%
BCEF					6.91%

For Pinus

Parameters	Sample size	Stand deviation	Stand error	Mean	U
BEF	321	0.408	0.023	1.416	3.16%
D	13	0.039	0.011	0.49	4.81%
BCEF					5.76%

3) Uncertainty of carbon stock:

The calculation of uncertainty of carbon stock is based on the uncertainty of volume in every stratum multiply by the uncertainty of expansion factors.

Parameters	Species	Sample Size	Stand deviation	Stand Error	t	Mean	U
BEF	Brich	39	0.337	0.054	2.024	1.586	6.89%
	Pinus	321	0.408	0.023	1.967	1.416	3.16%
D(tdm/m3)	Brich	189	0.013	0.001	1.973	0.443	0.45%

	Pinus	13	0.039	0.011	2.179	0.490	4.81%
BCEF	Brich					0.703	6.91%
	Pinus					0.694	5.76%
Volume (m3/ha)	Brich	117	38.03	3.516	1.981	56.997	12.22%
	Pinus	795	30.52	1.082	1.963	83.882	2.53%
Carbon Stock (tc/ha)	Brich						14.03%
	Pinus						6.29%
RGR (m3/ha/yr)	Brich					2.55	30%
	Pinus					3.75	30%

4) Uncertainty of regrowth

The uncertainty of regrowth is only associated with the parameter RGRi, as for the value quoted from IPCC Guidelines for National Greenhouse Gas Inventories (2006), Table 4.9, the uncertainty for non-industrialized countries of 30% is regulated therefore the uncertainty of RGR_i regrowth is 30%. And this uncertainty is adopted for the project for conservative.

Baseline Emission Uncertainty calculation

Based on the calculation of the 4 parameters and coefficients above, the U_{total} is 7.053%, the detailed calculation is listed as follows:

The baseline emission uncertainty has been listed in the PD of the project as 4.328%, the details for the project emission uncertainty is updated as:

Project Emission Uncertainty

Stratum	Parameter	Area(ha)	$V_{j,I,BSL,2010}$(m3/ha)	BEF	D(tdm/m³)	BCEF(tdm/m³)	CF(tc/tdm)	$V_{j,i,BSL,2014}$(m³/ha)	$\triangle V_{AB,t,PRJ}$(m³/ha)	$\triangle C_{AB,t,PRJ}$(tCO_2)
		a	b	c	d	e=c*d	f	g	h=g-b	i=h*a*e*f*44/12
										$u_i = \sqrt{U_h^2 + U_e^2}$
Brich	E	1,313	56.997	1.586	0.443	0.703	0.5	71.514	14.518	24,553.865
	U	0	12.22%	6.893%	0.445%	6.907%		2.886%	5.652%	8.925%
Pinus	E	9,697	83.882	1.416	0.490	0.694	0.5	116.663	32.782	404,361.759
	U	0	2.74%	3.164%	4.810%	5.757%		0.631%	1.2053%	5.882%
									U_{PRJ}	5.569%

Therefore, $U_{total} = \sqrt{U_{BSL}^2 + U_{PRJ}^2} = \sqrt{4.328\%^2 + 5.569\%^2} = 7.053\%$

According to the methodology, if $U_{total,LtPF} \leqslant 0.15$ then no deduction will result for uncertainty, therefore, it is unnecessary for the project to deduct for the uncertainty.

Calculation of verified carbon units

The amount of greenhouse gas credits estimated at section 4.4 above shall be adjusted to account for risk.

They shall be subject to deductions based on application of the most recent version of the VCS Tool for AFOLU Non-Permanence Risk Analysis and Buffer Determination.

Therefore, the amount of VCUs that can be issued at time t=t2 (the date of verification) for monitoring period $T=t_2-t_1$, is calculated as:

$$VCU_{net,\,LtPF} = (\text{Credits}_{\text{total, t 2, LtPF}} - \text{Credits}_{\text{total, t 1, LtPF}}) - \text{Bu}_{\text{IFM-VCS}} \quad (20)$$

Based on the analysis in NON-PERMANENCE RISK REPORT (please refer to the appendix), the overall risk rating is 23, then 23% of the total emission reductions shall be deducted.

Therefore, the emission reduction detail is listed:

Year	$GHG_{NET,BSL,t}$	$GHG_{NET,PRJ,t}$	$GHG_{LK,LtPF,t}$	$GHG_{CREDITS,LtPF,t}$	$U_{total,LtPF}$	$Credits_{total,LtPF}$	Risk Scroe	$Bu_{IFM-VCS}$	$VCU_{net,IFM}$
1	15,045.26	-88,334.87	0	103,380.13	7.053%	103,380.13	23	23,191	77,639.00
2	14,012.88	-88,334.87	0	102,347.75	7.053%	102,347.75	23	22,954	76,844.00
3	12,980.50	-88,334.87	0	101,315.37	7.053%	101,315.37	23	22,716	76,049.00
4	11,948.11	-88,334.87	0	100,282.99	7.053%	100,282.99	23	22,479	75,255.00
5	10,915.73	-88,334.87	0	99,250.61	7.053%	99,250.61	23	22,241	74,460.00
Total	64,902.48	-428,928.46	0	493,830.94		493,830.94		113,581	380,247.00
Average	12,980.50	-85,785.69	0	98,766.19		98,766.19			76,049.00