NORTH PIKOUNDA REDD+ PROJECT

PROJECT DESCRIPTION

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List of Abbreviations & Acronyms

AAC	Annual Allowable Cut
AFOLU	Agriculture, Forestry and other Land Use
ALM	Agriculture Land Management
ALP	Annual Logging Plan
AGB	Above Ground Biomass
ARR	Afforestation Reforestation and Revegetation
ASL	Above Sea Level
BAU	Business as usual
BCEF	Biomass Conversion and Expansion Factor
BEF	Biomass Expansion Factor
BOD	Biological Oxygen Demand
CAT	*Convention d'Amenagement et de Transformation*
°c	Celcius degree
CC	Carbon Conservation Pte. Ltd.
CCB	Climate, Community and Biodiversity Standards
CDM	Clean Development Mechanism
CF	Carbon Fraction
CIB	*Congolaise Industrielle des Bois (also includes Olam International Limited, the sole owner of CIB)*
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CO_2	Carbon dioxide
COMIFAC	Central African Forests Commission
CTI	*Convention de Transformation industrielle*
dbh	Diameter at Breast Height
DME	*Diametre Minimum d'aménagement*
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization of the United Nations
FIR	Forest Inventory Report
FLU	Forest Logging Unit
FMO	Forest Management Organization
FMU	Forest Management Unit
FPIC	Free, Prior and Informed Consent
FSC	Forest Stewardship Council
GHG	Greenhouse Gas
GIS	Geographic Information System
ha	Hectares
HCVF	High Conservation Value Forest
IFM	Improved Forest Management
IGN	*Institut National de l'Information Géographie et Forestière –*

	French national Institute of Geographic Information
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
LOA	Logged over area
ltHWP	Long Term Harvest Wood Products
LtPF	Logged to Protected Forest
m	Meters
m^3	Cubic Meters
mm	Milimeters
MAI	Mean Annual Increment
MEFDD	*Ministère de l'Economie Forestière et du Developpement Durable* - Ministry of Forestry Economy & Sustainable Development
NGO	Non Governmental Organization
OLAM	Olam International Limited
PDD	Project Design Document
PD	Project Document
PRC	Peat Rewetting and Conservation
PSP	Permanent Sample Plot
QA/QC	Quality Assurance/Quality Control
REDD	Reducing Emissions from Deforestation and Degradation
REDD+	Reducing Emissions from Deforestation and Degradation Plus conservation, sustainable management of forests and enhancement of forest carbon stocks
RIL	Reduced Impact Logging
RoC	Republic of Congo
R-PP	(REDD+) Readiness Preparation Proposal
SOP	Standard Operating Procedure
SFM	Sustainable Forest Management
tCO_2e	Tonnes of Carbon Dioxide Equivalent
UFA	*Unité Forestière d'Aménagement* – Forest Management Unit
UFE	*Unité Forestière d'Exploitation* – Forest Exploitation Unit
UFP	*Unité Forestière de Production* – Forest Production Unit
UNFCCC	United Nations Framework Convention for Climate Change
VCS	Verified Carbon Standard
VCS-PD	VCS Project Document
VCS-MR	VCS Monitoring Report
VCU	Verified Carbon Unit
WSG	Wood Specific Gravity

1 PROJECT DETAILS

1.1 Summary Description of the Project

The **North Pikounda REDD+ Project** (the Project) is a reducing emission from deforestation and degradation plus conservation and sustainable forestry (REDD+) project designed to protect 92,530 hectares (ha) of unlogged native Congolese forest, legally designated as a selective logging concession. The area is comprised of 60% of dry land mixed forest and 40% of areas designated as wetlands. The anticipated selective logging would normally have been undertaken on the dry lands, consisting on an area of 55,950 ha. Those dry lands constitute the project crediting area.

The concession is owned by Congolaise Industrielle des Bois (CIB) which has been established as a timber operator in the North of Congo since 1968. The company currently has five active sawmills, dryers and moulding units in Pokola and Loundoungou and employs over 900 people permanently and more than 100 subcontractors. Four forest concessions are allocated to the CIB and all have been engaged in sustainable forest management for several years. CIB was the first timber company to submit a Forest Management Plan in Congo in 2005 and the first to become FSC certified in 2006. The North Pikounda *Unité Forestière d'Exploitation* or Forest Exploitation Unit (UFE) was allocated to CIB by Ministerial Decree in 2002 and is 92,530 ha (the Project Area).

The Project is located in the Northern Congo region of Sangha, of the Northern Congo forest sector. The UFE is part of Pikounda *Unité Forestière d'Aménagement* (UFA)– a Forest Management Unit (FMU), which is divided in two UFEs:

1. North Pikounda UFE, designated for timber extraction being allocated to CIB, and;
2. South Pikounda UFE, has been decreed to become "Tokou-Pikounda Protected Area."

The main activity of the North Pikounda REDD+ Project is the cancelation of the planned degradation activities and the decision to instead protect the forest area, while maintaining and protecting the biodiversity of the area. This is particularly important as the Project Area has considerable biodiversity, including one of the largest known lowland gorilla populations in the Congo basin.

From the implementation of the Project, it is estimated that around 4,900,000 tonnes of GHG emissions will be avoided which would have been emitted into the atmosphere over a period of 30 years in the absence of the Project, not including the Project's Non-Permanence Risk Buffer amount, leakage, if any, which will be accounted for over the life of the project.

1.2 Sectoral Scope and Project Type

Sectoral Scope 14: Agriculture, Forest and other Land Use (AFOLU).

Project Category: Reduction Emission from Deforestation and Degradation (REDD).

Type of Activity: Improved Forest Management – Logged to Protected Forests (IFM-LtPF).

The project is following the steps of methodology VM0011, "*Estimating Greenhouse Gas Emissions Reductions From Planned Degradation (Improved Forest Management)*" developed by Carbon Planet to estimate the emissions that would have occurred if the legal harvesting of the North Pikounda UFE would have occurred.

The project is not a grouped project.

1.3 Project Proponents

Entity	**Congolaise Industrielle des Bois,** a wholly owned subsidiary of **Olam International Limited**
Role	Concession Holder and Project Proponent
Responsible Party	Christian Schwarz
Role in the Company	General Director CIB
Role in this Project	Project Owner
Telephone Number	+242 06 900 12 50
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Table 1 - Project proponent

1.4 Other Entities Involved in the Project

Entity	**Olam International Limited**
Role	Project Proponent
Responsible Party	Lucas Vanderwalt
Role in the Company	Director of Sustainability
Role in this Project	Project Manager
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Table 2 - Other entity involved in the project: Olam

Entity	**Carbon Conservation Pte Ltd**
Role	Technical Lead in Project Development
Responsible Party	Dorjee Sun
Role in the Company	CEO
Role in this Project	Lead Project Manager
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Table 3 - Other entity involved in the project: Carbon Conservation

1.5 Project Start Date

The Project start date is 01 January 2012, which is the date when harvesting of the North Pikounda Forest could have commenced based on the approval of the North Pikounda UFE Forest Management Plan from the Ministry Sustainable Development, of Forestry Economy & Environment (MEFDD) of the Republic of Congo (RoC).

1.6 Project Crediting Period

The project has a crediting period of 30 years. The start date of the beginning of the crediting period is first day of January 2012 and the end date of the crediting period is December 31, 2041.

The Project itself will be 30 years, as there will be thirty years of monitoring from the date of initiation of Project Activity, that is, monitoring will continue until 2041. Per the VCS guidelines, a mandatory baseline re-evaluation is to be executed at a minimum of every 10 years after project start. Therefore, there will be a planned mandatory baseline re-evaluation on or before December 2021 and on or before December 2031.

The verification events are planned to occur on an annual basis.

Table 4 - Project crediting period

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041

Baseline Validation/Re-evaluation
Verification

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

As per VCS guidance on REDD projects (VCS AFOLU v3.3), *ex ante* estimates to determine project scale are provided for only the first 10-year baseline period, through January 2021 (Table 6). The project is beneath the threshold of Large Projects, with less than estimated average annual GHG emission reductions or removals of 300,000 tCO2e per year.

Project (Less than or equal to 300,000 tonnes of CO_2e per year)	**Yes**
Large project (Greater than 300,000 tonnes of CO_2e per year)	**No**

Table 5 - Project scale

Years	Estimated Net GHG emission reductions or removals (tCO2e)
2012	56,209
2013	74,529
2014	90,271
2015	103,870
2016	115,689
2017	124,727
2018	131,501
2019	137,692
2020	143,398
2021	148,701
Total estimated ERs	**1,126,587**
Total number of crediting years	**10**
Average annual ERs	**112,659**

Table 6 - Estimated net GHG removals for the first 10 years

It is important to note that Table 6 above represent the estimations for the parameters $C'_{baseline,t}$ of VM0011, which are the annual net GHG emissions associated with the baseline scenario in year t. These figures take into account the Non-Permanence Risk Buffer as well as Leakage and Uncertainty which is estimated at each Verification event.

1.8 Description of the Project Activity

The main objective of the North Pikounda REDD+ Project (the Project) is the conservation of the forest area of the North Pikounda UFE. The main activity of the North Pikounda REDD+ Project is the complete cessation of selective logging or any other harvesting activities in the entire North Pikounda UFE for the duration of the project lifespan, that is 30 years. Instead of mechanized selective logging of the area that would have otherwise occurred without carbon finance, the area will become a non-harvested protected forest area where the substantial biodiversity will be able to remain intact for future generations.

In order to reach this objective of conservation, the project will implement a series of actions that are described in more detail in the monitoring plan (see chapter 0). These actions will be structured into four main sub-activities, namely:

1. **Carbon stock monitoring** through the implementation, monitoring and upkeep of a network of Permanent Sample Plots;

2. **Remote Sensed monitoring**: Spot 5 satellite has been calibrated to provide high-resolution images of the Project Area on an annual basis. In the future, Spot 6 and 7 images could even

be used to monitor the forests of North-Pikounda REDD+ project. This has been possible thanks to the partnership between Astrium, The Portal For the Satellite Observation of Congo Basin Forests[1] and IGN[2];

3. **Field Monitoring**: regular field missions will be organised to control identified "hot spot" for illegal logging in North Pikounda concessions. Additional missions will be organized depending on results of remote sensing monitoring or additional information;

4. **Social Activities**: a development fund will be financed through VCU sales. This fund will be managed by the North Pikounda REDD+ Steering Committee.

Figure 1 - View of the Sangha River from the Pokola Concession

[1] http://bassinducongo.reddspot.org/?langRedir=1
[2] *Institut National de l'Information Géographique et Forestière* – French Institute for Geography and Forest Data

1.9 Project Location including Geographic and Physical Information

The Project is located in the African country of the Republic of Congo (see Figure 2) and within the Sangha Department in the northern part of the country near the border with Cameroon. The largest nearby city is Ouesso, which is located on the Sangha River and the border with Cameroon. The Project is located less than a degree north of the equator and within the north-western portion of the Congo River Basin which is renowned for its large stands of tropical rainforests and extensive biodiversity.

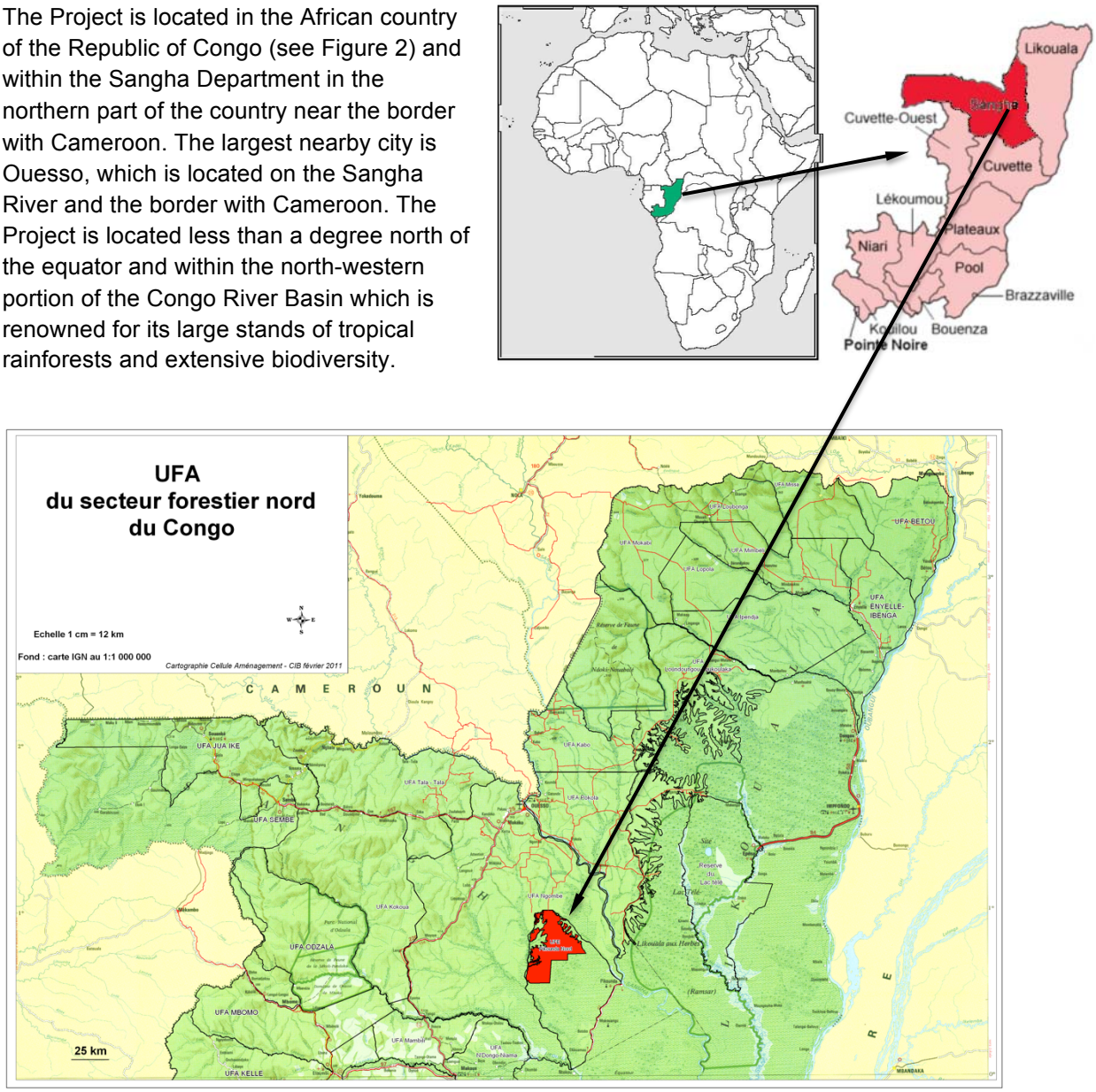

Figure 2 - Project location

The North Pikounda UFE is a logging concessions controlled by CIB in the north of the Republic of Congo (RoC), whose local operational headquarters are down-stream of Ouesso in the town of Pokola.

1.9.1 UFE localisation

The limits of North Pikounda UFE are defined by ministerial decree (decree n°8233/MEF/CAB approved 05th October 2006) and are described below. The UFE is delineated by:

- On the West: from the 0°33'42'' N parallel, the limit follows the flooded forests of the Kandeko river, then the Ebangapélé river up to the 1° N parallel;
- From North to North-Est and Est: the limit correspond to the 1°N parallel till the Ebangui river. There, it follows the Ebangui river flooded forests until the 16°25'07''E meridian;

- From South-East to West: the limit follows 0°44'13''N parallel between meridian 16°25'07''E and meridian 16°18'35''E. Then it follows the later meridian to the South until crossing the 0°41'56''N parallel, then this parallel straight to the West until it crosses the meridian 16°12'38''E. There, it follows a line oriented at 186° until the points of geographic coordinates 0°33'42''N – 16°12'03''E. From there, the limit follows the 0°33'42''N parallel until it crosses the Kandeko river.

According to the decree, the project area is 93,970 ha, but in fact the GIS corrected area (which is retained for this project) is 92,530 hectares.

Figure 4 next page presents the localisation of the North Pikounda UFE and its boundaries.

The project crediting area consists of all of the "dry land (*terra firma*) of the North Pikounda UFE. The exact localisation of those dry lands is provided in Figure 5 below.

1.9.2 Details of Ownership

The North Pikounda UFE is part of the private domain of the state which has been established and having as its main purpose the undertaking of forestry production activities by regulations (Articles 10 and 65 of Act 16-2000). The limits of North Pikounda UFE are defined by ministerial decree (decree n°8233/MEF/CAB approved 05th October 2006)

The Agreement of Development and Processing - No 12/MEFPRH/CAB/DGEF/DF-SGF 13/11/2002 signed between the Congolese government and Congolese Industrielle des Bois (CIB) and Order No. 5856/MEF / CAB / DGEF / DF-FMS 13/11/2002 approving the agreement to assign the Unit of Forest Exploitation (UFE) Pikounda North for a period of 15 years from the date of signing of the order of approval.

The Government of the Republic of Congo, through his Excellency Henri DJOMBO, Minister of Sustainable Development and the Forest Economics of the Environment contracted, together with CIB, on 24 May 2012,in order that CIB might undertake the "development and implementation of the Pilot REDD+ North Pikounda UFE" signed and implemented a REDD+ Project Development Agreement. The project was to be a "REDD+ pioneer project for the improvement of sustainable forest management of natural tropical forests in the Congo Basin including [for CIB to have]the right to hold and commercialize the carbon credits from this [NPR+] Project." The Agreement agreed to a 30 year Project timespan and a corresponding grant to CIB to maintain the North Pikounda UFE license for the same period in order to undertake the REDD+ Activity. A benefit sharing scheme between CIB and the RoC was incorporated into the agreement.

CIB has had its Forest Management Plan for the North Pikounda Area approved for January 2012 harvesting and absent the above mentioned REDD+ Project Development Agreement, could harvest the North Pikounda UFE.

1.9.3 Establishment of Control of the Project Area

CIB exerts legal and physical control of the NPR+ Project Area, as well as the ability to leverage that control for commercial exploitation of timber resources.

It is mandates in the 2002 Agreement of Development and Processing that CIB must undertake numerous activities in order to be able to have a validated Forest Management Plan that would allow

for the control required to undertake mechanised selective logging. A host of activities over the last decade took place that have steadily moved the North Pikounda concession to receive its Forest Management Plan approved for January 2012 harvesting. This included but is not limited to:

1. Stakeholder consultations;
2. Complete forest inventory;
3. Division of the Pikounda UFA;
4. Community Social and Economic Study;
5. REDD+ Feasibility Study;
6. Etc.

With the final ministerial approval of the Management Plan by Minister Djombo, received in early 2012, such that logging could have commenced at the beginning of 2012, the legal control of the North Pikounda UFE is complete. The ability to conduct REDD+ activity is legally based on the Project Development Agreement between CIB and the RoC.

CIB maintains Physical control of the property through having access dedicated logging roads that can be used to access the North Pikounda UFE. CIB has had two inventory teams in the forest priort to the carbon project in order to evaluate timber production levels, the latest was in 2006. CIB also collaborates with a neighbour concession (also FSC certified) regarding access and information regarding unauthorised access to the area.

Since the NPR+ Project has began in 2012, the area is now clearly demarcated with signs, and additional inventory activity has set up permanent sample plots (PSPs). These sites are regularly visited. Additionally the Project utilises space based observation systems in order to detect land cover change.

CIB maintains ongoing legal and physical control of the north Pikounda UFE.

1.9.4 Climate

The climate of the Northern part of Congo is equatorial (Vennetier, 1965). According to Leroux (1983), the project area belongs to the Congo Basin climatic region and to the domain of the permanent Atlantic monsoon. North Pikounda UFE is located 70 km south-east from Ouesso meteorological station.

Annual mean rainfall in Ouesso is 1686 mm (1961-1990). The Rain regime is bimodal with two rainfall peaks, one in May (187 mm) and one in October (238 mm and 15 days of rain). The main dry season takes place between December and February and there is a small dry season around July.

Mean temperatures are slightly oscillating around 25°c, with a minimum of 24°c in August and a maximum of 25,7°c in March. Daily temperatures differences are small, generally less then 10°c. Annual mean hygrometry is 85%, with monthly means varying from 80% in February to 87% in October during the primary rain season.

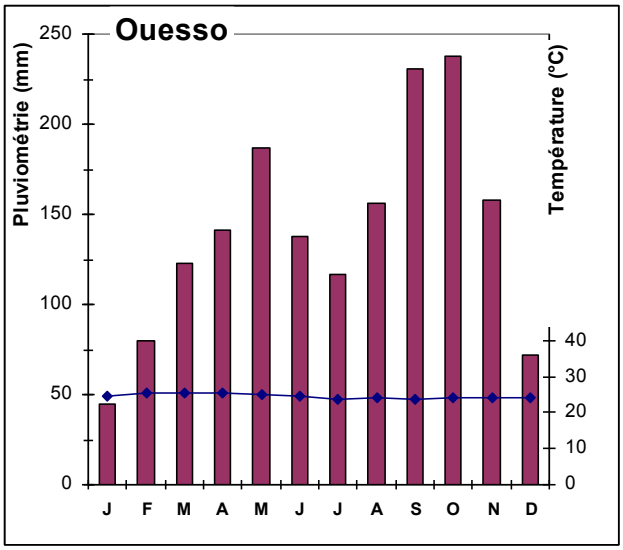

Figure 3 – Average Rainfall and Temperature based on monthly means for a 30 years period (1961-1991) at Ouesso (*ASECNA*)

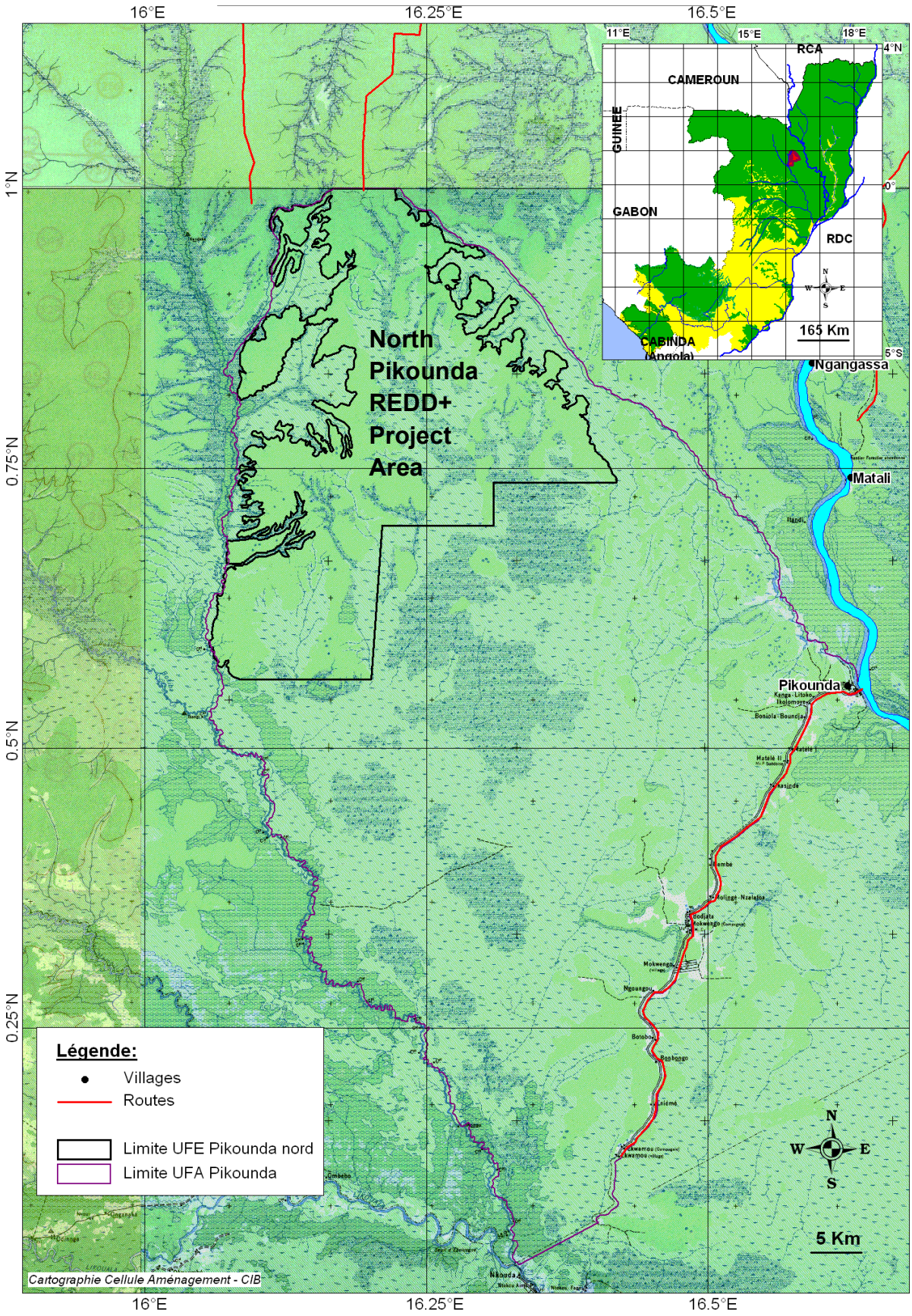

Figure 4 - Map of North Pikounda UFE and the REDD+ Project Area

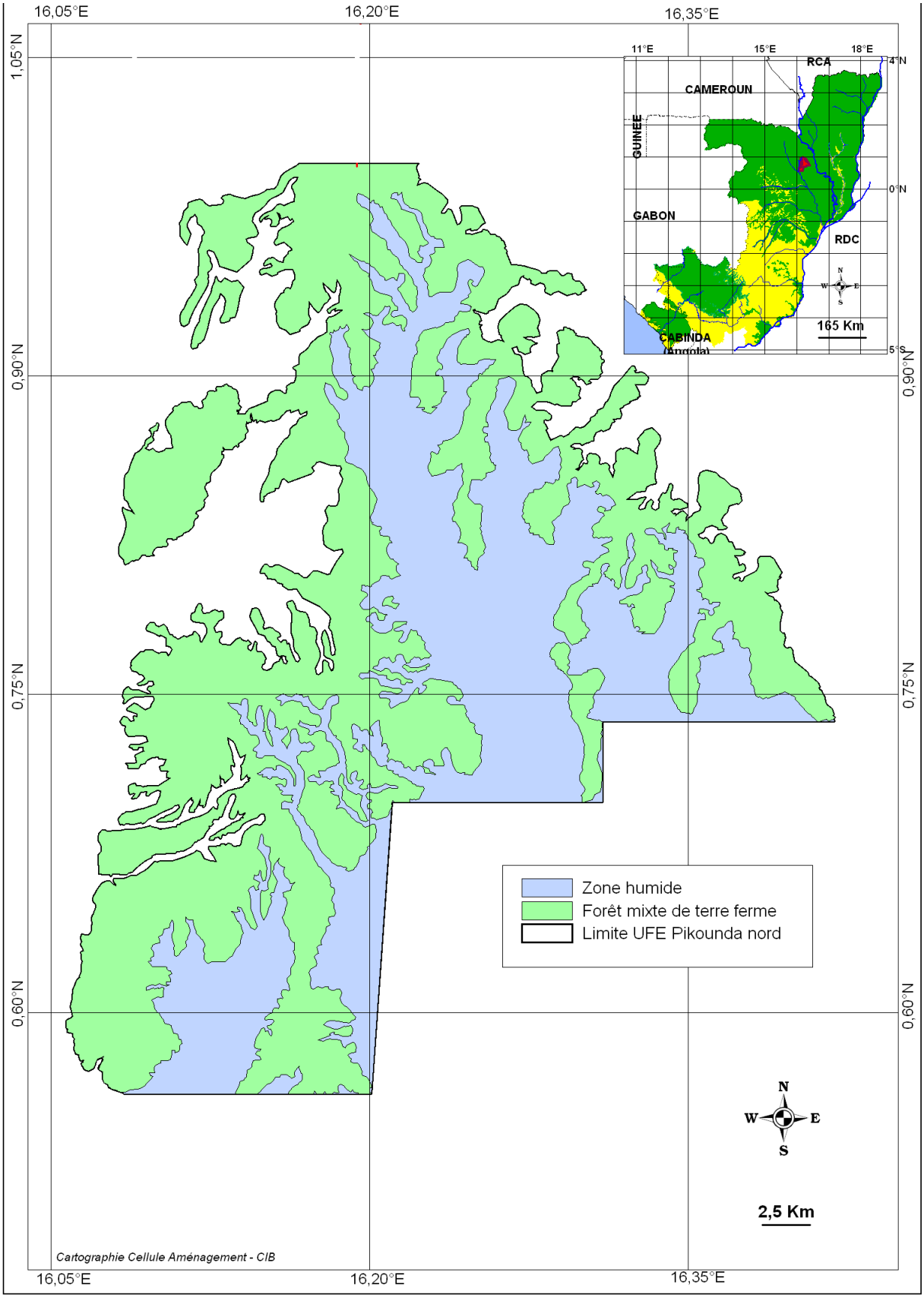

Figure 5 – Map of the crediting area: Dryland mixed forests (in green)

1.9.5 Topography and hydrology

The North Pikounda Project Area is generally flat, with only a small variation in elevation change: from 325m above sea level (ASL) to 350m ASL. The Ebangui River drains the Northeast part of the UFE and drains into the Sangha River. The western side of the project area feeds the Ebangapélé, Kandeko and Bokiba Rivers which in turn feed the Likouala River, also eventually draining into the Sangha River. All of these watersheds feed into the Congo River and make up a portion of the greater Congo River Basin.

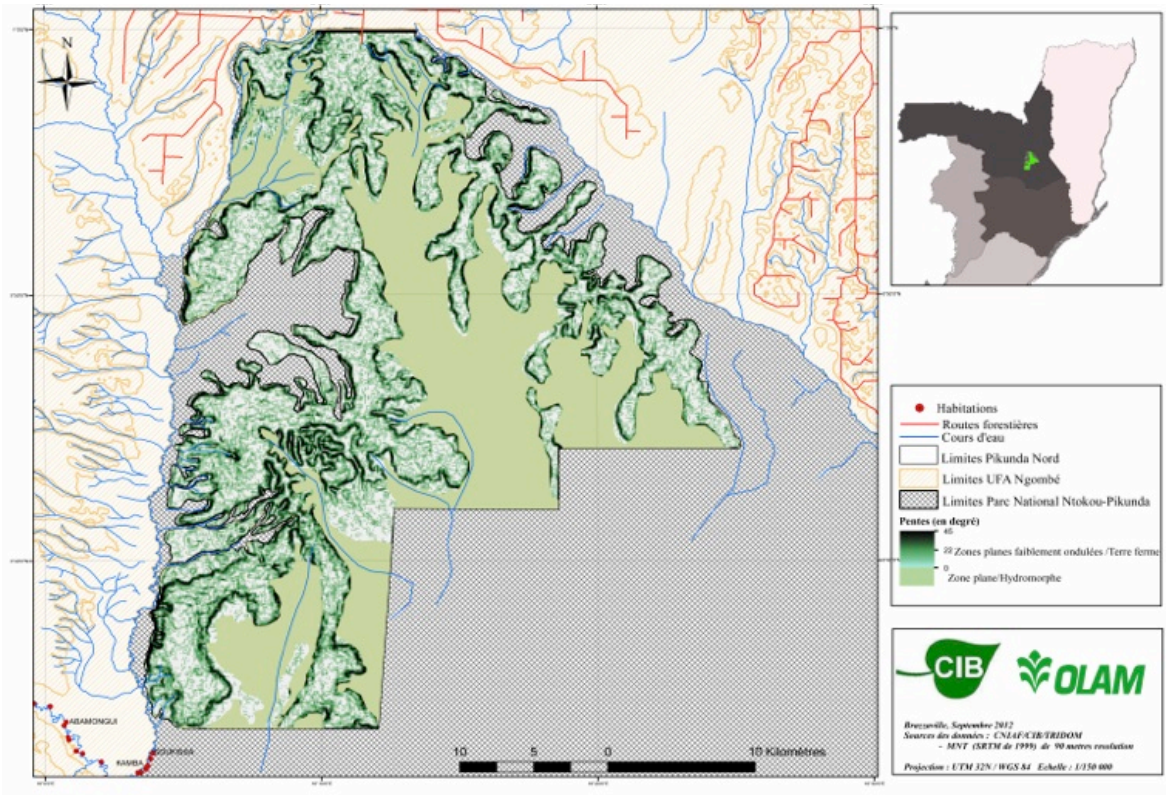

Figure 6 - Lands elevation / Slopes map

1.9.6 Geology and Pedology

The project area is almost completely covered by quaternary clayey or sandy alluvium deposited by the Sangha river (ORSTOM, 1983).

Soils located on dry lands are of ferallitic types, with red to yellowish colors, ranging from silty-clayey-sandy to sandy. They present substantial depth, with little difference between successive layers, very acid and greatly desaturated (Gillet, 2008).

Hydromorphic soils, oligotrophic, peaty or semi-peaty are occupying the permanently flooded lowlands and swamps depressions. These soils are not part of the crediting area and would not have been disturbed by the logging activities under the baseline scenario

The geological map of Congo, produced by ORSTOM, is provided in ***Appendix 01***.

1.10 Conditions Prior to Project Initiation

The North Pikounda UFE has been allocated to the CIB by Ministerial Decree in 2002 in a *Convention d'Amenagement et de Transformation* (CAT), that is a Convention of Management and Transformation. Since then many activities have taken place on the North Pikounda Project Area. The main events and milestones that have led to the validation of the NPR+ Project are set forth below:

Signing of the MoU MEF / CIB for the project management of UFA granted to the CIB	Oct 2000
Convention d'Amenagement et de Transformation (CAT) for Pokola UFA and North Pikounda UFE by the MEFDD, as the CAT was signed on behalf of the RoC by Minister Henri Djombo and by Director General Jean Marie Mevelec for CIB	Nov 2002
Management contract processing for enhancement of UFE	Nov 2002
Multi-resource inventory (trees, regeneration, NTFP, large mammals)	Jan-May 2003
Pikounda UFA is subdivided into two units of Forest Operations (Order No. 8233/MEF/CAB from 05 October 2006	Oct 2006
Completion of the ecological study for UFE Pikounda Nord	Aug 2008
Achievement of socio-economic surveys for UFE Pikounda Nord	Nov 2010
Olam International Acquires CIB	
Delivery to MDDEFE preparatory studies for development: report inventories, socio-economic, ecological study, map report	Jan 2011
Delivered to the preparatory studies MDDEFE amended	Apr 2011
Olam International undertakes REDD+ Feasibility Study	Jun-Aug 2011
RoC Submits REDD Readiness Proposal to UN-REDD	
Validation by the MDDEFE preparatory studies for the development for UFE Pikounda Nord	Jul-Aug 2011
Olam International and RoC undertake technical feasibility discussion in Singapore	Oct 2011

MDDEFE delivered to the draft management plan for the for UFE Pikounda Nord	Dec 2011
RoC introduces the North Pikounda REDD+ as a Pilot Project at COP 17 Durban, South Africa	Nov-Dec 2011
REDD+ Project Activity Begins	Jan 2012
Agreement between Olam and RoC for the development of the North Pikounda REDD+ Project signed	May 2012
Initial REDD+ Project Steering Committee meeting is held in Pokola	Sep 2012
Management Plan of UFE North Pikounda provided to MDEDEF	Oct 2012
Approval by MDDEFE of the Management Plan of UFE North Pikounda	Feb 2013

CIB has approved Forest Management Plans for all of its other concessions.

Within a Forest Management Plan of the RoC, forest can be divided in different "management series" which correspond to their respective objective or purpose of management. These objectives can be:

a. **Production Areas**: allocated to timber harvesting;
b. **Conservation Areas**: preservation& research of the various different ecosystems;
c. **Protection Areas**: buffer zones and swamp areas that are not allowed to be logged; and
d. **Community Development Areas**: for local population use only (farming, hunting, fishing and harvesting of non-timber products).

In accordance with concession management practices in the RoC, CIB, in the development of the proposed management plan, has classified the concession into production areas and non-production areas. Production areas are dry land mixed forest areas while the wetland areas (constituted of flooded forests, riverine and riparian forests, swamps) will be included in the Protection Area management series.

Forest Type	Area (GIS)	
	(ha)	(%)
Dry land mixed Forest (Production Area)	55,950	60.5
Wetlands areas (Protection Area)	36,570	39.5
Total North Pikounda UFE	**92,530**	**100**

Table 7 - Proportion of forest types in the North Pikounda UFE

1.10.1 Forest Management Plan for Selective Harvesting

On or about the 13th November 2002, CIB was issued a CAT for Pokola UFA and North Pikounda UFE by the MEFDD, as the CAT was signed on behalf of the RoC by Minister Henri Djombo and by Director General Jean Marie Mevelec for CIB.

In 2011/2012 CIB produced a forest management plan entitled "*Plan d'Amenagement De L'Unité Forestière D'Exploitation De Pikounda-Nord (2012-2031) version 2*" which was submitted to the MEFDD and approved in February of 2012

The Forest Management Plan for Pikounda Nord UFE includes different studies: a forest inventory report, an environmental impact study, a socio-economic study, a large-mammal survey and a cartography report. The initial inventory work began in 2003 with the forest resource inventory.

1.10.2 Human Habitation

For the preparation of the Management Plan, CIB has undertaken studies with international consultants (Pierre, 2004 ; Leclerc, 2004 ; Pierre *et al*., 2010), which have been completed by CIB's own social team. Those studies concluded that there are no people living within the concession area, nor have local communities been believed to be residing in the area for the past 50 years. It is further understood that in general, the local population does not enter the North Pikounda area3 due to natural barriers that surrounds the area. The closest community (Molenda) is over twenty kilometers away, and access to the concession would require crossing the Ebangue River and then trekking twenty kilometers overland through dense and mostly swampy forest with no paths, let alone roads. This lack of access is ideal for a forest protection project of this type.

The socio-economical studies that has been undertaken for the Forest Management Plan preparation have shown that Molenda community traditional land use does not overlap with CIB concession (see Figure 7 next page).

Currently, road access to the North Pikounda UFE is only from a single forest access road through the IFO concession, to the North of the project area. This road has been reopened solely for the purpose of the Project (carbon inventory and control). The access to this road is controlled by eco-guards under the responsibility of IFO (this company is FSC certified). Within the concession itself, there are no roads whatsoever.

Illegal logging, forests fires, slash and burn agriculture or other reversals have not occurred on the property in the past.

[3] Socio-economical study for North Pikounda UFE, Etude socio-économique de l'UFE Pikounda Nord

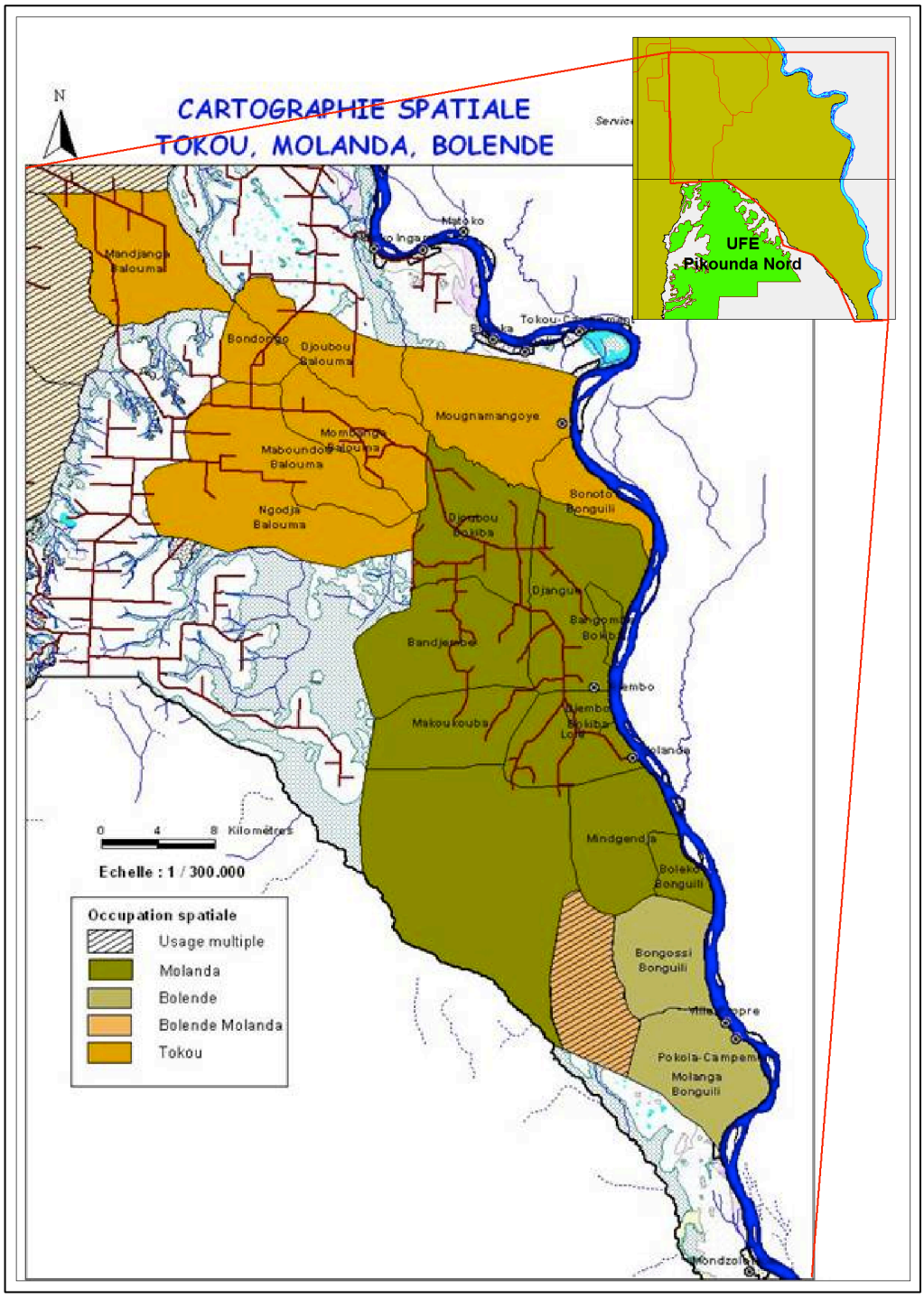

Figure 7 - Local communities land use map (Management Plan – 2012)

1.10.3 Biodiversity Condition

The North Pikounda UFE are old-growth forests, as it has never been commercially logged and its remoteness as indicated above means that habitation and hunting in the past has been extremely limited. This remains true today.

A. Flora

Northern Congo forests formations can be included in the tropical semi-evergreen forests (de Namur, 1990), which correspond to a transition formation between evergreen and semi-deciduous forests (Vivien and Faure, 1985; White, 1986).

The project area is stratified into two stratum: production forests (dry land mixed forests) and protection forests (wetlands). Table 7 summarizes the area per strata. For more explanation about the stratification process, please refer to ***Appendix 02***, chapter 1 and Lembe (2012) report.

Figure 8 represents the general stratification of North Pikounda UFE.

Dry land mixed forests

Dry land mixed forest represents 55,950 ha or around sixty percent (60%) of the North Pikounda UFE.

These forests are characterised by a complex structure, a high vegetal diversity and a heterogeneous physiognomy. The under-storey is very dense, made of liana-like giant herbaceous species such as *Hamania, Marantaceae* (i.e. *Megaphrynium, etc.), Zingiberaceae* (i.e. *Aframomum, Costus, etc.)* and *Commelinaceae* (i.e. *Palisota*, *etc*.) and hereafter designated as *Marantaceae*. The *Marantaceae* are generally 3 meters in height and can reach 6 meters around trees. Tree height can be greater than 50 meters and the diversity in tree species is high. The forests contains most of the key commercial species such as *Sapelli* (*Entandrophragma cylindricum*) *Sipo* (*Entandrophragma utile)* and *Wengé* (*Millettia laurentii*).

Depending on the canopy opening and the under-storey structure, it is possible to distinguish three different forests structures:

1. "**dense**" canopy forests, where tree crowns are adjoining and the under-storey generally open to dense;
2. "**light**" canopy forests, with a discontinuous canopy and a dense understory difficult to penetrate; and
3. "**open**" canopy forests with a very dense under-storey of *Marantaceae* (generally Megaphrynium).

The various formations compose a forest mosaic and the variations between the 3 structures are progressives (i.e. they act as a continuum). It is often difficult to differentiate them in the field or by the use of remotely sensed imagery (Laporte, 2002 ; Laporte & Lin, 2004 ; Gillet 2006 ; rapport d'inventaire d'aménagement).

Wetlands

Wetlands, depending on the degree of hydromorphy, include: (1) swamp forests perpetually flooded; (2) periodically flooded forests of the alluvial plains; (3) riparian forests bordering the rivers; and (4) swamps.

Tree height varies between 15 and 30 meters. Vegetation in wetlands is dominated by some species such as *bahia* (*Hallea ciliata*), water *padouk* (*Pterocarpus osun*), water *bubinga* (*Guibourtia demeusei*), water *ilomba* (*Pycnanthus marchalianus*), *limbali* (*Gilbertiodendron dewevrei*), *rikio* (*Uapaca* spp.), *eyoum* (*Dialium* spp.), *ayinda* (*Anthocleista* spp.), *ossol* (*Symphonia globulifera*), *Sterculia suaviolacea*, etc.

Wetlands are not logged under normal condition and thus will not be part of the crediting area.

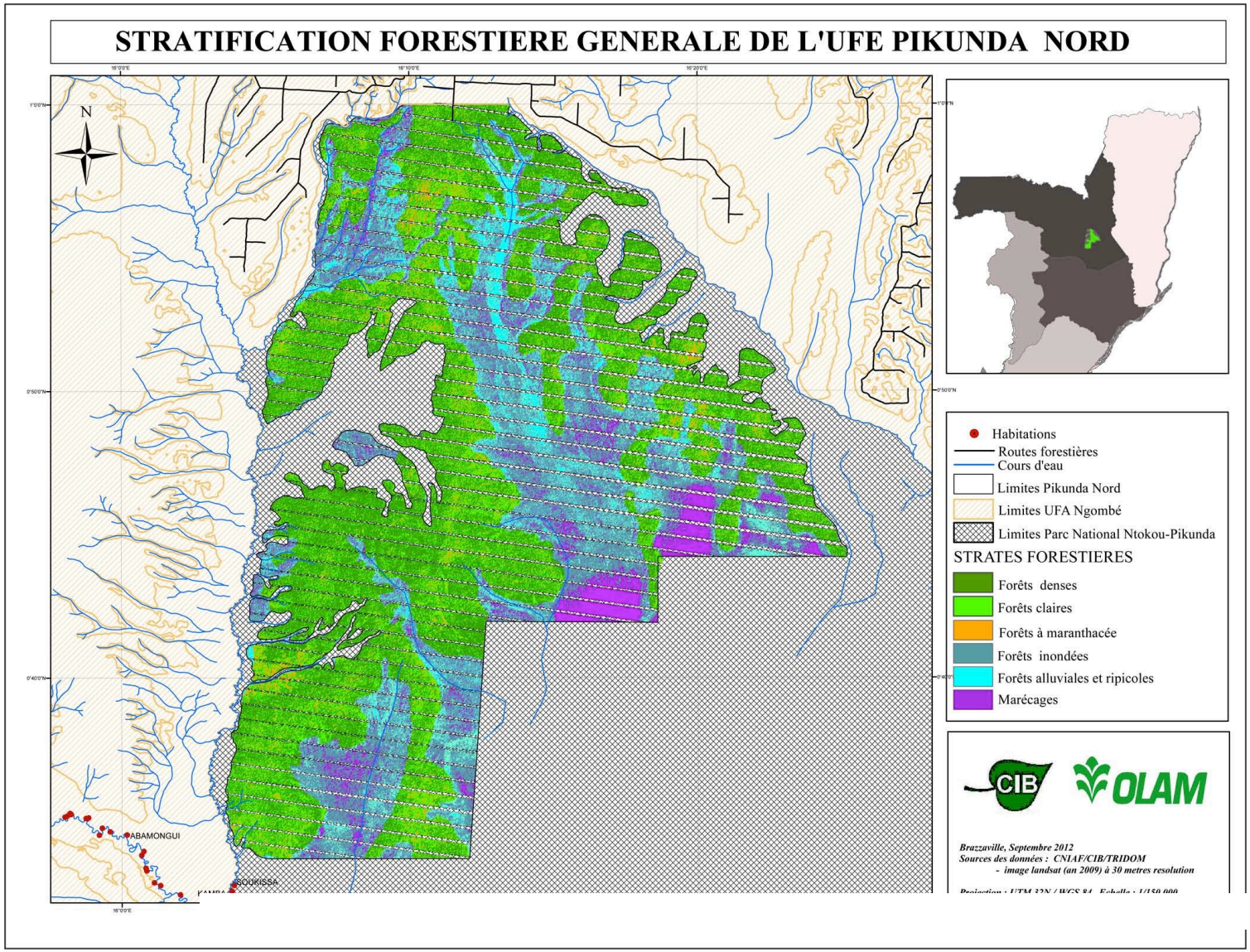

Figure 8 - General stratification map

Protected Species

The table below provides the protection status of the rare species inventoried (as part of the forest management planning process) as considered by both the International Union of Concerned Scientists (IUCN) and the Convention on international Trade in Endangered Species of Wild Fauna and Flora (CITES).

Common Name	Scientific Name	CITES Status	IUCN Status
Mukulungu	*Autranella congolensis*	Not Listed	CR
Afrormosia	*Pericopsis elata*	Appendix I	EN
Agba	*Prioria balsamifera*	Not Listed	EN
Ebène noir	*Diospyros crassiflora*	Not Listed	EN
Pao rosa	*Bobgunnia(=Swartzia) fistuloides*	Not Listed	EN
Wengué	*Millettia laurentii*	Not Listed	EN
Acajou	*Khaya anthotheca*	Not Listed	VU
Azobé	*Lophira alata*	Not Listed	VU
Bilinga	*Nauclea diderrichii*	Not Listed	VU
Bosse clair	*Guarea cedrata*	Not Listed	VU
Dibétou	*Lovoa trichilioides*	Not Listed	VU
Doussié	*Afzelia bipindensis*	Not Listed	VU
Eyong	*Eribroma oblongum*	Not Listed	VU
Iroko	*Milicia excelsa*	Not Listed	VU
Kanda	*Beilschmiedia spp*	Not Listed	VU
Kosipo	*Entandrophragma candollei*	Not Listed	VU
Koto	*Pterygota spp.*	Not Listed	VU
Sapelli	*Entandrophragma cylindricum*	Not Listed	VU
Sipo	*Entandrophragma utile*	Not Listed	VU
Tiama	*Entandrophragma angolense*	Not Listed	VU
Ayous	*Triplochiton scleroxylon*	Not Listed	LC
Iatandza	*Albizia ferruginea*	Not Listed	LC

Table 8 – IUCN / CITES status for species present in Congo

(LC : Least Concern; VU: Vulnerable; EN: Endangered; CR: Critically endangered)

B. Fauna

Nearly 60 mammal species are present in North Congo, including the African Forest Elephant, lowland gorillas, chimpanzees, bongos, leopards and hippopotamuses, many of which are known to be within the North Pikounda concession. It should be further noted that 13 species are integrally protected in Congo species and also have IUCN status and/or CITES status (see below).

Common Name	Local name (Lingala)	Scientific Name	CITES Status	IUCN Status[4]
Bongo	*Mbongo*	*Tragelaphus euryceros*	Not Listed in Congo	NT
Water Chevrotain	*Mbenguéné*	*Hyenoschus aquaticus*	Not Listed	LC
Hippopotamus	*Ngoubou*	*Hippopotamus amphibius*	Appendix II	VU
Leopard	*Koyi*	*Panthera pardus*	Appendix I	NT
Honey Badger	*Kwokwoto*	*Mellivora capensis*	Not Listed in Congo	LC
Giant Pangolin	*Kélépa*	*Manis gigantea*	Appendix II	NT
Agile Mangabey	*Tamba*	*Cercocebus galeritus agilis*	Appendix I	LC
Robust Chimpanzee	*Soumbou*	*Pan troglodytes*	Appendix I	EN
Guereza	*Kalou*	*Colobus guereza*	Appendix II	LC
Uhehe Red Colobus	*Niaou*	*Colobus badius*	Not Listed	EN
Lowland Gorilla	*Ebobo*	*Gorilla gorilla gorilla*	Appendix I	CR
African Forest Elephant	*Njokou*	*Loxodonta cyclotis*	Not listed but may be coverd under Appendix II	VU
Aardvark	*Kpigna*	*Orycteropus afer*	Not Listed	LC

Table 9 - Protected Large Mammals Present in the North of Congo (Poulsen and Clark, 2005)

The North Pikounda concession provides shelter for important large mammal populations, particularly lowland gorillas and elephants. The lowland gorilla, a charismatic and critically endangered species, lives within the concession with high concentrations found to the south. Inventories have shown that the lowland gorilla population density in Pikounda is one of the highest in Central Africa (Poulsen and Clark, 2005) with more than 10 nests/ km, i.e., almost 6,000 individual in the concession, located mostly in the north and eastern part of the Project Area.

To compare, the table below indicates different nest densities from different studies in the Northern Congo.

[4] IUCN Red List of Threatened Species, Version 2011.1.

Figure 9 - Lowland gorilla

(credit: CIB)

Area	Gorilla density (ind.km^{-2})	Sources
UFA Pokola	2.2	Poulsen & Clark, 2005
PN Odzala-Kokoua	3.7	Blake, 2006
UFA Ngombé	4.2	Kiminou *et al*, 2007
Ntokou	4.6	Malonga *et al*., 2007b
UFA Pikounda	4.7	Malonga *et al*., 2007a
UFE Pikounda-Nord	**10.6**	Poulsen & Clark, 2005
PN Odzala-Kokoua	11.3	Bermejo, 1999
Lac Télé	12.2	Poulsen & Clark, 2004

Table 10 - Gorilla Density Comparison in Northern Congo

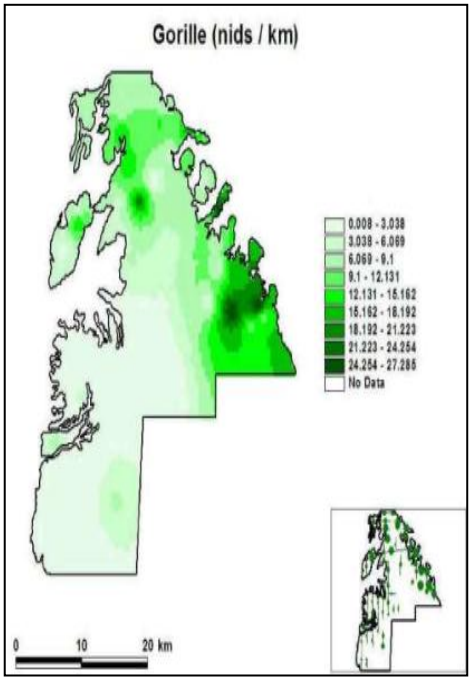

Figure 10 – Gorillas nest concentration in Pikounda

Elephants are also classified as a vulnerable species on the IUCN Red List.[5] Their density is relatively high in Pikounda with 0.81 to 1.38 capita per km², mostly in the northern part of the concession[6]. These densities are high compare to densities observed in neighbouring Nouabalé-Ndoki Park[7,8] of 0.6 elephant / km² and 0.9 elephant / km².

Figure 11 - African forest elephant on a logging road

(credit : CIB)

[5] Blanc, J. 2008. *Loxodonta Africana*, in IUCN, IUCN Red List of Threatened Species, Version 2011.1.
[6] Poulsen J.R. & Clark C.J. (2005), supra
[7] Blake 1994 *in* Poulsen & Clark, 2005, supra
[8] Carroll, 1988 et Faye & Agnagna 1991 *in* Poulsen & Clark, 2005, supra

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

Overview

CIB, CIB-OLAM, Olam International and Carbon Conservation will comply with all applicable local, district and national laws, regulations and standards. Within the Project area, none of the proposed Project Activities violate any law. The government of the Republic of Congo owns the land in the Project Area but North Pikounda UFE is defined by ministerial decree and CIB, as the Project Proponent is the legal concessionaire of the UFE. CIB has an approved Forest Management Plan for the Project Area. The Project Proponent owns the rights to the sequestered carbon in the project area.

1.11.1 Forestry Laws and Regulations

The Forest Management requirements and planning of the North Pikounda UFE is provided by Congolese Forestry Law, on the one hand it is a tool for planning and management of industrial forestry activity and, on the other hand it is the legal frame of reference for the development and harvesting plan of forest as well as the entire management arrangements needed to ensure the integrity of the private domain of the State. The management plan is approved by decree of the Council of Ministers. The North Pikounda UFE Management Plan was approved in this way in February of 2012.

The legislative and regulatory framework, which supports and regulates the development and management plan of a UFA or UFE is based on the following texts:

• Law No. 16-2000 of 20 November 2000 Forest Code and its implementing regulations, including Decree No. 2002-437 of 31 December 2002 establishing the conditions for management and use of forests; this Act is being revision.

• Law No. 003-91 of 23 April 1991 on environmental protection;

• Law No. 37-2008 of 28 November 2008 on wildlife and protected areas;

• Law No. 10-2004 of 26 March 2004 laying down general principles applicable to a plan Land Law, including the rights of individuals and legal entities on land.

1.11.2 Corporate Laws

Loi N° 19-2005 of 24 November February 2005“ regulates commercial activity in the Republic of Congo.

Congolaise Industrielle des Bois (CIB), is a Limited Company with a Board of Directors duly registered in the Republic of Congo as of 30th May 1968 and the company registration number is CG-OUE-RCCM-05-B-179.

CIB-Olam is authorised to engage in forest production activity based on the Certificat DÁgreement No 005 /MEFDD/CAB/DGEF/DVRF-SIB singed on 15 January 2013

1.11.3 Labor Laws

The mutual rights and obligations that govern the relations between CIB, the holder of the Forest Management Plan, and the company personnel, their dependents (wife (s) and children living under the roof) are defined within the following texts:

• Labor Code of the Republic of Congo, Law 45/75 of March 15, 1975 and Law No. 6/96 of 6 March 1996;

• Collective Agreement logging and agricultural dated 23 April 1974, revised March 7, 1992;

• Order No. 0780/MTPSI.DGT.DRTSS.3/3 of 24 February 1975 extending in the People's Republic of Congo to the collective agreement for agricultural and forestry operations on 23 April 1974.

The regulations concerning the rights and mutual obligations of the company and its employees do not directly govern the Forest Management Plan, but constitute a regulatory framework annex, that serve to underpin the guidelines for socio-economic development linked to the living conditions and activities of employees and their dependents (MOU, worker rules, amendment of the management of hunting, activity, etc.).

1.11.4 International Agreements

The Republic of Congo is party to the United Nations Framework Convention on Climate Change, being a signatory as of 12 June 1992, where the Convention was ratified on 14 October 1994 and entered into force on 12 January 1997. On 12 January 2007, the Republic of Congo ratified and acceded to the Kyoto Protocol.

Internationally, the Republic of Congo has also ratified several international conventions on the protection of the environment and is a signatory to the following other relevant international agreements dealing with the environment and the protection of biodiversity:

Table 11 - Applicable International Agreements list

Convention or Agreement	Date of Entry / Ratification
Paris Convention on World Cultural and Natural Heritage, UNESCO, 1972	12 October 1987
Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	31 January 1983
RAMSAR Convention on Wetlands of International Importance, 1971	18 October 1998
Bonn Convention on Migratory Species of Wild Animals, 1979	01 JANUARY 2000
International Agreement on Tropical Timber, January 26, 1994 (adoption Geneva, 2006)	31 Jul 2008
Convention on Biological Diversity, Rio, 1992	11 June 1992
United Nations Convention on Action against Desertification in Countries Experiencing Serious Drought and / or Desertification, Particularly in Africa, Paris, 1994	12 July 1999

Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora, 1994	10 December 1996
COMIFAC Treaty, Yaounde, 2002	05 February 2005

Further, Congo is a member of the International Tropical Timber Organization (ITTO), the African Timber Organization (ATO), the Conference on Forest Ecosystems in Central Africa (CEFDHAC), the Organization for Wildlife conservation in Africa (OCFSA) and the International Union for Conservation of Nature (IUCN).

The North Pikounda REDD+ Project aims to attain its objectives in term of climate change, biodiversity, fauna, flora wetlands conservation and sustainable use of forests ecosystems, in part through the application of rule of law and the MEFDD process of the RoC.

1.11.5 Legal Agreements between CIB and the Republic of Congo

Extraction and Carbon Rights

The North Pikounda UFE is part of the private domain of the state which has been established and having as its main purpose the undertaking of forestry production activities by regulations (Articles 10 and 65 of Act 16-2000). The limits of North Pikounda UFE are defined by ministerial decree (decree n°8233/MEF/CAB approved 05th October 2006)

The Agreement of Development and Processing - No 12/MEFPRH/CAB/DGEF/DF-SGF 13/11/2002 signed between the Congolese government and Congolese Industrielle des Bois (CIB) and Order No. 5856/MEF / CAB / DGEF / DF-FMS 13/11/2002 approving the agreement to assign the Unit of Forest Exploitation (UFE) Pikounda North for a period of 15 years from the date of signing of the order of approval.

As such exploitation (Articles 65, 66, 67, 68 and 72 of Act 16-2000) includes the Convention itself that determines the rights and obligations of the parties, and the particular specifications that specify the details of the tenderer, in particular regarding the forest management plan, operations, industrial facilities, vocational training and social infrastructure.

The Government of the Republic of Congo, through his Excellency Henri DJOMBO, Minister of Sustainable Development and the Forest Economics of the Environment contracted, together with CIB, on 24 May 2012,in order that CIB might undertake the “development and implementation of the Pilot REDD+ North Pikounda UFE” signed a REDD+ project development agreement. The project was to be a “REDD+ pioneer project for the improvement of sustainable forest management of natural tropical forests in the Congo Basin including [for CIB,] the right to hold and commercialize the carbon credits from this Project”. The Agreement agreed to a 30 years Project timespan and a corresponding grant to CIB to maintain the North Pikounda UFE license for the same period.

Moreover, the agreement signed, required the establishment of a Republic of Congo led “North Pikounda REDD+ Project Steering Committee.

The agreement transfers the obligation of project development and of the underlying carbon rights to CIB, and states the roles and obligations of the two parties to that agreement, the project time period, as well as revenue sharing with the government and local communities,

The North Pikounda UFE Concession License

On 13 November 2002 CIB was issued its "*Convention d'Aménagement et de Transformation, pour la mise en valeur des Unitées Forestière d'Amenagement Pokola et de l'Unite Forestière d'Exploitation Pikounda Nord situées dans la région de la Sangha*" (CAT) (Which translates as: Convention of Installation and Transformation, for the development of the Units Forestiere d' Amenagement Pokola and the Unit Forestiere d' Exploitation Pikounda North situated in the area of Sangha). The CAT was signed on behalf of the RoC by Minister Henri Djombo of the MEFDD and by Director General Jean Marie Mevelec for CIB.

On the same day, both Pokola and North Pikounda were issued, by Minister Henri Djombo, their "*Cahier de charges particulier relatif a la convention d'aménagement et de transformation conclue entre le gouvernement congolais et la congolaise industrielle des bois, pour la mise en valeur de l'UFA Pokola et de l'UFE Pikounda Nord, situées dans la région de la Sangha*" (Which translates as: Specifications relating to the convention of installation and transformation concluded between the Congolese government and the CIB, for the development of the UFA Pokola and of the UFE of North Pikounda, situated in the area of Sangha).

1.11.6 Forestry and Environmental Taxes

The various forest and environmental taxes (Articles 48, 87 to 100, 179 and 180 of the Act 2000-16) currently in force in the Congo and which could potentially impact the North Pikounda UFE site are presented in Table 12.

Table 12 - Forestry and Environmental taxes in North Congo (Zone IV)

Type of tax	Rate	References:
Surface Tax	350 FCFA /ha	Order No. 6382 of 31/12/02
Deforestation Tax	50,000 FCFA / ha (based life and roads)	Order No. 6380 of 31/12/02
Harvesting Tax	3% of FOB value of the gross volume	Order No. 6378 of 31/12/02
Export tax of logs	8.5% of FOB value	Order No. 6383 of 31/12/02
Export tax on sawn wood	dried lumber: 1.5% of FOB value sawn wet: 3.5% of FOB value	Order No. 6383 of 31/12/02
Tax control of forest products for export	1% of FOB value	Decree 2002-436 of 31/12/02 (Article 18)
Taxes on forest products accessories	(pm)	Order No. 6379 of 31/12/02

Areas of forestry taxation are determined by Order No. 6386 of 31/12/02. FOB values for calculating the harvesting tax and export tax of wood are fixed by Order No. 7840 MEF / MEFB of 14/09/09.

These taxes, remain in effect despite the Project being an Avoided Planned Degradation Project and no harvesting is taking place; CIB is still required to pay the Surface Tax.

1.12 Ownership and Other Programs

1.12.1 Right of Use

The Congolese forestry domain consists of the state forest estate and the private forest estate[9]. The State forest estate is divided between the non-permanent forest estate and the permanent forest estate. The permanent forest estate includes land allocated for forests and wildlife habitat[10] and also includes private state forest estates, municipal, local community or territorial forest estates and forest estates owned by legal persons[11].

Forests in the private domain of the State include gazetted forests for protection, natural forest conservation, recreational forests, experimental forests and ***production forests***[12].

CIB holds the Pikounda UFE (among others) production forest concession as a forest owner in the private domain. It holds the license through a number of legally issued agreements with the RoC so that CIB may exploit the forest product, specifically the timber, within the licensed concessions. CIB has been a concession holder in RoC since 1968 when it integrated two timber firms: SFS (*Société Forestière de la Sangha*, Forest Sangha Society, created in 1953) and IBOCO (a sawmill in Brazzaville) created in 1961; with its head office is located at Ouesso

On the 13th November 2002, the CAT for Pokola FMU and North Pikounda FLU by the MEFDD was signed, as the CAT was signed on behalf of the RoC by Minister Henri Djombo and by Director General Jean Marie Mevelec for CIB.

The formal license granted is entitled:

"*Convention d'Amenagement et de Transformation, pour la mise en valeur des Unites Forestiere d'Amenagement Pokola et de l'Unite Forestiere d'Exploitation Pikounda Nord situees dans la region de la Sangha*"

Which translates as: Convention of Installation and Transformation, for the development of the *Units Forestiere d' Amenagement Pokola* and the *Unit Forestiere d' Exploitation Pikounda Northern situees* in the area of Sangha.

On the same day, both Pokala and North Pikounda were issued by MEFDD Minister Djombo, through the "*Cahier de charges particulier relatif a la convention d'amenagement et de transformation conclue entre le gouvernement congolais et la congolais industrielle des bois, pour la mise en valeur de l'UFA Pokola et de l'UFE Pikounda Nord, situees dans la region de la Sangha*." (Which translates as: Specifications relating to the convention of installation and transformation concluded between the Congolese government and the CIB, for the development of the UFA Pokola and of IUFE Northern Pikounda, situated in the area of Sangha.)

This document sets forth in Article 2 the fifteen (15) year duration of the production license and further requires the adoption of a management plan that is in line with the RoC forestry law.

Currently the CIB-Olam North Pikounda management plan envisions that it will harvest as mentioned above at a somewhat accelerated rate and then allow for the forest to recuperate. This 30-year management plan will require CIB –OLAM to have its license renewed during the Project term, as a concession license is only granted for 15 years at a time in RoC. This type of relicensing every 15 years is normal and something that CIB has conducted many times without issue in the past; after all CIB has been operating in that part of Northern Congo for quite a significant amount of time, with the original concession licenses spanning back to 1963.

[9] Article 3, Forestry Code
[10] Article 5, Forestry Code
[11] Article 6, Forestry Code
[12] Article 8, Forestry Code

As part of the written agreement between CIB-OLAM and the MEFDD, signed in May of 2012, the RoC through the MEFDD agreed to allow CIB to conduct the North Pikounda REDD+ Project for 30 years, granting an extension of the licence until the end of the Project.

In addition to having exploitation rights for the timber on the Pikounda CIB has received further explicit confirmation from the MEFDD in the 24 May 2012 agreement of CIB's right to conduct the REDD+ project and maintain legal title and ownership of any carbon credits originated from the Project.

1.12.2 Emissions Trading Programs and Other Binding Limits

The Republic of Congo is a non-Annex I country under Kyoto Protocol and does not have any GHG reduction commitments under the Convention. Moreover, CIB does not have any project related to carbon credit generation under the Clean Development Mechanism (CDM) or other regulatory scheme within the Project Area.

1.12.3 Participation under Other GHG Programs

This is the first and only application for this project to a Greenhouse Gas (GHG) program. No participation in any other GHG programs is contemplated at this time.

1.12.4 Other Forms of Environmental Credit

This is the first and only application for this project to a to any type of environmental credit programme, GHG or otherwise. No participation in other GHG programs is contemplated at this time.

The project may or may not become certified under the Forest Stewardship Council and/or the Climate Community & Biodiversity Alliance standards. In any case, neither of these programs issues any type of environmental credit.

1.12.5 Projects Rejected by Other GHG Programs

Not Applicable

1.13 Additional Information Relevant to the Project

Eligibility Criteria

The Project is not a grouped Project.

Leakage Management

The Leakage Management Plan and associated leakage and risk mitigation measures are set forth in paragraph 3.3 and in ***Appendix 03***.

Commercially Sensitive Information

Some annexes contain commercially sensitive information. All necessary supporting information shall be provided to the validator but may not necessarily be distributed publicly. In particular, harvested volumes necessary for the calculation of the leakage are available in appendixes 03.a, 03.b and 03.c but will not be disclosed in paragraph 4.1 "Data and Parameters Available at Validation".

Further Information

None

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

Version 1.0 of VM0011 ***Methodology for Improved Forest Management – Logged to Protected Forest: Calculating GHG Benefits from Preventing Planned Degradation***13 by Carbon Planet Limited (referred to hereafter as VM0011).

2.2 Applicability of Methodology

Table 13 below presents the methodology applicability conditions and its corresponding justifications.

Table 13 - Applicability of the methodology

Criteria	Description of Applicability Condition	Justification of Applicability
Project Type	Improved Forest Management - Logged to Protected Forest; with no removals (e.g. harvesting, planned biomass burning) occurring in the Project Area upon implementation of the actual project	The Project is avoiding legally approved and planned selective harvesting of commercial tree species and, instead, as part of the Project Activity will not remove any timber from the Project Area but will conserve, protect and monitor the Project Area for the 30 year duration of the Project
Condition of the Forest	Intact forest or previously logged forest (also known as forest degraded due to logging) Land within the Project Area must have qualified as forest at least 10 years before the project start date	Forests in the Project Area are unlogged old-growth forest and has qualified as a forest for over 10 years: 1. North Pikounda UFE has been granted to CIB in 2002 (CAT) which prove that the area is legally defined as forest in RoC. No previous administrative or logging title has been granted for this area in the past; 2. Remote sensing data (Spot 4-5 images) dating from 2012 shows no sign of past or current human activities (legal or illegal logging, slash and burn agriculture, commercial agriculture) or natural disturbances that could have changed the land status from forest to non-forested land (See

[13] http://www.v-c-s.org/sites/v-c-s.org/files/VM0011%20IFM-LtpF%20Carbon%20Planet%20FINAL%2021%20MAR%202011.pdf

		Spot images provided in ***Appendix 04***); 3. The 2003 forest resources inventory and 2012 carbon stock inventory has shown no evidence of human presence or of areas that would not qualify as "Forest".
Type of Forest	Tropical forests including evergreen tropical rainforests, moist deciduous forests, tropical dry forests and tropical upland forests, except peat swamp forests.	The Project Area is comprised entirely of tropical semi-evergreen forests and none of the area is comprised of peat swamp forests (Lembe, 2012).
Forest Product Type	Harvested wood products i.e., sawn log, pulplog and commercially harvested fuelwood (See Appendices A and B.9).	The license for North Pikounda UFE held by CIB is for the harvesting of commercial wood products, specifically round logs to be converted to sawn timber.
Drivers of Planned Degradation	Legally sanctioned logging (timber and commercially harvested fuelwood) undertaken in accordance with the relevant laws, regulations and codes of practice of the country in which the Methodology is being applied.	Legally sanctioned commercial selective timber extraction conducted according to an approved forest management plan is the only driver of degradation in the Project area; there are no nearby human activities that cause planned degradation.
Baseline Activities to be Displaced	Legally sanctioned selective logging for specific forest product types presented above	The without project or business as usual (BAU) scenario is legal commercial selective timber extraction conducted according to the Forest Management Plan approved by MEFDD
Project Area	Must be designated, sanctioned or approved by the relevant authority in the host country for the selective logging	Pursuant to the 13th November 2002, CIB was issued a "*Convention d'Aménagement et de Transformation, pour la mise en valeur des Unites Forestiere d'Amenagement Pokola et de l'Unite Forestiere d'Exploitation Pikounda Nord situées dans la région de la Sangha*" (CAT) for Pokola UFA and North Pikounda UFE by the MEFDD, as the CAT was signed on behalf of the RoC by Minister Henri Djombo and by Director General Jean Marie Mevelec for CIB.

		The CAT license granted CIB the legal right to conduct selective logging following an approved Forest Management Plan.
Carbon Pools	Carbon Pools considered: • Aboveground biomass (AGB) of all trees as defined by the relevant authority in the host country; • Harvested wood products (HWPs) based on domestic production not domestic consumption; • Deadwood (DW). Carbon Pools not considered: • Aboveground biomass (non-trees); • Belowground biomass; • Soil; • Litter.	The Project will only consider the following Carbon Pools: • **Aboveground Biomass (AGB)** of all trees as defined by the relevant authority in the host country; • **Harvested Wood Products (HWPs)** based on domestic production and on volumes granted and estimated in the approved Management Plan; • **Deadwood (DW)** as defined in the methodology, that is: 1. Carbon from residual stand damage; and 2. Carbon in branches and trimming left after harvesting of the merchantable logs. The following Carbon Pools as set forth in VM0011 are not considered: • Aboveground biomass (non-trees); • Belowground biomass; • Soil; and • Litter.

2.3 Project Boundary

2.3.1 Physical Project Boundaries

Please refer to paragraph 1.9.1 for a description of the North Pikounda UFE Project Area.

The total area for the Project Area given by GIS data is 92,530 ha. Of this, 55,950 ha are considered production area and will constitute the project crediting area. The remaining 36,580 ha are wetlands that would have seen no disturbances under the baseline scenario.

2.3.2 Stratification of the Project Area

An initial stratification of the project area has been proposed in the Management Plan. As seen in previous chapters, and in particular in paragraph 1.10.3 A/ Flora, the project area was stratified into

two stratum consisting of dry land mixed forests dedicated for harvesting and wetlands designated for conservation.

For the purpose of the present project, a new stratification study was undertaken to try to indicate with greater precision the sub-stratum for the already identified main stratum (G. Lembe, 2012). Based on an analyse of 2010 SPOT4/5, 2009 LANDSAT 7 ETM+ and 2007 ASTER images, together with analyse of topographic maps, data of the forest resources inventory and other data, the report concluded that it was not possible to determine additional strata and confirmed that the strata already identified were the best to describe the state of the forests and the different forest cover types in North Pikounda UFE.

The stratification strategy and results are provided in ***Appendix 02***. Figure 8 p.27 present the general stratification of the North Pikounda UFE.

Error! Reference source not found. next page presents the two strata retained for the baseline scenario for North Pikounda UFA:

- In black, the wetlands covering 39.5% of the project area, that are excluded from the crediting area, as they would not have been impacted by harvesting under the baseline scenario;
- In gradation of green and orange, the dryland mixed forests, covering 60.5% of the project area, which constitute the crediting area. For this stratum, we have represented the variations of forest structure: Dense canopy forests in dark green, Light canopy forests in light green and Open canopy forests in orange.

2.3.3 Leakage area

Forest zones in the Congo are separated into two different entities: Northern forests and South Western forests. The concessions installed in the Northern forests are similar in regards to forest type and climatic region, size, and the concessions are all operating with a similar kind of management plan. The operations in the South-Western forests are local companies with smaller size concessions, and the forests have been harvested several times through history as they are coastal forests and have a close proximity to the Congo River for log transport. The Northern Forests are divided further into two departments or regional administrative structures, i.e. the Likouala and the Sangha. All concessions pertaining to these departments are included as part of the Market Leakage area for the IFM-LtPF Project. All of CIB concessions are included in this area.

2.3.4 Temporal Boundaries

The Project Area has been a forest for more then ten (10) years prior to the initiation of the Project.

The Project will have a thirty (30) years crediting period.

Verification and subsequent origination of VCUs will occur annually.

Re-assessment of the projects baseline will be done every 10 years from the Project Start Date.

The Project Baseline is a forward looking baseline (i.e. no historical baseline needed) based on an RoC approved Forest Management Plan.

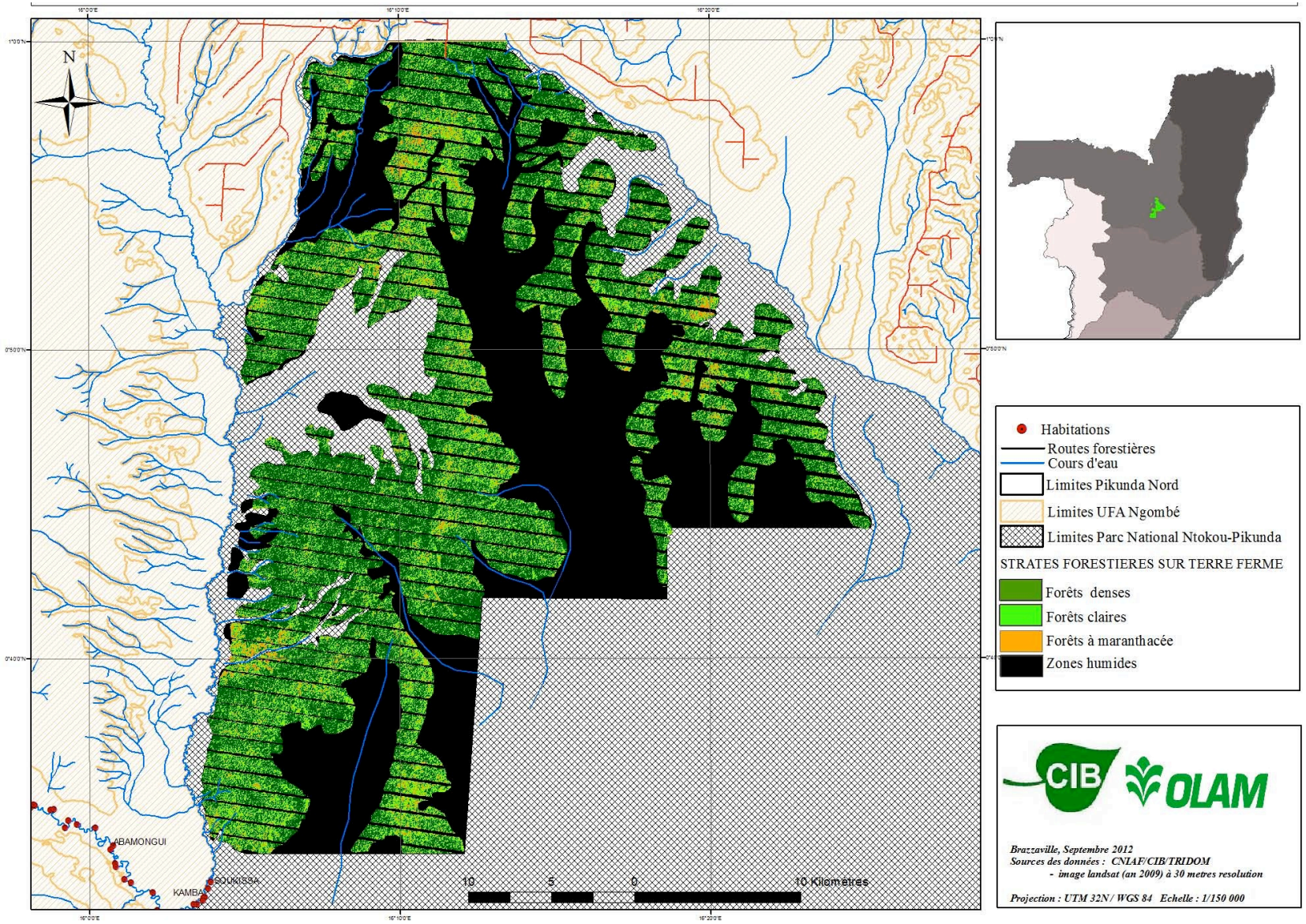

Figure 12 - Strata retained for the baseline scenario

2.3.5 Greenhouse Gas Boundaries – Baseline, Project and Leakage

The North Pikounda REDD+ Project has numerous GHG sources and sinks within the Project Area. They are set forth below in Table 14.

Table 14 - Greenhouse Gas boundaries

Source		Gas	Included?	Justification/Explanation
Baseline	**Forest Degradation**	CO_2	Yes	Since selective logging is the baseline activity. It will be determined through carbon stock assessment.
		CH_4	No	
		N_2O	No	
		Other	No	
	Fossil Fuel use in Machinery	CO_2	Yes	Since logging is the baseline activity it is included but it is subject to significance
		CH_4	Yes	
		N_2O	Yes	
		Other	No	
	Electricity Consumption	CO_2	Yes	Included while no sustainable source of electricity is installed (such as wood pellet generator)
		CH_4	Yes	
		N_2O	Yes	
		Other	No	
	Forest Fires	CO_2	No	Not included as it is not part of the methodology and forest fires do not occur in the baseline scenario as the landscape remains too moist and the vegetation is too undisturbed to support natural forest fires.
		CH_4	No	
		N_2O	No	
		Other	No	
	Commercially harvested fuelwood	CO_2	No	Not included as no local community has its territory within the project area boundaries and CIB is not harvesting timber for the purpose of producing fuelwood
		CH_4	No	
		N_2O	No	
		Other	No	
	Harvested Wood Product	CO_2	Yes	Included, as HWP are part of the normal baseline scenario that is the processing of the round logs into sawn timber that will have a significant life span.
		CH_4	No	
		N_2O	No	
		Other	No	
	Deadwood	CO_2	Yes	Included, Deadwood is part of the baseline scenario and is a normal result of harvesting activity (branches and trimmings, residual stand damage)
		CH_4	No	
		N_2O	No	
		Other	No	
	Biomass burning in the course of land use conversion	CO_2	No	Not included, as it is an unlikely scenario. No local community has its territory within the project area boundaries and the only settlements are 20 km far from the project area with no access roads
		CH_4	No	
		N_2O	No	
		Other	No	

	Embodied Carbon in AGB	CO_2	Yes	Included
		CH_4	No	
		N_2O	No	
		Other	No	
	Growth Foregone	CO_2	Yes	Included, as it is a carbon sink under baseline scenario
		CH_4	No	
		N_2O	No	
		Other	No	
	Regrowth	CO_2	Yes	Included, as it is a carbon sink under baseline scenario
		CH_4	No	
		N_2O	No	
		Other	No	
	Leakage (Activity Shifting and Market leakage)	CO_2	Yes	Included, as a carbon sources under baseline scenario
		CH_4	No	
		N_2O	No	
		Other	No	
Project Activity	**Travel (flights, ground travel)**	CO_2	No	Not significant and therefor not monitored (see paragraph 3.2)
		CH_4	No	
		N_2O	No	
		Other	No	
	Natural disturbances	CO_2	Yes	Included but subject to significance as violent flood, natural fires and hurricanes are not occurring in this area
		CH_4	No	
		N_2O	No	
		Other	No	
	Illegal logging/agriculture	CO_2	Yes	Included but subject to significance as no local community has its territory within the project area boundaries and the only settlements are 20 km far from the project area with no access roads
		CH_4	No	
		N_2O	No	
		Other	No	

2.3.6 Carbon Pools

Table 15 presents the justification for inclusion or exclusion of carbon pools in the Project, based on the VM0011 Methodology.

Table 15 - Carbon pools considered

Carbon Pool	Status for IFM-LtPF Methodology	Justification
Aboveground Biomass (tree)	Included	Anticipated to significantly increase under the project activities, or decrease due to the baseline
Aboveground Biomass (non-tree)	Not included	Unlikely to decrease as a result of the project activities, or increase due to the baseline
Belowground	Not included	Unlikely to decrease as a result of the project

Biomass		activities, or increase due to the baseline
Deadwood	Included	Anticipated to significantly decrease under IFM-LtPF
Litter	Not included	Unlikely to decrease as a result of the project activities, or increase due to the baseline
Soil	Not included	Unlikely to decrease as a result of the project activities, or increase due to the baseline
Harvested Wood Products (HWP)	Included	Anticipated to significantly decrease under the project activities

2.4 Baseline Scenario

The Project is required to Identify and justify the baseline scenario. This has been conducted according the VM0011 Methodology ”Project Baseline Justification” requirements as set forth in Section 2.1.1 – "Selection of Baseline Amongst Alternative Scenarios.”

The procedure in VM0011 has been adapted from Steps 1 and 2 of the *Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities* (CDM-EB 2007b, pp. 2-7)[14].

Selection of Baseline Amongst Alternative Scenarios per VM0011 Requirements

Step 1: Identify credible alternative baseline scenarios to the proposed VCS IFM-LtPF project activity.

Step 1a: Identify all realistic and credible alternative baseline scenarios to the proposed VCS IFM-LtPF project activity.

Alternative 1. Continuation of the Pre Project Land Use - FSC RIL Selective Harvesting: The North Pikounda Concession is logged according to the requirements of Congolese forestry regulations and also according to FSC certification standards as practiced by CIB.

The proposed scenario of selective harvesting with the application of the FSC Forest Stewardship standard for the Congo Basin Region[15] (in North Pikounda UFE). This is the same method and standard, currently existing in all of the other CIB concessions in the Republic of Congo, as well as one other concession bordering and mostly surrounding North Pikounda UFE.

The credibility of the proposition that selective harvesting would take place under the FSC standard is supported by the following six (a-f) points:

Table 16 – Alternative 1 credibility

No.	Source of Credibility	Explanation
a.	National Forestry Policy	The Republic of Congo has had as a matter of national forestry policy a written Forestry Code in place since the turn

[14] Approved VCS Methodology VM0011, Version 1, Carbon Planet 2011
[15] FSC Forest Stewardship Standard for the Congo Basin, FSC-STD-CB-01-2012-EN Congo Basin Regional Standard EN, approved April 2012

		of the century, including the Law N° 16-2000 of 20 November 2000. Further, the Forestry Code, Decree N°. 2002- 437 of 31 December 2002, which establishes conditions pertaining to the management and use of the forest including conventional selective harvesting.
b.	Economic Trends	Forestry as a sector is the second largest commercial sector in the RoC after oil, and in 2010, the ITTO estimated that the export value of Industrial Roundwood was valued at USD $85,919,500 resulted and sawnwood was valued at USD $50,786,380. The World Bank indicates that timber exports to China are increasing and that the Congo Basin now has surpassed demand from Italy, France and Spain.[16]
c.	Land Use Records	The North Pikounda UFE is a recognised forest concession in the RoC.
d.	Current Land Use Activity	Currently, the North Pikounda UFE has been approved for selective harvesting and the CIB concession has owned the licence since 2002 and has had the legal ability to begin harvesting in 2012. Further, all of CIB's other concessions are FSC certified, and in order to maintain those certifications, North Pikounda would need to be certified if it was to be harvested as well.
e.	Past Land Use Activity	The North Pikounda UFE has never been logged and is primary undisturbed forestland.
f.	Enforced Mandatory Regulations	The government of the Republic of Congo has in place the above mentioned forestry laws and regulations and all of the RoC forestry laws and regulations would be adhered to in order to maintain FSC certification.

Conclusion:

Selective harvesting, conducted according to the national Congolese standards that are currently in effect, and then further supplemented by application of the FSC standard for the Congo Basin Region, is a credible and realistic scenario and should be considered as a plausible alternative scenario to the North Pikounda REDD+ project.

Alternative 2. No Harvesting and/or Protection but without being registered under the VCS as an IFM-LtPF project *(or an other carbon standard)*: The North Pikounda UFE concession is retained by CIB or some other third party, no harvesting activity would take place and the area would be maintained and the area would be protected.

[16] Blaser, J. A. Sarre, D. Poore, and S. Johnson. 2011 Status of Tropical Forest Management 2011. Technical Series 38. Yokohama, Japan: ITTO.

This proposed alternative would see CIB or some other third party "maintain & protect" the current forest area of North Pikounda UFE that is 93,500 ha.

The proposed alternative without access to carbon finance would need to find alternative funding sources (i.e. grant funding, IGO funding, etc.) for monitoring and protection activity and cooperation with the RoC government would also be necessary in order to be viable. South Pikounda UFE, formerly part of the Pikounda UFA until 2006 (Order No. 8233/MEF/CAB from 05 October 2006) is an example of this.

Table 17 - Alternative 2 credibility

No.	Source of Credibility	Explanation
	Economic Trends	Forestry as a sector is one of the largest commercial sector in the RoC after oil, and in 2010, the ITTO estimated that the export value of Industrial Roundwood was valued at USD $85,919,500 resulted and sawnwood was valued at USD $50,786,380. The World Bank indicates that timber exports to China are increasing and that the Congo Basin now has surpassed demand from Italy, France and Spain.[17] CIB is required to pay a Surface tax for every hectare regardless if it harvests or not. Without either carbon finance or harvesting, there would be no funding for paying the Surface Tax nor any other protection activity.
	Land Use Records	Currently, the North Pikounda UFE has been approved for selective harvesting and the CIB concession has owned the licence since 2002 and has had the legal ability to begin harvesting in 2012 as per the forest management plan approved by the Ministry of Foresty[18]. The North Pikounda UFE is a recognised forest concession in the RoC. There has been past historical examples of the RoC government receiving a portion of a concession for conservation purposes, such as the use of Pikounda South UFE as a conservation area to be included in a new national conservation area.
	Current Land Use Activity	Currently, the North Pikounda UFE has been approved for selective harvesting and the CIB concession has owned the licence since 2002 and has had the legal ability to begin

[17] Blaser, J. A. Sarre, D. Poore, and S. Johnson. 2011 Status of Tropical Forest Management 2011. Technical Series 38. Yokohama, Japan: ITTO.
[18] North Pikounda Forest Management Plan

		harvesting in 2012 as per the forest management plan approved by the Ministry of Foresty[19]. If no harvesting commences on the UFE, and absent any other agreement to the contrary, the RoC by law can rescind the concessional rights that exist within the North Pikounda UFE. However, the RoC government could negotiate terms for the conservation of the area as has been done in the past.
	Past Land Use Activity	The North Pikounda UFE has never been logged and is primary undisturbed forest land
	Enforced Mandatory Regulations	The Republic of Congo forestry law requires that a concessionaire conduct the logging activity that is set forth in its license agreements. If the concession does not perform to the conditions of the license, the concession could be withdrawn. There are past examples of the government of RoC in allowing a concession area to be designated as a protection area and legally binding terms could feasibly be negotiated from a legal perspective

Conclusion:

The alternative scenario of "No Harvesting/Protection but without being registered under the VCS as an IFM-LtPF project" (or an other carbon standard) is a feasible and credible alternative scenario, however it would require specific negotiation with the RoC government and a financing mechanism to assist with resourcing the monitoring and protection of the area.

Alternative 3. Oil Palm Plantation: Engage in clear-cut harvesting and land-use change in order to plant fast growing oil palm species for production or high quality oil palm for international or domestic use.

The Palm Oil Sector is growing again in the Republic of Congo and there are areas within the Sangha Department that are currently being intensely clear felled and planted with Oil Palm by Malaysian owned entities for domestic use or for International export[20].

Table 18 - Alternative 3 credibility

No.	Source of Credibility	Explanation
	National Forest Policy	The Republic of Congo has a National Forestry policy approach that includes partial development of the nation through the growth of agro-forestry industries, including Oil Palm
	Economic Trends	Oil palm is an industry that is seeing renewed growth in the

[19] North Pikounda Forest Management Plan
[20] Etude du Secteur Agricole – République du Congo (2012), CERAPE/SOFRECO

		RoC, and despite oil palm being widely used by indigenous peoples, as a modern industry it is in its small, but set for rapid growth as the world trend for consumption of oil palm increases. The new National Highway from Brazzaville to Ouesso now could assist with the more rapid transportation of oil palm to costal ports. Processing equipment would need to be installed close to the plantation site and passable road would have to be installed to connect to Ouesso.
	Current Land Use Activity	Currently, the North Pikounda UFE has been approved for selective harvesting and the CIB concession has owned the licence since 2000 and has had the legal ability to begin harvesting in 2012 as per the forest management plan approved by the Ministry of Forestry[21]. It is feasible that if a Forest Management Plan for oil palm was submitted to the MEFDD and other legal requirements were adhered, that a concessionaire might be able to use the North Pikounda UFE as an oil palm plantation.

Conclusion:

The alternative scenario of "Oil Palm Plantation" is a feasible and credible scenario, however, it would require the alteration and subsequent approval of a forestry management plan, and it would require the building of substantial infrastructure. As there is nearby precedence of such activity, it is a feasible, although not perhaps the most likely scenario.

The following Alternative Scenarios are deemed to be credible and feasible:

Table 19 - Summary of credible potential alternatives to IFM-LtPF project

Alt. No.:	Alternative Scenario:	Description:
Alternative 1.	Continuation of the Pre Project Land Use: FSC Certified Selective Harvesting	The North Pikounda Concession is logged according to the requirements of Congolese forestry regulations and also according to FSC RIL practices by CIB
Alternative 2	No Harvesting and/or Protection but without being registered under the VCS as an IFM-LtPF project	The concession is retained by CIB or another Concessionaire and becomes an area that is not logged and the protection from planned degradation is not paid for by VCS carbon credits.

[21] North Pikounda Forest Management Plan

Alternative 3.	Oil Palm Plantation	Engage in clear-cut harvesting and land-use change in order to plant fast growing oil palm for subsequent palm oil production.

The above Alternative Scenarios are deemed to be the most credible and feasible after conducting the analysis required by Step 1, Sub-step 1a.

Sub-step 1b: Identify realistic and credible alternative baseline scenarios with "enforced mandatory legislation and regulations.

Alternative 1. FSC RIL Selective Harvesting: The North Pikounda Concession is logged according to the requirements of Congolese forestry regulations and also according to FSC RIL practices by CIB.

Alternative 2. No Harvesting and/or Protection but without being registered under the VCS as an IFM-LtPF project: The concession is retained by CIB or another Concessionaire and becomes an area that is not logged and the protection from planned degradation is not paid for by carbon credits.

Alternative 3. Oil Palm Plantation: Engage in clear-cut harvesting and land-use change in order to plant fast growing species oil palm production

Table 20 - Enforced regulations for each alternative retained

Alternative	Scenario	Enforced Regulations
Alternative 1.	FSC RIL Selective Harvesting	The North Pikounda UFE is part of the private domain of the state which has been established and having as its main purpose the undertaking of forestry production activities by regulations (Articles 10 and 65 of Act 16-2000) and subsequent Forest Management legislation, The Forest Management Plan (2012) approved by the government of RoC, which legally sanction selective harvesting, is able to be implemented. FSC harvesting is not a legal requirement, but CIB is required to use FSC certification in all of its harvesting activities.
Alternative 2	No Harvesting and/or Protection but without being registered under the VCS as an IFM-LtPF project	The North Pikounda UFE is part of the private domain of the state which has been established and having as its main purpose the undertaking of forestry production activities by regulations (Articles 10 and 65 of Act 16-2000) and subsequent Forest Management legislation South Pikounda UFE, formerly part of the Pikounda UFA until 2006 (Order

		No. 8233/MEF/CAB from 05 October 2006) is an example of how a concession area can be altered to providing protection for an area otherwise subject to selective harvesting. Any special legal action to undertake such action, it is legally feasible
Alternative 3.	Oil Palm Plantation	The North Pikounda UFE is part of the private domain of the state which has been established and having as its main purpose the undertaking of forestry production activities by regulations (Articles 10 and 65 of Act 16-2000) and subsequent Forest Management legislation

Conclusion:

All of the alternatives: one, two and three; have applicable enforced mandatory legislation and regulations.

Table 21 below indicates the remaining realistic and credible baseline scenarios that have enforced mandatory regulations:

Table 21 - Remaining realistic and credible baseline scenarios

Alt. No	Remaining realistic and credible baseline scenarios
Alternative 1.	FSC RIL Selective Harvesting
Alternative 2.	No Harvesting and/or Protection but without being registered under the VCS (*or other carbon standard*) as an IFM-LtPF project
Alternative 3.	Oil Palm Plantation

STEP 2: Determine Alternative Baseline Scenarios

Sub-step 2a: Identify barriers that would prevent the implementation of at least one alternative baseline scenario.

Table 22 - Identified barriers for each alternative scenario

Alternative. No	Scenario	Identified Barriers
1.	**FSC RIL Selective Harvesting**: The North Pikounda Concession is logged according to the requirements of Congolese forestry regulations and also according to FSC RIL practices by CIB	No barriers identified
2.	No Harvesting and/or Protection but without being registered under the	- Institutional Barriers: the lack of government resources and the

	VCS (*or other carbon standard*) as an IFM-LtPF project: The North Pikounda UFE is protected from harvesting.	inability of the state to effectively protect the area as well as substantial internal government resistance to creating conservation areas that do not promote the development of the country. - Contrary to prevailing practices of logging forest concessions.
3.	**Oil Palm Plantation:** Engage in clear-cut harvesting and land-use change in order to plant fast growing eucalyptus species for pulp & paper production	- Infrastructure Barriers:- Because of the remoteness of the North Pikounda UFE, there may be a lack of access to necessary material & infrastructure for implementation. - Absence of nearby large scale processing facilities to convert and add value to the Oil Palm fruit bunch. - Difficulty of transporting product to market.

Sub-step 2b: Eliminate baseline scenarios that are prevented by the identified barriers

Alternative 2 – No Harvesting and Protection without carbon finance is eliminated as an alternative baseline scenario as there are substantial structural and institutional barriers that prevent the long term implementation of protection of the Pikounda area without carbon finance.

Because of the interest at very high-levels the RoC government of REDD+ as a mechanism to originate carbon offsets as well as providing multi-stakeholder benefits, it has been substantially less difficult to initiate a 93,000ha stop logging area. The benefit that RoC can see of a potential carbon market to the country is highlighted by its deep involvement in the World Bank's FCPF & CF and the UN-REDD+ Program, and is a regional leader as it seeks to use REDD+ to be the basis of a LEDS. A conservation program without carbon finance is unable to establish itself in the same rapid and effective manner as the NPR+ Project.

Alternative 3 – Oil Palm Plantation is eliminated as an alternative baseline scenario as there are barriers to access the necessary material & infrastructure for implementation as well as an Absence of nearby facilities to convert and add value to the Oil Palm.

Sub-step 2c: Determine the baseline scenario

Refined List of Alternative Scenarios	
Alternative 1.	**FSC RIL Selective Harvesting**: The North Pikounda Concession is logged according to the requirements of Congolese forestry regulations and also according to FSC RIL practices by CIB

VM0011 does not require that an "investment analysis" be conducted as per Step 3. of the *Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities.*

Establishment of the Baseline Scenario: Selective Logging

The most conservative baseline scenario for the North Pikounda REDD+ is FSC RIL Selective Harvesting.

This is supported by:

(i) Documented history (well beyond 10 years) of the selective logging practices of CIB
(ii) The legal requirement of forest management and land use in the area are met;
(iii) Proof that the FSC Forest Stewardship standard for the Congo Basin Region surpasses the legal requirements of the Republic of Congo.

The Baseline Scenario of Selective Logging represents what would have most likely occurred in the absence of the IFM-LtPF North Pikounda REDD+ Project.

2.4.1 Description of the Baseline Scenario

Species and volumes harvested

The Project's baseline scenario is mechanised commercial selective logging under Forest Stewardship Council (FSC) Guidelines and supported by a Forest Management Plan that has been approved by the MEFDD. This is the harvesting method that is employed in all of CIB's concessions in the RoC, which currently is about 1.4 million ha.

The North Pikounda UFE approved management plan will have a rotation length of 30 years, but with a harvesting period of twenty (20) years only. The final ten (10) years will allow the forest to regenerate itself after harvesting operations.

Table 23 below presents the species from the Management Plan retained for the baseline scenario, together with their respective DMA (*Diamètre Minimum d'Aménagement* – Minimum Diameter of harvesting). It is important to note that the DMA is superior or equal to the legal diameter for harvesting as defined by Congolese legislation. Those species have been selected based on the results of the Management Forest resources Inventory".

Table 23 - List of species retained for harvesting in the Management Plan (2012)

Common name	Scientific name	Botanical family	DMA
Principal species (*Essences objectifs*)			
Azobé	*Lophira alata*	*Ochnaceae*	80
Bilinga	*Nauclea diderrichii*	*Rubiaceae*	70
Bosse clair	*Guarea cedrata*	*Meliaceae*	70
Iroko	*Milicia excelsa*	*Moraceae*	80

Padouk	*Pterocarpus soyauxii*	*Papilionaceae*	80
Sapelli	*Entandrophragma cylindricum*	*Meliaceae*	90
Sipo	*Entandrophragma utile*	*Meliaceae*	90
Tali	*Erythrophleum ivorense, E. suaveolens*	*Caesalpiniaceae*	70
Wengué	*Millettia laurentii*	*Papilionaceae*	60
Promotion species (Essences promotion)			
Acajou	*Khaya anthotheca*	*Meliaceae*	110
Dabéma	*Piptadeniastrum africanum*	*Mimosaceae*	90
Diania PF	*Celtis tessmannii*	*Ulmaceae*	70
Dibétou	*Lovoa trichilioides*	*Meliaceae*	80
Doussié	*Afzelia bipindensis*	*Caesalpiniaceae*	60
Ebène noir	*Diospyros crassiflora*	*Ebenaceae*	90
Essessang	*Ricinodendron heudelotii*	*Euphorbiaceae*	80
Etimoé	*Copaifera mildbraedii*	*Caesalpiniaceae*	80
Eveuss	*Klainedoxa spp.*	*Irvingiaceae*	80
Fraké	*Terminalia superba*	*Combretaceae*	70
Iatandza	*Albizia ferruginea*	*Mimosaceae*	80
Ilomba	*Pycnanthus angolensis*	*Myristicaceae*	90
Kossipo	*Entandrophragma candollei*	*Meliaceae*	80
Kotibé	*Nesogordonia papaverifera*	*Sterculiaceae*	60
Koto	*Pterygota spp.*	*Sterculiaceae*	80
Lati	*Amphimas ferrugineus, A. pterocarpoides*	*Caesalpiniaceae*	90
Limbali	*Gilbertiodendron dewevrei*	*Caesalpiniaceae*	90
Longhi abam	*Gambeya lacourtiana*	*Sapotaceae*	70
Longhi perp	*Gambeya perpulchra*	*Sapotaceae*	70
Mambodé	*Detarium macrocarpum*	*Caesalpiniaceae*	80
Niové	*Staudtia stipitata*	*Myristicaceae*	60
Ohia	*Celtis mildbraedii, C. zenkeri*	*Ulmaceae*	70
Olon	*Zanthoxylum spp*	*Rutaceae*	60
Tiama	*Entandrophragma angolense*	*Meliaceae*	90

The harvestable volumes for the commercial species have been estimated using one entry allometric equations called “Tarifs de Cubage” in French. Those allometric equations estimate the volume of harvested log (merchantable volume) based on the measured diameter at breast height (1.30 m). The study allowing designing those equations is presented in ***Appendix 06*** (MEFDD-CIB, 2010).

Table 24 - Allometric equations retained for merchantable volumes estimation (MEDDFE-CIB, 2010)

Tree species	Allometric equation (*Tarif de Cubage*)	Source
Acajou	$V = -0{,}95804511 + 11{,}6256093 \times D^2$	CIB/CNIAF
Azobé	$V = 11{,}174 \times D^{2{,}2625}$	IFO
Bilinga	$V = 11{,}247 \times D^{2{,}1283}$	IFO
Bossé clair	$V = 10{,}563 \times D^{2{,}0707}$	IFO
Dibétou	$V = 11{,}656 \times D^{2{,}1796}$	IFO
Doussié	$V = 0{,}62680394 + 10{,}0879376 \times D^2$	CIB/CNIAF
Etimoé	$V = 12{,}496 \times D^{2{,}2661}$	IFO

Iroko	$V = - 1,02219564 + 13,1167837 \times D^2$	CIB/CNIAF
Kossipo	$V = 10,305 \times D^{2,1682}$	IFO
Kotibé	$V = 10,753 \times D^{2,3638}$	IFO
Koto	$V = 9,9749 \times D^{2,0446}$	IFO
Fraké	$V = 11,338 \times D1^{,7845}$	IFO
Longhi	$V = 10,158 \times D^{2,2886}$	IFO
Niové	$V = 12,23 \times D^{2,6276}$	IFO
Padouk	$V = 10,904 \times D^{1,9581}$	IFO
Sapelli	$V = 11,361 \times D^{2,13}$	IFO
Sipo	$V = 11,475 \times D^{1,9041}$	IFO
Tali	$V = 8,7849 \times D^{1,914}$	IFO
Tiama	$V = 9,8198 \times D^{2,0349}$	IFO
Wengué	$V = 6,6039 \times D^{1,4859}$	IFO
Others	$V = - 1,3180336 + 14,1061804 \times D^2$	CIB/CNIAF

Based on the Management inventory results (botanical species and diameter) and on the above allometric equations, “Potential Volume” per species are calculated. Those volumes represent the raw standing volumes per species. Then a combination of two coefficients is applied to these volumes to obtain the “Merchantable Volume” per species. Those coefficients are:

- “Coefficient d’exploitabilité” or Coefficient of potentiality of harvesting: represents the proportion of standing trees (of one specific species) that have the necessary quality for being exported/transformed;
- “Coefficient de commercialisation” or Coefficient of “merchantability”: allow estimating the merchantable volumes for one species from the “harvestable” volumes. This coefficient measures the timber losses between the felling of the tree and the export/transformation. In particular, it accounts for:
  - logs or part of logs damaged during felling: wrenching, smashing, etc;
  - timber default: internal rot, bump, bad conformation;
  - part of logs left over after on-site preparation (too short, segment of logs with default…).

The study defining those coefficients is the same than the one defining the “Tarifs de Cubage” (MEFDD-CIB, 2010) and is presented in ***Appendix 06***.

The Merchantable Volumes represent the final volumes that can be used by the company whether as round log for exportation or for being transformed at the sawmills.

Harvesting and Industrial process

In the Management Plan, four UFP (*Unité Forestière de Production* – Forest Production Unit) are defined. Those UFPs are designed to be divided into 5 Annual Allowable Cut (representing 20 years of harvesting in total). The UFP map is presented in ***Appendix 07.a***. The area and the volumes harvested each year are considered to be $1/5^{th}$ of the UFP area/volume under the baseline scenario.

The steps for harvesting, transforming and exporting the timber are presented in Figure 13, next page.

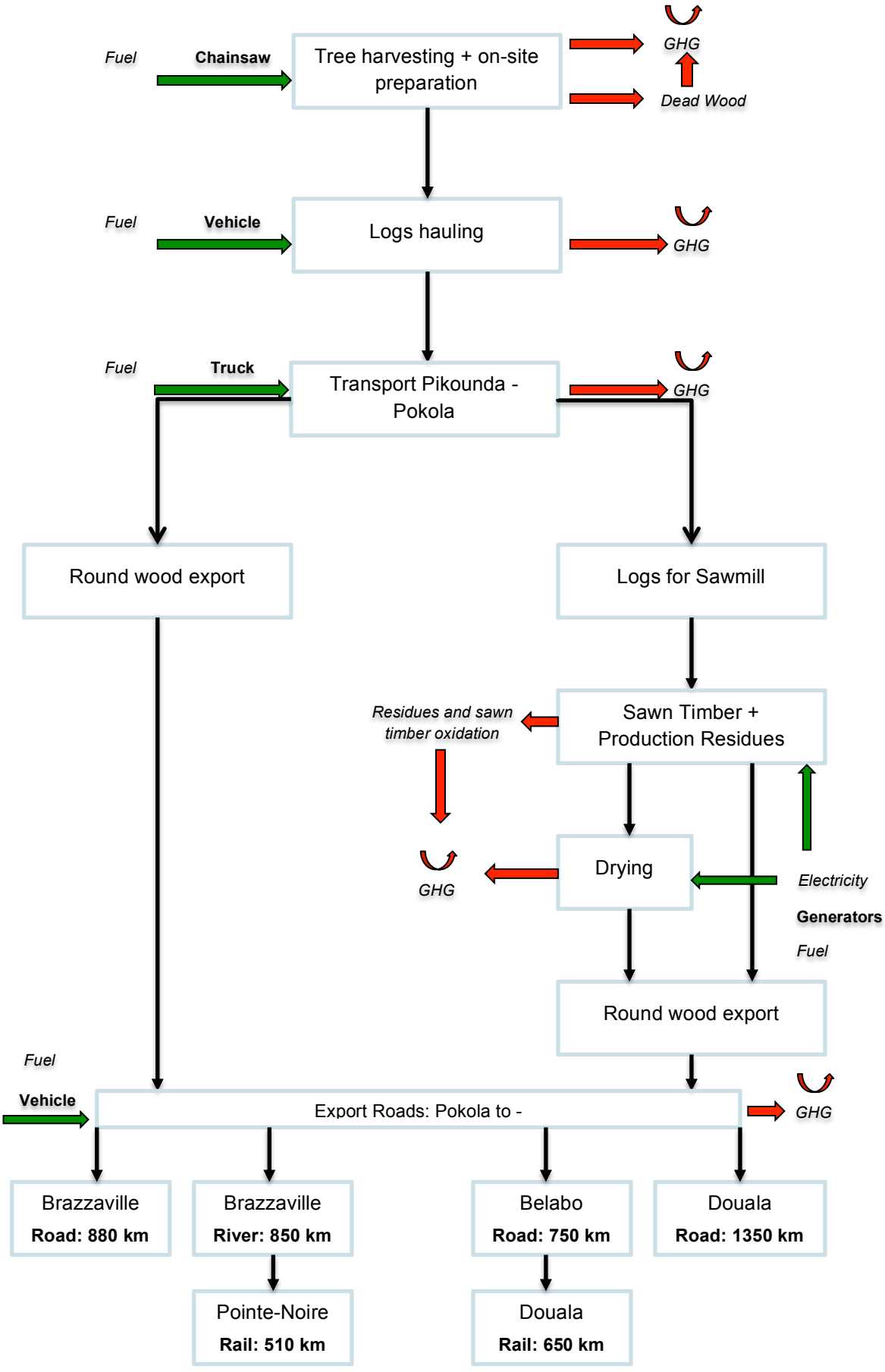

Figure 13 - Harvesting/Industrial process retained for the baseline scenario

2.5 Additionality

2.5.1 Scope and Applicability

Scope

The Project uses VT0001 *Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities* version 3.0 (1 February 2012) as per the instructions within the VM0011 Methodology to uses the latest version of said VCS Tool.

Applicability Conditions

The Tool (VT001) is applicable because:

a) The Project is proposing similar AFOLU baselines to the proposed project activity and the credible baselines do not lead to a violation of any applicable laws even if the law is not enforced; and
b) The Project has used the baseline methodology to provide for a stepwise approach in justifying the determination of the most plausible baseline scenario.

Overview of the Additionality Assessment

Figure 14 is the "VCS flowchart of the Tool for the Demonstration and Assessment of Additionality in VCS AFOLU Project Activities which indicates the various paths that the assessment can take."

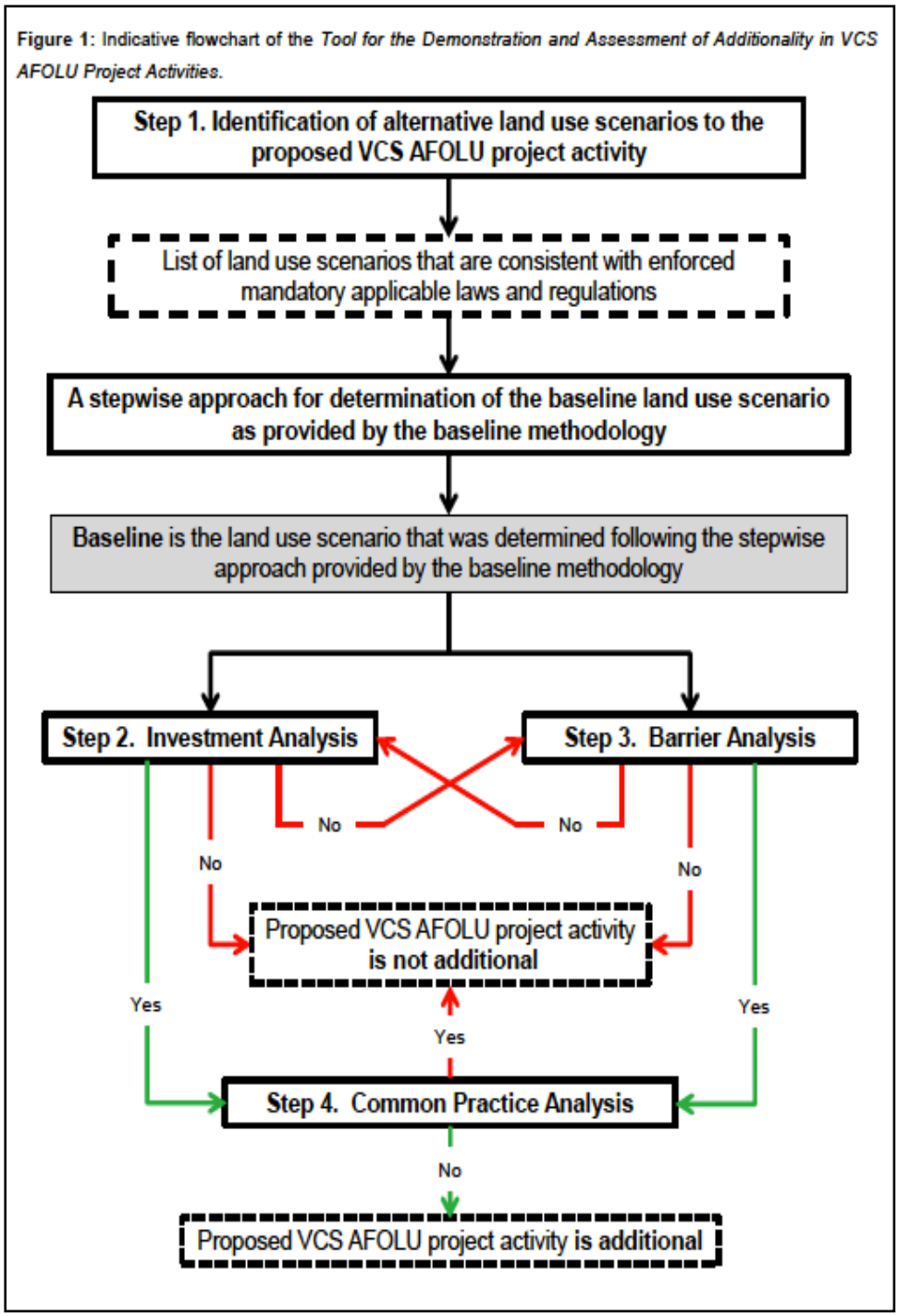

Figure 14 - Indicative flowchart of the additionality tool VT001

Figure 15 is the North Pikounda REDD+ Project flowchart of the Tool for the Demonstration and Assessment of Additionality in VCS AFOLU Project Activities indicating the assessment pathway the North Pikounda Project took.

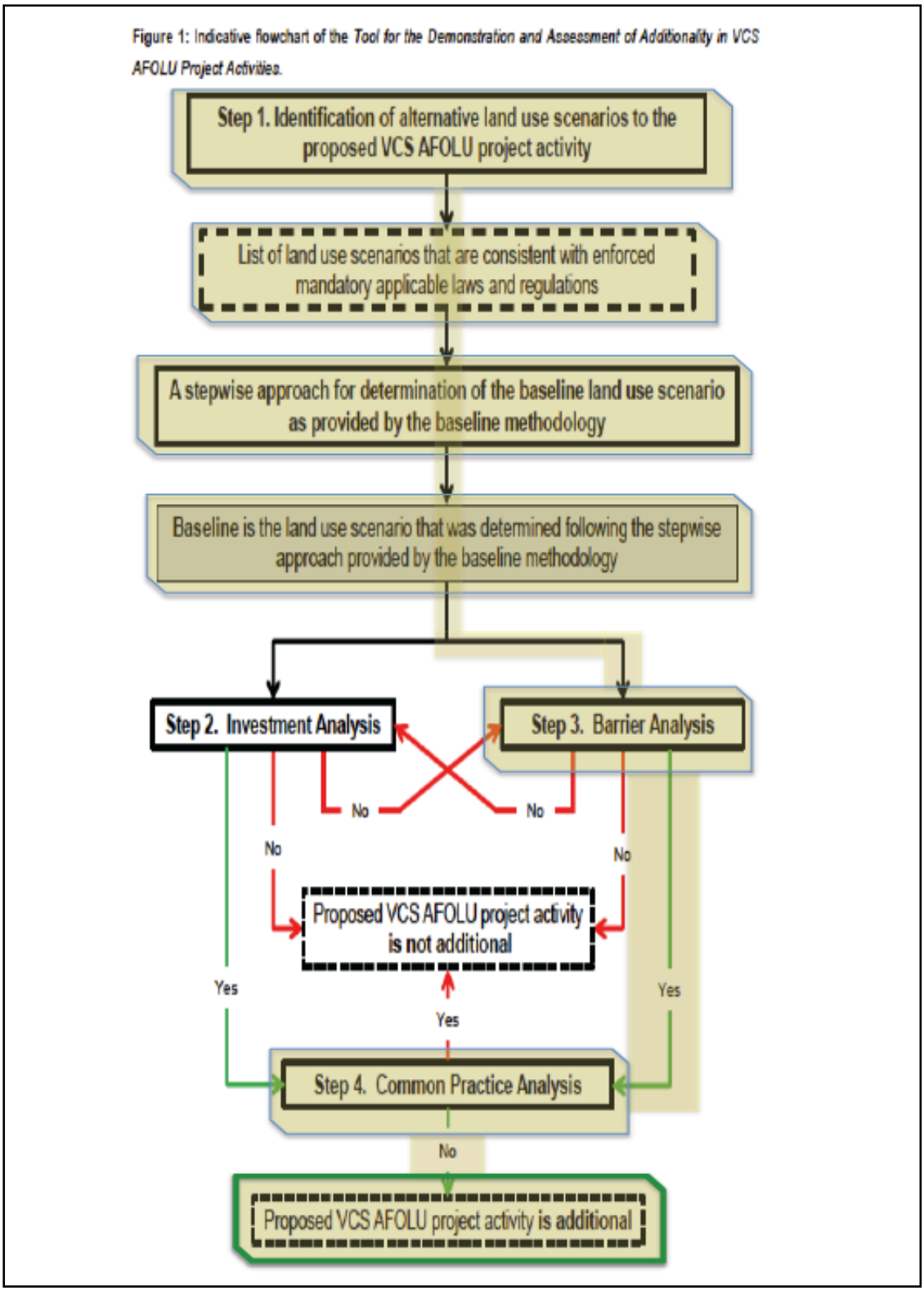

Figure 15 - Path of analysis chosen for the project

2.5.2 Procedure

STEP 1. Identification of alternative land use scenarios to the proposed VCS AFOLU project activity

Step 1a. Identify credible alternate land use scenarios to the proposed VCS AFOLU project activity

Alternative 1. Continuation of the Pre Project Land Use - FSC RIL Selective Harvesting: The North Pikounda Concession is logged according to the requirements of Congolese forestry regulations and also according to FSC certification standards as practiced by CIB.

The proposed scenario of selective harvesting with the application of the FSC Forest Stewardship standard for the Congo Basin Region[22] (in North Pikounda UFE). This is the same method and standard, currently existing in all of the other CIB concessions in the Republic of Congo, as well as one other concession bordering and mostly surrounding North Pikounda UFE.

The credibility of the proposition that selective harvesting would take place under the FSC standard is supported by the following six (a-f) points:

Table 25 – Alternative 1 credibility

No.	Source of Credibility	Explanation
a.	National Forestry Policy	The Republic of Congo has had as a matter of national forestry policy a written Forestry Code in place since the turn of the century, including the Law N° 16-2000 of 20 November 2000. Further, the Forestry Code, Decree N°. 2002- 437 of 31 December 2002, which establishes conditions pertaining to the management and use of the forest including conventional selective harvesting.
b.	Economic Trends	Forestry as a sector is the second largest commercial sector in the RoC after oil, and in 2010, the ITTO estimated that the export value of Industrial Roundwood was valued at USD $85,919,500 resulted and sawnwood was valued at USD $50,786,380. The World Bank indicates that timber exports to China are increasing and that the Congo Basin now has surpassed demand from Italy, France and Spain.[23]
c.	Land Use Records	The North Pikounda UFE is a recognised forest concession in the RoC.
d.	Current Land Use Activity	Currently, the North Pikounda UFE has been approved for

[22] FSC Forest Stewardship Standard for the Congo Basin, FSC-STD-CB-01-2012-EN Congo Basin Regional Standard EN, approved April 2012
[23] Blaser, J. A. Sarre, D. Poore, and S. Johnson. 2011 Status of Tropical Forest Management 2011. Technical Series 38. Yokohama, Japan: ITTO.

		selective harvesting and the CIB concession has owned the licence since 2002 and has had the legal ability to begin harvesting in 2012. Further, all of CIB's other concessions are FSC certified, and in order to maintain those certifications, North Pikounda would need to be certified if it was to be harvested as well.
e.	Past Land Use Activity	The North Pikounda UFE has never been logged and is primary undisturbed forestland.
f.	Enforced Mandatory Regulations	The government of the Republic of Congo has in place the above mentioned forestry laws and regulations and all of the RoC forestry laws and regulations would be adhered to in order to maintain FSC certification.

Conclusion:

Selective harvesting, conducted according to the national Congolese standards that are currently in effect, and then further supplemented by application of the FSC standard for the Congo Basin Region, is a credible and realistic scenario and should be considered as a plausible alternative scenario to the North Pikounda REDD+ project.

Alternative 2. No Harvesting and/or Protection but without being registered under the VCS as an IFM-LtPF project *(or an other carbon standard)*: The North Pikounda UFE concession is retained by CIB or some other third party, no harvesting activity would take place and the area would be maintained and the area would be protected.

This proposed alternative would see CIB or some other third party "maintain & protect" the current forest area of North Pikounda UFE that is 93,500 ha.

The proposed alternative without access to carbon finance would need to find ways to overcome institutional barriers within the host country government. With so many conservation projects in the past that have been supported, there is less appetite within RoC government to undertake additional conservation activity. As a result, without carbon finance, a project such as Alternative 3 might not be able to overcome such barriers and produce a functioning conservation activity.

Table 26 - Alternative 2 credibility

No.	Source of Credibility	Explanation
	Economic Trends	Forestry as a sector is one of the largest commercial sector in the RoC after oil, and in 2010, the ITTO estimated that the export value of Industrial Roundwood was valued at USD $85,919,500 resulted and sawnwood was valued at USD $50,786,380.

		The World Bank indicates that timber exports to China are increasing and that the Congo Basin now has surpassed demand from Italy, France and Spain.[24] CIB is required to pay a Surface tax for every hectare regardless if it harvests or not. Without either carbon finance or harvesting, there would be no funding for paying the Surface Tax nor any other protection activity.
	Land Use Records	Currently, the North Pikounda UFE has been approved for selective harvesting and the CIB concession has owned the licence since 2002 and has had the legal ability to begin harvesting in 2012 as per the forest management plan approved by the Ministry of Foresty[25]. The North Pikounda UFE is a recognised forest concession in the RoC. There has been past historical examples of the RoC government receiving a portion of a concession for conservation purposes, such as the use of Pikounda South UFE as a conservation area to b included in a new national conservation area.
	Current Land Use Activity	Currently, the North Pikounda UFE has been approved for selective harvesting and the CIB concession has owned the licence since 2002 and has had the legal ability to begin harvesting in 2012 as per the forest management plan approved by the Ministry of Foresty[26]. If no harvesting commences on the UFE, and absent any other agreement to the contrary, the RoC by law can rescind the concessional rights that exist within the North Pikounda UFE. However, the RoC government could negotiate terms for the conservation of the area as has been done in the past.
	Past Land Use Activity	The North Pikounda UFE has never been logged and is primary undisturbed forest land
	Enforced Mandatory Regulations	The Republic of Congo forestry law requires that a concessionaire conduct the logging activity that is set forth in its license agreements. If the concession does not perform to the conditions of the license, the concession could be withdrawn.

[24] Blaser, J. A. Sarre, D. Poore, and S. Johnson. 2011 Status of Tropical Forest Management 2011. Technical Series 38. Yokohama, Japan: ITTO.
[25] North Pikounda Forest Management Plan
[26] North Pikounda Forest Management Plan

		There are past examples of the government of RoC in allowing a concession area to be designated as a protection area and legally binding terms could feasibly be negotiated from a legal perspective

Conclusion:

The alternative scenario of "No Harvesting/Protection but without being registered under the VCS as an IFM-LtPF project" (or an other carbon standard) is a feasible and credible alternative scenario, however it would require specific negotiation with the RoC government and a financing mechanism to assist with resourcing the monitoring and protection of the area.

Alternative 3. Oil Palm Plantation: Engage in clear-cut harvesting and land-use change in order to plant fast growing oil palm species for production or high quality oil palm for international or domestic use.

The Palm Oil Sector is growing again in the Republic of Congo and there are areas within the Sangha Department that are currently being intensely clear felled and planted with Oil Palm by Malaysian owned entities for domestic use or for International export[27].

Table 27 - Alternative 3 credibility

No.	Source of Credibility	Explanation
	National Forest Policy	The Republic of Congo has a National Forestry policy approach that includes partial development of the nation through the growth of agro-forestry industries, including Oil Palm
	Economic Trends	Oil palm is an industry that is seeing renewed growth in the RoC, and despite oil palm being widely used by indigenous peoples, as a modern industry it is in its small, but set for rapid growth as the world trend for consumption of oil palm increases. The new National Highway from Brazzaville to Ouesso now could assist with the more rapid transportation of oil palm to costal ports. Processing equipment would need to be installed close to the plantation site and passable road would have to be installed to connect to Ouesso.
	Current Land Use Activity	Currently, the North Pikounda UFE has been approved for selective harvesting and the CIB concession has owned the licence since 2000 and has had the legal ability to begin harvesting in 2012 as per the forest management plan approved by the Ministry of Forestry[28].

[27] Etude du Secteur Agricole – République du Congo (2012), CERAPE/SOFRECO
[28] North Pikounda Forest Management Plan

		It is feasible that if a Forest Management Plan for oil palm was submitted to the MEFDD and other legal requirements were adhered, that a concessionaire might be able to use the North Pikounda UFE as an oil palm plantation.

Conclusion:

The alternative scenario of "Oil Palm Plantation" is a feasible and credible scenario, however, it would require the alteration and subsequent approval of a forestry management plan, and it would require the building of substantial infrastructure as the North Pikounda site is very remote and has no access to any oil palm mills . Although there is precedence of such activity (i.e. Oil Palm Concession), in that instance the Oil Palm Concession is situated directly adjacent to the national highway. As such, it is a feasible, although not perhaps the most likely scenario. As the North Pikounda area is located over 100km away from the national highway, accessible only by unpaved logging roads and then still nearly a thousand kilometres to the ocean ports. The only large-scale precedent noted above, has access to infrastructure as it is being established directly adjacent to the new paved national highway that is under construction.

The following Alternative Scenarios are deemed to be credible and feasible:

Table 28 - Summary of credible potential alternatives to IFM-LtPF project

Alt. No.:	Alternative Scenario:	Description:
Alternative 1.	Continuation of the Pre Project Land Use: FSC Certified Selective Harvesting	The North Pikounda Concession is logged according to the requirements of Congolese forestry regulations and also according to FSC RIL practices by CIB
Alternative 2.	No Harvesting and/or Protection but without being registered under the VCS as an IFM-LtPF project	The concession is retained by CIB or another Concessionaire and becomes an area that is not logged and the protection from planned degradation is not paid for by VCS carbon credits.
Alternative 3.	Oil Palm Plantation	Engage in clear-cut harvesting and land-use change in order to plant fast growing oil palm for subsequent palm oil production.

The above Alternative Scenarios are deemed to be the most credible and feasible after conducting the analysis required by Step 1, Sub-step 1a.

Sub-step 1b: Identify realistic and credible alternative baseline scenarios with "enforced mandatory legislation and regulations.

Alternative 1. FSC RIL Selective Harvesting: The North Pikounda Concession is logged according to the requirements of Congolese forestry regulations and also according to FSC RIL practices by CIB.

Alternative 2. No Harvesting and/or Protection but without being registered under the VCS as an IFM-LtPF project: The concession is retained by CIB or another Concessionaire and becomes an area that is not logged and the protection from planned degradation is not paid for by carbon credits.

Alternative 3. Oil Palm Plantation: Engage in clear-cut harvesting and land-use change in order to plant fast growing species oil palm production

Table 29 - Enforced regulations for each alternative retained

Alternative	Scenario	Enforced Regulations
Alternative 1.	FSC RIL Selective Harvesting	The North Pikounda UFE is part of the private domain of the state which has been established and having as its main purpose the undertaking of forestry production activities by regulations (Articles 10 and 65 of Act 16-2000) and subsequent Forest Management legislation, The Forest Management Plan (2012) approved by the government of RoC, which legally sanction selective harvesting, is able to be implemented. FSC harvesting is not a legal requirement, but CIB is required to use FSC certification in all of its harvesting activities.
Alternative 2.	No Harvesting and/or Protection but without being registered under the VCS as an IFM-LtPF project	The North Pikounda UFE is part of the private domain of the state which has been established and having as its main purpose the undertaking of forestry production activities by regulations (Articles 10 and 65 of Act 16-2000) and subsequent Forest Management legislation South Pikounda UFE, formerly part of the Pikounda UFA until 2006 (Order No. 8233/MEF/CAB from 05 October 2006) is an example of how a concession area can be altered to providing protection for an area otherwise subject to selective harvesting. Any special legal action to undertake such action, it is legally feasable
Alternative 3.	Oil Palm Plantation	The North Pikounda UFE is part of the private domain of the state which has been established and having as its main purpose the undertaking of forestry production activities by regulations (Articles 10 and 65 of Act 16-2000) and subsequent Forest Management legislation

Conclusion:

All of the alternatives: one, two and three have applicable enforced mandatory legislation and regulations.

Table 21 below indicates the remaining realistic and credible baseline scenarios that have enforced mandatory regulations:

Table 30 - Remaining realistic and credible baseline scenarios

Alt. No	Remaining realistic and credible baseline scenarios
Alternative 1.	FSC RIL Selective Harvesting
Alternative 2.	No Harvesting and/or Protection but without being registered under the VCS (*or other carbon standard*) as an IFM-LtPF project
Alternative 3.	Oil Palm Plantation

STEP 2: Investment Analysis

In order to maintain a simple yet conservative baseline analysis, the Project has opted to apply the Barrier Analysis instead of the Investment Analysis and thus Step 2 of VT0001 is not utilised.

STEP 3: Barrier Analysis

Sub-step 3a: Identify barriers that would prevent the implementation of the type of proposed project activity

The Identified Barriers are:

Institutional Barriers:

1. Although REDD+ is being implemented via the UN REDD Readiness Program no specific carbon laws exist to date within the RoC, and the North Pikounda REDD+ Project was at the time of its implementation the only REDD+ emission reduction activity in Congo on a project scale. The RoC has limited resources, even within the forestry department that has received REDD+ funding. The NPR+ Project as the national pilot project, and because of not only the carbon funding that can be realized from the sale of the credits, but as well as the off-setting origination potential of REDD+, allows the Project to be able to literally sail through the planning and implementation stage. Conservation efforts that do not include carbon funding, are not able to as quickly negotiate through the required steps, as REDD+ is a national priority program.

   This type of institutional barrier is not an issue in the Conventional and RIL harvesting situations as selective logging is well codified in the RoC. This type of institutional barrier would not affect oil palm, which has long been traded in RoC and is currently seen as being a logical sector to restart, which is being done not far from the NPR+ Project Area.

Barriers due to prevailing practice:

1. This REDD+ Project acknowledges that generating emission reduction credits from a private forest concession using an IFM-LtPF methodology has never been implemented in the Congo, let alone anywhere in Africa; it is a “first of its kind.”

In fact, there are no carbon origination projects of any kind (CDM or otherwise) in the Republic of Congo, nor are any others known to be contemplated, i.e. there is no pipeline. The project would be the first REDD+ project in RoC to be part of the VCS. There are no other stop logging projects linked to carbon finance in the RoC.

It is only because of the carbon finance that will be realised from the origination of the VCS carbon credits that the project can exist in the way that it will. If their was no carbon finance, the area of the NPR+ would be logged by CIB (or some other concessionaire) as the North Pikounda UFE was invested in by CIB to make a profit. This corporate position of using carbon finance to protect North Pikounda has been publicly made available by CIB Olam[29].

In past instances when CIB has been involved in creating conservation areas in the late 1990s and early years of the millennium, the intent was to be able to ensure some type of international timber certification. This eventually led to an FSC certification of a forest management plan for Kabo in 2006. However, the reasons for engaging in conservation then are vastly different then they are today.

The carbon project however, with its origination of a tradable carbon off-setting asset that simultaneously protects the forest asset via the REDD+ scheme within the RoC, is able to have a strong future. The Government of the RoC have quickly established capacity with National REDD+ Coordination team, have completed the World Banks REDD Readiness scheme and has received REDD+ funding from both the World Bank and the UN REDD+ Program. This in turn has helped support numerous regional REDD+ teams at the Department (District) level in the northern departments. The strongly backed NPR+ Pilot project is able to muster the type of substantial government support that pure conservation cannot.

In regards to selective logging and oil palm, they are in fact the prevailing practices in the RoC. Oil Palm plantations are already in existence in RoC, including the countries largest, the ATAMA plantation located in the Sangha Department.

Infrastructure Barrier

1. The alternative baseline scenario of Oil Palm has an infrastructure barrier in that it is very remote and distant from the transport links and processing facilities and as such it would make the Oil Palm alternative unfeasible, as it require the building of substantial infrastructure in the North Pikounda area and there is an inherent difficulty in transporting the product to market. Although there is precedence of Oil Palm in the north of RoC, in that instance it has access to infrastructure and processing facilities, as it is being established directly adjacent to the new paved national highway that is under construction. As such, the Oil Palm alternative faces an infrastructure Barrier.

   Neither the NPR+ project nor the selective logging scenario face this Infrastructure barrier.

[29] Olam Website - http://olamonline.com/olam-internationals-subsidiary-cib-and-republic-of-congo-announce-a-pioneering-redd-initiative-to-realise-value-from-standing-forests

Sub-Step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternative land use scenarios (except the proposed project activity):

The three identified barriers from Sub Step 3a. would not prevent at least one of the alternative scenarios. Selective Harvesting (FSC or Conventional) in the Congo is not affected by the same barrier to entry of the market as a VCS REDD+ IFM-LtPF in Congo is.

Institutional Barriers:

1. Selective logging in the RoC has a respected Forestry Code since 2000 and subsequent forest management regulations have allowed it to have substantial compliance with forestry regulations including three FSC certified forestry sector producers.

   A Forest Protection project without a carbon link would face substantial institutional barriers from government officials reluctant to engage in more conservation with no link to the further economic or social development of the country.

   An Oil Palm concession project would not face institutional barriers as it is an existing business type in RoC and exists within the same governmental Department (Sangha) as the NPR+ Project.

Barriers due to prevailing practice:

2. Selective logging is in theory a long-standing part of the economy of RoC as is Oil Palm, and neither Selective Logging nor Oil Palm is hindered by being a "first of its kind" project. In fact the opposite is true in that RoC has a working Forest Code supplemented by a Sustainable Forest Management Scheme that has been largely implemented in the North of Congo. Oil Palm activity exist in the Sangha Department.

   A stop logging carbon project has never been instigated on the scale now being conducted, and without carbon finance could not have been undertaking. The opportunity of the RoC accessing the international off-set market from forest carbon credits, with the NPR+ Pilot Project, ensured it was not hindered in the way conservation projects would be.

   In the past, the primary motivation of forest concessionaires to engage in conservation has been the need to be certified by an international third party standard, such as FSC. This was a key motivation in the past to undertake conservation action prior to certification.

Infrastructure Barrier

3. Selective logging currently is undertaking throughout the Northern portion of RoC and does not face infrastructure requirements of Oil Palm. All of the infrastructure requirements needed for Selective logging are in place.

   Neither stop logging with and nor without carbon financing would face the infrastructure barrier that Oil Palm does, as now physical product is being produced by either activity.

Step 4. Common Practice Analysis

The proposed activity is a first of its kind. There are no carbon laws, no CDM carbon projects, no voluntary carbon project and **no-one has ever implemented a VCS IFM-LtPF project in the country** within the last ten years.

As such from the perspective of the Common Practice Analysis, the project is additional.

Conclusion – The North Pikounda REDD+ is Additional

Based on meeting the above additionality requirements, and having implemented the stepwise additionality process **by application of the latest version of the VCS AFOLU Additionality tool as required by the VM0011 methodology, the proposed VCS AFOLU North Pikounda REDD+ project activity is believed to be additional.**

2.6 Methodology Deviations

The deviations from the methodology are listed in the table below.

Table 31 - Methodology deviations list

Methodology chapter	Deviation
3.1 **Estimation of Emissions from Degradation**	Data used to model the volumes that would have been harvested by CIB under the Baseline Scenario imply the Merchantable Volumes estimated in the North Pikounda FMP and normal harvesting practices based on real volumes historically harvested by CIB in its concession. As Merchantable Volumes estimated in the FMP are based on sampling, it is possible that, for some species, real harvested volumes exceed those that have been defined in FMP or, at the opposite, are lower than what has been expected. To take this aspect into account, we have defined a new parameter called "Harvesting Intensity Ratio". This species-specific parameter, expressed in percent, is equal to the mean historical harvested volumes divided by the volume estimated for this specie in the FMP: $$HI_x = \frac{\overline{V_{merch,x}}}{V_{merchFMP,x}} + corr$$ Where: HI_x: is the Harvesting Intensity ratio for the species x; $V_{merch,x}$ is the mean merchantable volumes of species x harvested over the reference period in CIB concessions; $V_{merchFMP,x}$ is the merchantable volumes for species x as estimated in North Pikounda FMP; Corr: is a correcting factor that can be added or subtracted to represent the advantage/disadvantage that NPR+ present compared to other UFAs (distance, old-growth forest, better timber quality, etc…)
3.2.1.1 **Validation of Existing Data**	The methodology states that, to use data from Forest Inventory Resource Management Plan, it should be no older than 5 year old. The actual Management Plan approved in 2012 by the government of the Republic of Congo has been designed based on data collected in the project area in 2003. This data has been acquired following the normal inventory procedures in effect in Congo, and the stratification used for the inventory is similar to the one used for the IFM-LtPF project. This situation is the cause of a deviation for the North Pikounda project. It is not possible not to use the data from the Management Plan because the government has approved it. Therefore, this Management Plan constitutes the legal base for our estimations of degradations under the baseline scenario. It is not possible to consider the options of doing a new Management Plan (chap.3.2.3.2 p.40) as it would interfere with a ministerial decree.

Methodology chapter	Deviation
	Furthermore, it has been possible, using the results from PSPs, to validate data from the management plan using recommendations from VM0011 (chap. 3.2.1.1). The demonstration is presented in ***Appendix 02.a, chap. V***. We consider that, AGB of both growing stock and merchantable trees having naturally increased during the time left between the Forest Resources Inventory for the management plan and the Carbon inventory for the IFM-LtPF project, it is conservative to use the volumes stated in the Management Plan report.
3.3.1 **Net Carbon from the Dead Wood Pool**	As recommended by the methodology, we have used Brown et al (2005) study to estimate the carbon from residual stand damage. It appeared that this study provided CIB site specific data for both Residual Stand Damage factor (f_{RSD}) and the branches and trimming factor (f_{Branch_Trim}), but that the results where aggregated without possibility of differentiation between f_{RSD} and f_{Branch_Trim}. Therefore a new factor will be used, called $f_{damages}$ and the following equation will replace equations 3.18, 3.19 and 3.20: 2.6.1.1.1.1.1.1 $C_{DWin,t} = f_{damages} \times V_{merch,t}$ With $f_{damages} = f_{FSD} + f_{branch\_trim}$ $f_{damages}$ is expressed in tC / m^3 harvested.
3.3.5 **Carbon in the Regrowth after Selective Logging**	To calculate the factor called $G_{regrowth,t}$, we have developed a growth model based on the results of the monitoring of PSPs. Based on the difference of growth for all timber species in the PSPs between two monitoring events, we can estimate the difference of AGB for trees between 5-20 cm diameter (noted $B_{AGB\_regrowth,t}$),, which we consider to correspond to the carbon stored in the regrowth that would have occurred in the gaps following logging under the baseline scenario. As this model allow us to estimate the growth between two monitoring events for every tree (taking into account each specific WSG), $G_{regrowth,t}$ is therefore expressed in $tC.ha^{-1}.yr^{-1}$ instead of (t d.m.).$ha^{-1}.yr^{-1}$. Equation 3-38 is therefore replaced by the following equation: $C_{regrowth,t} = \overline{G}_{regrowth,t} * \sum_{t=1}^{t^*} A_{NHA\_annual,t}$ ***Appendix 02***, chap. 4.2.5 gives more details about regrowth estimation
3.3.5 **Carbon in the Regrowth after Selective Logging**	While VCS VM0011 methodology state that it applies a conservative approach "by considering that the entire annual harvest area would permit regrowth each year", we have considered that, in the case of this project, this approach was not representing the reality.

Methodology chapter	Deviation
	Indeed, there is a fixed annual area that can be legally harvested annually, but, under the baseline scenario of RIL, this area will not be totally harvested. More precisely, Meoli (2005) has defined that, for CIB harvesting operations, only 12.4% of the annual area that can be harvested is effectively damaged by harvesting operations (felling gaps + hauling damages + road network), thus only 12.4% of the annual harvesting area will allow regrowth. This percentage will be applied to the parameter $A_{NHA\_annual,t}$ (described hereinabove) in the regrowth calculation.
3.4.1 and 3.4.2 **Emissions Due to Harvesting and On-Site Preparation Operations**	Actually, fuel used for the harvesting operations (i.e., logging, on-site preparation, hauling, etc.) is accounted into two categories: "mixed petrol" (petrol + oil) used for chainsaw and "Gas Oil" used for heavy machinery (skidders, bulldozers, loading machine, etc). It is not possible to differentiate between the mixed petrol used for a chainsaw that has been used to cut a tree or to prepare it. We have therefore decided to combine emissions due to harvesting and on-site preparation in one category. Equations 3.40 (p.61) will therefore be replaced by the following equation: $E_{harvest+onsiteprep,t} = FC_{harvest+onsiteprep} \times EF_{fuel} \times V_{merch,t}$ Where , $FC_{harvest+onsiteprep}$ is the fuel consumption of chainsaws employed for felling, snigging and trimming per m^3 of harvested material.
3.4.4 **Emissions due to log transport**	In equation 3-46, trucks Fuel Consumption ($FC_{transport,t}$, in $L.km^{-1}$) has been used instead of trucks fuel efficiency ($Eff_{vehicle}$, in $km.kL^{-1}$). This will not impact the final results.
3.4.5 **Emissions Due to Timber Processing**	Electricity is generated by 6 generators that have different power rating (4x1250 KVa, 1x1275 KVa, 1x1375 KVa) and different load capacity. Those generators are working altogether in synchronization in order to provide electricity with the required frequency. The project transformations units, administrative units, workshops etc are all equipped with energy meters that allow following the electricity consumptions on a daily basis. Each generator fuel consumption is monitored too. It is therefore very easy to link the production of sawn timber with the electricity consumption for each transformation unit, and to link this electricity consumption with the generator fuel consumption? The following equations are replacing equations used to estimate $E_{processing}$ in chap. 3.4.5 of VM0011: $E_{processing,t} = FC_{generators} * EF_{fuel} * V_{sawn\_timber,t}$

Methodology chapter	Deviation
3.4.6 **Emissions due to log distribution**	VM0011 only considers distribution of logs/sawn timber by road while, in the baseline scenario, some timber products are transported by river/train. Additional Fuel Consumption and Fuel Emissions factors have therefore been considered in the calculation of $E_{distribution,t}$. For example two new emission factors have been created for boat and train transport, respectively $EF_{distriboat}$ and $EF_{distrirail}$. In the case of distribution by road, we have used the Fuel Consumption instead of the Fuel efficiency for the calculations. Tow specific truck capacity have also been calculated, one for truck travelling to Cameroon ($CAP_{cameroon}$) where there is a legal limit for truck capacity and one for trucks travelling to Congo (CAP_{congo}).

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

The approach to quantify GHG emissions reductions is fully based on the VM0011 methodology. The baseline emissions accounting for this project is provided in the documentation provided for monitoring events.

3.1 Baseline Emissions

The annual emissions resulting from the legally sanctioned selective logging is the combination of the degradation of the Project Area ($C'_{degradation,t}$) as well as annual emissions due to selective logging operations ($C'_{emissions,t}$). Equation 3.1 of VM0011 is described as follows:

$$C'_{baseline,t} = C'_{degradation,t} + C'_{emissions,t}$$

3.1.1 Calculation of $C'_{degradation}$

The baseline scenario implies the annual harvesting of merchantable volumes of commercial species (above minimum diameter as specified in the Management Plan). While felled, trees can damage other trees, then they are converted to merchantable logs (by removing tree crown, buttresses, stumps, etc.): the resulting volumes of wood are entering the Dead Wood Pool, which will slowly decay, releasing GHG emissions into the atmosphere. The merchantable logs will be either processed into sawn timber (long term Harvested Wood Products or ltHWPs) or exported as roundwood. In the case of merchantable logs intended to be used in the manufacture of ltHWPs, the proportion of log converted to sawn timber is calculated using species-specific lumber recovery factors. The remaining proportion of merchantable logs are considered to be immediately oxidized while the emissions from ltHWPs are accounted for by applying a rate of oxidation. Please see Figure 13 p.57 for a detailed flowchart of harvesting and industrial activities retained for the baseline scenario.

Finally, during the lifetime of the baseline scenario, in areas damaged by harvesting operations, trees would have experienced regrowth that must be subtracted from the overall carbon losses. On the other hand, logging operations remove trees that would have otherwise experience growth. This loss in growth, defined as the “Growth Foregone”, is to be determined and added to the amount of carbon degradation. The equation 3.2 of VM0011 summarizes the steps described above:

$$C'_{degradation,t} = [(C_{DW_{decay},t} + C_{ltHWP_{oxidation},t} + C_{growth\_foregone,t} - C_{regrowth,t}) \times \frac{44}{12}]$$

$C'_{degradation,t}$ is calculated following the 8 steps described here-after:

1. The areas to be harvested are tabulated on an annual basis, based on the four UFPs described in the management plan. Each UFP area is divided by 5, the results correspond to an Annual Allowable Cut or “*Assiette Annuelle de Coupe*”;

2. The merchantable volumes that would have been harvested are calculated for each commercial species based on the management plan data. In this document, species-specific allometric equations approved in RoC, also called “Tarifs de Cubage”, allow the Project to estimate the volume of merchantable log from DBH. Please refer to Table 24 p.54 for a list of these “Tarifs de Cubage” and to ***Appendix 06*** for the description of their validation.

3. The merchantable volume (dry mass) is multiplied by the density or Wood Specific Gravity (WSG) of each species and by the carbon fraction to find the quantity of carbon removed (see equations 3-3 and 3-4 below);

$$\overline{C}_{merch,j,t=0} = D * CF_{wood} * \overline{V}_{merch,j,t=0}$$

$$\overline{C}_{merch,t=0} = \frac{\sum_{j=1}^{J} (\overline{C}_{merch,j,t=0} * A_{project,j,t=0}}{A_{project,t=0}}$$

The annual total carbon in the merchantable logs in year t is then calculated following equation 3-15a:

$$C_{merch,t} = \overline{C}_{merch,t=0} * A_{NHA\_annual,t}$$

4. The "Total_Damage" factors (calculated by Brown *et al*, 2005) allow to calculate the carbon that enter the Dead Wood pool annually, based on the merchantable volumes harvested (see paragraph 2.6):

$$C_{DW_{in},t} = f_{total\_damages} * V_{merch,t}$$

with $f_{total\_damages} = f_{RSD} + f_{branch\_trim}$

5. The amount of carbon leaving the deadwood pool is then calculated using a rate of decay for dead wood matter using equations 3-21, 3-22a, 3-23, 3,24:

$$F_{DW\_remain,t} = e^{-k_{decay} * t}$$

$$C_{DW_{pool},t} = \sum_{t=1}^{t^*} \left(F_{DW\_remain,t} * C_{DWin,t} \right)$$

$$C_{DW_{out},t} = \sum_{t=1}^{t^*} C_{DWin,t} - C_{DWpool,t}$$

$$C_{DW_{decay},t} = C_{DWout,t} - C_{DWout,t-1}$$

6. Based on the past years of productions, average species-specific lumber recovery factors and export ratios (% of merchantable volumes that are exported as round wood or as sawn timber) have been calculated. This allow the Project to calculate the volume of logs that would have been directly exported, the volume of logs that would have been transformed, the volume of long-term Harvested Wood Products (ltHWPs) produced and the resulting volumes of ltHWPs residues. A part of the carbon that is

sequestered in wood is slowly emitted each year due to the combination of immediate oxidation of ltHWP residues and delayed oxidation of long-term Harvested Wood Products (equation 3-25). In this scenario, short-term Harvested Wood products (pulplog and harvested fuelwood) are not considered.

$$C_{ltHWP_{oxidation},t} = C_{ltHWP_{residues},t} + C_{ltHWP_{net\_out},t}$$

The carbon emitted due to the immediate oxidation of ltHWPs residues is calculated following equation 3-26:

$$C_{ltHWP_{residues},t} = \overline{C}_{merch,p,t=0} * \left(1 - f_{lumber\_recovery}\right) * A_{NHA\_annual,t}$$

Carbon emitted due to oxidation of the ltHWP pool over project lifetime is calculated following equations 3-27, 3-28, 3-29a, 3-30, 3-31:

$$C_{ltHWP_{in},t} = \overline{C}_{merch,p,t=0} * f_{lumber\_recovery} * A_{NHA\_annual,t}$$

$$F_{ltHWP\_remain,t} = e^{-k_{ltHWP\_ox} * t}$$

$$C_{ltHWP_{pool},t} = \sum_{t=1}^{t^*} \left(F_{ltHWP\_remain,t} * C_{ltHWP_{in},t}\right)$$

$$C_{ltHWP_{out},t} = \sum_{t=1}^{t^*} C_{ltHWP_{in},t} - C_{ltHWP,t}$$

$$C_{ltHWP_{net\_out},t} = C_{ltHWP_{out},t} - C_{ltHWP_{out},t-1}$$

8. The growth foregone, corresponding to the growth of the harvested trees that would have occurred without harvesting, is calculated based on the measurement obtained in the PSPs for merchantable species for two consecutive monitoring events The equation 3-36a presented below as been slightly modified from the one presented in VM0011: there is only one stratum in the project crediting area, therefore, it was not necessary to combine the results from different stratum (that is also why equation 3-36b will not be used).

$$\overline{G}_{growth\_foregone,t} = \frac{\overline{B}_{AGB\_merch,m2} - \overline{B}_{AGB\_merch,m1}}{\Delta m}$$

The carbon in the growth foregone is estimated by multiplying the increase in AGB in merchantable trees by the carbon fraction used for AGB and the annual net harvest area that have been exploited up to year t (equation 3-37a)

$$C_{growth\_foregone,t} = CF_{AGB} * \overline{G}_{growth\_foregone,t} * \sum_{t=1}^{t^*} A_{NHA\_annual,t}$$

8. The methodology suggest to account for regrowth in the gap following logging using equation 3-38, modified following explanation detailed in paragraph 2.6 (Methodology deviations):

$$C_{regrowth,t} = \overline{G}_{regrowth,t} * \sum_{t=1}^{t^*} A_{NHA\_annual,t}$$

VM0011 suggest to select a an annual average growth in the AGB after logging based on (i) published peer reviewed studies for forests with corresponding age, climate region and ecological zone (ii) national growth models and (iii) local growth models. As the two first options were not available, we have developed a local growth model specific for the project area based on the results of the monitoring of the PSPs. For more details on the Regrowth factor modelling, please refers to ***Appendix 02.a, chap. 4.2.5***. The annual estimation for regrowth is then applied to the percentage of the Annual Net Harvest area that would have been damaged due to logging activities under the baseline scenario. This percentage has been estimated to 12,4% by Meoli (2005) and is specific to CIB reduced impact logging operations.

3.1.2 Calculation of C'$_{emissions}$

To calculate the annual GHG emissions, emission sources associated with the implementation of the baseline activities shall be estimated.

Omission of any of the associated sources is conservative.

The total emissions due to those activities (C'$_{emissions}$) is determined from the summation of the emissions sources presented in equation 3-39 below:

$$C'_{emissions,t} = E_{harvest\_onsiteprep,t} + E_{hauling,t} + E_{transport,t} + E_{processing,t} + E_{distribution,t}$$

As it was not possible to discriminate the emissions due to harvest from those due to on-site preparation, a new factor, $E_{harvest\_onsiteprep}$ has been created, with:

$$E_{harvest\_onsiteprep,t} = E_{harvest,t} + E_{onsiteprep,t}$$

The steps used to calculate C'$_{emissions}$ are described here-after:

1. Harvesting and on-site preparation of merchantable logs in CIB concessions is done using chainsaws. Based on one year of fuel consumption, we have calculated a mean Fuel Consumption factor (L per m^{-3} of merchantable timber produced) and selected appropriate fuel Emission Factor from the literature. $E_{harvest\_onsiteprep,t}$ is calculated using the following equation (which regroups equations 3-40 and 3-42 of VM0011):

$$E_{harvest\_onsiteprep,t} = FC_{harvest\_onsiteprep,t} * EF_{fuel} * V_{merch,t}$$

2. To estimate emissions associated with log hauling from the felling zone to the collection depot, the fuel consumption for all mechanical equipment's used for hauling on CIB concessions during one year has been used to calculate hauling Fuel Consumption factor (L per m^{-3} of merchantable timber produced) and is multiplied by the annual merchantable volume used in the baseline scenario (equation 3-43).

$$E_{hauling,t} = FC_{hauling,t} * EF_{fuel} * V_{merch,t}$$

3. After centralizing logs in a collection depot, they are loaded on to trucks to transport them from the project area to the industrial site (Pokola) where they will be dispatched between exported logs and timber that will be processed in the sawmill. The following equations are used to calculate the emissions associated with log transport (respectively equations 3-44, 3-45, 3-46).

$$N_{trucks\_transport,t} = \frac{V_{merch,t}}{Cap_{truck}}$$

$$KM_{transport\_total,t} = KM_{transport,t} * N_{trucks\_transport,t} * 2$$

$$E_{transport,t} = FC_{transport,t} * EF_{fuel} * KM_{transport\_total,t}$$

Trucks capacity and fuel consumption have been calculated based on one year of transportation within CIB concessions. The annual mean trajectory that would have been covered by trucks has been calculated using provisional road map provided in ***Appendix 07.a***: the provisional total road distance is calculated for each UFP starting from UFP 1 to UFP 4. The mean road distance is then calculated per UFP. The calculation excel document is provided in ***Appendix 07.b***.

4. Electricity consumption is easy to follow in Pokola, as each production/administrative unit is equipped with an electricity meter. Identically, the fuel consumption used for each generator is strictly monitored. Volumes per species entering each sawmill are also closely monitored. It is therefore very easy to combine all those elements to estimate the fuel consumption per cubic meter of sawn timber. This way of calculating $E_{processing,t}$ constitute a methodological deviation (as explained in paragraph 2.6) but remains conservative.

$$E_{processing,t} = FC_{generators} * EF_{fuel} * V_{sawn\_timber,t}$$

$$V_{sawn\_timber,t} = V_{merch,t} * f_{export/sawn}$$

Where:

Factor	Description	Unit
$FC_{generators}$	Fuel consumption of generators employed to produce electricity used by units transforming logs into sawn timber. Here, the volumes considered are volumes of timber **entering** the sawmills	$L.m^{-3}$
$f_{export/sawn}$	Fraction of merchantable volumes that are transformed in the sawmill. This ratio is species-specific, based on 6 years of CIB data (2006-2011)	dimensionless

Fuel emission factor has been selected from the relevant literature.

It is important to note that, in the future, a co-generation system will be implemented in Pokola, which will use timber processing residues to generate electricity. Once this system is in place, the emissions due to processing will not anymore be accounted for, and the baseline will be revised accordingly. This will be the object of a deviation in the Monitoring report and the baseline will include this change once it will be revised after 10 years.

5. Finally, the emissions due to log distribution are to be calculated. In the baseline scenario, exported volumes are transiting through two different routes (see also Figure 13):

   Congo Route: timber is transported either by road or river from Pokola to Brazzaville. There, a % of timbers remain in the capital for being sold on the local market while the remaining volumes are transported to Pointe-Noire by train to be exported;

   Cameroon Route: timber is transported by road from Pokola to Douala or by road to Belabo where it joins Douala by train.

   Basically, the VM0011 equations remain adapted, they just have to be adapted to take into account the different types of vehicles used to transport each specific volume to each specific destination. Equations 3-52 and 3-53 and 3-54 have been modified slightly to include this specificity:

$$N_{vehicle\_transport,t} = \frac{V_{merch,vehicle,t}}{Cap_{vehicle}}$$

$$KM_{distrib\_total,vehicle,destination,t} = KM_{distrib,destination,t} * N_{vehicle\_transport,t} * 2$$

$$E_{distribution,vehicle,destination,t} = FC_{distrib,vehicle,destination,t} * EF_{fuel} * KM_{distrib\_total,vehicle,destinationt}$$

More specifically, in the case of transport by rail we have applied directly an emission factor by tons of freight transported:

$$E_{distribution,rail,destination,t} = EF_{rail} * V_{merch,rail,destination,t} * 0,6014 * KM_{distrib,destination,t}$$

0,6014 represent the average WSG for merchantable tree species harvested under the baseline scenario. EF_{rail} is expressed in kg CO_2-e per tonnes of freight transported per km.

Finally, another equation has been added to calculate the global GHG annual emissions due to ltHWPs distribution:

$$E_{distribution,t} = (E_{distribution\_road,t} + E_{distribution\_river,t} + E_{distribution\_rail,t})_{Congo} + (E_{distribution\_road,t} + E_{distribution\_rail,t})_{Cameroon}$$

Table 32 below summarize the export figures that are retained for the baseline scenario. The percentage of annual round wood and sawn timber are listed per destination. See Figure 13 p.57 for more details about export routes.

Table 32 - Timber export figures retained for baseline scenario

Destination	Distance (km)	Transport	% of annual roundwood exported through	% of annual sawn timber exported through
PKL-BZV	880	Road	0	12.3
PKL-BZV	850	River	7	0
BZV-PTN	510	Rail	Same as above	Same as above
PKL-DOU	1350	Road	50	72.8
PKL-BELABO	750	Road	43	14.9
BELABO-DOU	650	Rail	Same as above	Same as above
			100	100

3.2 Project Emissions

Emissions associated with the actual project implementation are given by equation 4-1, p.73 of VM0011:

$$C'_{actual,t} = E_{projplan,t} + E_{design,t} + E_{monitoring,t} + \left[\left(C_{natdisturb,t} + C_{illegal\_harvest,t}\right) * 44/12\right]$$

1. In the case of this project, for the 3 first parameters of equation 4-1 ($E_{projplan,t}$, $E_{design,t}$ and $E_{monitoring,t}$), we have considered that:
   - The project administration being hosted in already existing CIB administrative buildings in Pokola, no additional electricity is used because of the project, and the electricity consumed by the devices used for the project (computer, light bulbs…) is negligible compare to the overall carbon emissions/removals. Therefore, the parameter $E_{admin,t}$ of equation 4-2 p.74 is considered to be equal to 0, and $E_{projplan,t}$ is consequently equal to $E_{plan\_travel,t}$:

$$E_{projplan,t} = E_{plantravel,t}$$

- Emissions of flight or ground transport, whether they are due to project planning, project design or project monitoring (equations 4-6, 4-7, 4-8, 4-10, 4-11, 4-12, 4-13, 4-14) are monitored in the same way and are accounted for in the same way. For this purpose, a travel log as been created, where all trips that have a link with the project are recorded. The travel log for years 2011-2012 is provided in ***Appendix 08***.

The emissions of all travels with a link with the project have been estimated for the year 2011 and 2012 which correspond to the years of project planning, project design and activities implemented for the first monitoring period. We consider that these two years have seen much more GHG emissions due to project planning/design that what would be emitted in the future and the total GHG emissions for 2011 and 2012 is lower than 50 tCO2-e (See ***Appendix 08*** for GHG emissions estimations for travels related to the project). **The emissions due to $E_{projplan,t}$, $E_{design,t}$ and $E_{monitoring,t}$, compared to the annual estimated GHG reductions, are totally insignificant (far less than 5 %) and will therefore not be accounted for in the future.** Equation 4-1 therefore becomes:

$$C'_{actual,t} = \left(C_{natdisturb,t} + C_{illegal\_harvest,t}\right) * 44/12$$

2. The parameter $C_{natdisturb,t}$ is considered to be non-existent as historically, the natural disturbances listed in the methodology are not occurring in the project area: there are no volcanoes, the area is flat and not subject to landslides, no windstorms or hurricanes are occurring this close to the equator and could be the cause of reducing the extent of the forests, no fire is naturally occurring or human induced, and, while some parts of the project are naturally flooded during the rain season, those floods are annual and non catastrophic thus not reducing the extent of the forests. However, this assertion will be check at each Verification event, especially in case new human settlements are moving in the project area, and which could evidence in a start of slash and burn agriculture. Please refer to the monitoring Plan in ***Appendix 09*** for more details about Natural Disturbances monitoring. Basically, the steps to monitor Natural Disturbances are the same than those explained here-after for Illegal Harvesting monitoring.

3. For estimation of the parameter $C_{illegal\_harvest,t}$, the project proponent will use the two different methods proposed in the methodology, that is to say, satellite data and field control. While, illegal harvesting is very unlikely in the area (see paragraph 1.10.2), it will be carefully monitored during the whole project lifetime. Please refer to the Monitoring Plan in ***Appendix 09*** for more details about illegal harvesting monitoring.
   - First, if good quality satellite images (i.e. without significant cloud cover), those images will be used to identify and calculate the extent of potential illegally harvested areas (CIB is referenced as a project holder with the Portal of Spatial Observation of Congo Basin Forests and therefore has full access to the catalogue of Spot images – See ***Appendix 09***);
   - Then, whether or not illegal harvesting area is identified through satellite images, the CIB will control if any intrusion has occurred. If they discover illegal logging from field observation or following satellite images monitoring, they will measure the extent of the area harvested, identify the tree species harvested and measure the diameter of the stumps when it is possible.

3.3 Leakage

The North Pikounda REDD+ Project will monitor and measure GHG emissions that arise as a result of the implementation of the Project, that is if they are attributable to the Project, and are measurable, they will be deemed to be leakage.

Two sources of leakage will be considered:

1. Activity Shifting Leakage: carbon emissions from degradation due to the shifting of logging operations to a new forest area or if the baseline activity has shifted from the Project Area to other areas controlled by CIB (limited to within RoC) i.e. removal of harvested wood products including sawlogs and the associated emissions.

2. **Market Leakage**: carbon from emissions due to shifts in supply and demand of sawlogs, timber and other harvested wood products.

The project leakage is the combined total of the above leakage parameters described as:

$$C'_{leakage,t} = (CL_{activityshifting,t} + CL_{market,t}) \times \frac{44}{12} + CL'_{emissions,t}$$

At the time of this Project Validation, no Activity Shifting Leakage was observed, neither was any Market Effect Leakage observed.

Further details are found in the North Pikounda REDD+ Leakage Assessment, in ***Appendixes 03.a, 03.b and 03.c.***

For each monitoring event, in case of identified leakage, the parameter $C'_{leakage,t}$ will be estimated following the methodology described in the next paragraphs (and further in details in appendixes) and it will be deducted from $C_{'baseline,t}$, as required in equation 1.1 of VM0011:

$$C'_{IFM-LtPF} = C'_{baseline} - C'_{leakage}$$

No management zones are planned for leakage under the baseline scenario: in our case leakage could only consists in market leakage, i.e the intensification of harvesting activities by CIB competitors, against which no legal action could be undertaken.

3.3.1 Activity shifting leakage

The VM0011 methodology accounts for activity shifting leakage from the following two different sources for an IFM-LtPF project:

(i) Intensification of logging operations: The Project Proponent is required to demonstrate that the harvesting operation in other forest lands owned and/or operated have not materially changed, i.e., increased harvest volume to compensate the harvest volume lost due to commencement of an IFM-LtPF project, and

(ii) Shifting of harvesting operation: The Project Proponent acquires new forest land within the host country and undertake or shifts the harvesting operation to recover the loss of harvest volume due to IFM-LtPF project.

Leakage due to activity shifting is given by Equation 5-2 below:

$$C_{activityshifting,t} = C_{IH\_activityshifting,t} + C_{SH\_activityshifting,t}$$

Where $C_{IH\_activityshifting,t}$ is the annual carbon losses due to the intensification of harvesting operations and $C_{SH\_activtyshifting,t}$ is the annual carbon losses due to the shifting of harvesting operations.

A. Intensification of logging operations

The VM0011 describes the procedure for quantifying activity shifting leakage due to intensification of harvesting in the forestlands owned and/or operated by the Project Proponent. A comparison of harvest volumes from these forestlands (*l*) from before and after the commencement of an IFM-LtPF is performed to detect and quantify the leakage due to intensification of harvesting. An historical reference period of ten (10) years before the project start has been chosen, from 2002 to 2011. The total leakage in terms of merchantable logs volume is calculated as given by Equation 5-7 in VM0011:

$$V_{IH\_activityshifting,t} = \sum_{l=1}^{L} (V_{actualharvest,l,t} - V_{historicalharvest,l,t})$$

Parameter	Description
$V_{IH\_activityshifting,t}$	Annual total intensification of harvest volume per year in year *t* ($m^3\ yr^{-1}$)
$\bar{V}_{actualharvest,l,t}$	Annual actual volume of harvest for land *l*, (*where l = 1,2,3,…..L*), that is owned and/or operated by the Project Proponent in year *t* ($m^3\ yr^{-1}$)
$V_{historicalharvest,l,t}$	Average volume of harvest for land *l*, (*where l = 1,2,3,…..L*), that is owned and/or operated by the Project Proponent over the historical reference period K, determined ex ante before the start of the IFM-LtPF project activity, hence t=0 ($m^3\ yr^{-1}$)

Timber volumes are then converted into their corresponding carbon content by applying the usual carbon fraction and WSG.

B. Shifting of operations

The activity shifting leakage is caused by the Project Proponent due to shifting of harvesting into new area after the commencement of IFM-LtPF project activity. In this case, the CIB-Olam have neither acquired new concessions nor shifted harvesting into the new forest land besides the concession areas already operated within the Republic of Congo, this parameter will therefore not be considered.

3.3.2 Market leakage

Leakage due to market effect is attributed to an IFM-LtPF project when the project significantly reduce the production of timber that affects the demand and supply equilibrium as well as results shifting of production elsewhere by the third party i.e. other than the Project Proponent, but within the host country. The applied methodology (VM0011) suggests to follow the latest version of the VCS rules for assessing leakage due to market effect for an IFM-LtPF project (refer to Section 5.3, Pages 99-100 in

VM0011, version 1.0). The latest VCS AFOLU Requirement 3.3 (Oct. 2012) provides the following options:

1. Apply appropriate leakage discount factor as suggested on Table 3 (Page 54);

2. Use direct accounting method published in scientific peer-reviewed journal that applies to same general forest types as the project and accounted at the country level.

For this project, we choose to apply the second option and decide to use a procedure described by Sharma *et al* (2012)[30] ("the Paper") and published as a peer reviewed journal paper in Greenhouse Gas Measurement and Management. This paper specifically provides leakage assessment techniques for an IFM-LtPF project under the VCS and is authored by the same group of experts who developed VM0011.

Sharma *et al* (2012) provides a pragmatic method of accounting leakage due to market effect for an IFM project under the VCS. Leakage due to market effect is objectively assessed and quantified by comparing the average annual harvest volume and also factoring in the harvesting trend in the historical reference period and the monitoring period for the same forest types or tree species composition in the same climatic region within the host country. The market leakage volume in the monitoring period is given by the following equation in Sharma *et al* (2012):

$$V_{ML,C,M} = M \times \left[\bar{V}_{after,C,M} - \left(\bar{V}_{before,C,M} \times (1 \pm i) \right) \right]$$

Parameter	Description
$V_{ML,C,M}$	Total volume of timber harvested due to the market leakage
M	Number of years in the monitoring period
$\bar{V}_{after,C,M}$	Average annual volume of timber production after the implementation of an IFM-LtPF project from the same forest types or tree species composition and in the same climatic region within the host country, for the monitoring period, *M*
$\bar{V}_{before,C,M}$	Average annual volume of timber production before the implementation of an IFM-LtPF project from the same forest types or tree species composition and in the same climatic region within the host country, for the historical reference period, *N*
i	Harvesting trend in the historical reference period (dimensionless)

The market leakage occurs wherever the average annual volume of timber harvest with trend before an IFM project exceeded by the volume of the timber harvest after the project. There would be no market leakage if the volume of harvest after the project is lesser than the volume of harvest with trend before the project. One of the following two situations would occur:

$\bar{V}_{before,C,N} \times (1 \pm i) \geq \bar{V}_{after,C,M} \rightarrow$ No leakage due to Market

[30] Sharma, S. K., Telfer, M., Phua, S., Chandler, H. (2012). *A pragmatic method for estimating greenhouse gas emissions due to leakage for Improved Forest Management under the Verified Carbon Standard (VCS)*, Journal of Greenhouse Gas Measurement and Management, **2**(1), 22-32.

$\bar{V}_{before,C,N} \times (1 \pm i) < \bar{V}_{after,C,M} \rightarrow$ Leakage due to Market

The estimation of the harvesting trend is given by the following equation:

$$i = \frac{\sum_{n=1}^{N} \frac{\left(V_{before,C,n} - V_{before,C,n-1}\right)}{V_{before,C,n-1}}}{N}$$

Parameter	Description
i	Harvesting trend in the historical reference period
$V_{before,C,n}$	Average annual harvest in all concessions, where $n=1,2,3\ldots N$
$V_{before,C,n-1}$	Average annual harvest in all concessions in the previous year as depicted by n-1, where $n=1,2,3\ldots N$
N	Number of years in the in the historical reference period

Average annual volume of timber production from all concessions areas (C) before and after the start of the IFM project are estimated summating the annual harvest in each concession (c) and divide by the number of years in the historical reference period and in the monitoring period as given by the following equations:

$$\bar{V}_{before,C,N} = \frac{\sum_{c=1}^{C}\sum_{n=1}^{N} V_{C,N}}{N}$$

$$\bar{V}_{after,C,M} = \frac{\sum_{c=1}^{C}\sum_{n=1}^{M} V_{C,M}}{M}$$

Where

Parameter	Description
$V_{C,N}$	Annual volume of timber production in each concession, *c*, with the same forest types or tree species composition in the country in each year, n, of the historical reference period (N).
$V_{C,M}$	Annual volume of timber production in each concession, *c*, with the same forest types or tree species composition in the country in each year, m, of the historical reference period (M).

3.4 Summary of GHG Emission Reductions and Removals

Table 33 - Summary of GHG emissions reductions

Years	Estimated baseline emissions or removals (tCO2e)	Estimated project emissions or removals (tCO2e)	Estimated leakage emissions (tCO2e)	Assigned to the Pooled Non-Permanence Risk Buffer	Estimated net GHG emission reductions or removals (tCO2e)
Year 2012	69,547	-	0	13,338	56,209
Year 2013	92,737	-	-	18,208	74,529
Year 2014	112,663	-	-	22,393	90,271
Year 2015	129,877	-	-	26,008	103,870
Year 2016	144,838	-	-	29,149	115,689
Year 2017	156,189	-	-	31,461	124,727
Year 2018	164,763	-	-	33,262	131,501
Year 2019	172,600	-	-	34,908	137,692
Year 2020	179,823	-	-	36,424	143,398
Year 2021	186,535	-	-	37,834	148,701
Total	1,409,572	-	-	282,985	1,126,587

4 MONITORING

4.1 Data and Parameters Available at Validation

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification	Uncertainty (CI95% or relative error)
VM0011: General						
$A_{project,t=0}$	ha	Project Area	Management plan	55,950	-	-
$A_{NHA\_annual,t}$	ha	1/5th of the area of each UFP	Management plan	See VCS-MR ***Appendix 07***	-	-
CF_{AGB}	tC.(t d.m.)$^{-1}$	Carbon Fraction in the AGB	IPCC, AFOLU, Chap 4, Table 4.3	0.47	IPCC default values	-
CF_{wood}		Carbon Fraction in the Merchantable logs		0.49		
D	(t d.m.).m^{-3}	Wood specific gravity	Zanne and al, 2009	See VCS-MR ***Appendix 06***	Species-specific. If species not present in Zanne and al (2009), the value of 0,58 commonly accepted for timber in central Africa (Chave, Picard, …) will be applied	-
$f(DBH_{n,l,s,j,t=0}, H_{n,l,s,j,t=0})$	dimensionless	Volume allometric equations for calculation of Merchantable volumes	Management plan	See ***Appendix 06***	"Tarifs de cubage" commonly employed in the country	+/- 6% (on merchantable volumes calculated) for "objective" species and +/- 11% for "promotion" species
		Volume allometric equations for calculation of AGB	Chave and al, 2005 Feldspauch	See ***Appendix 02.a***		+/- 8.3% (on mean carbon stock/ha)

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification	Uncertainty (CI95% or relative error)
			and al, 2012	See annex of this document		
$DBH_{n,i,s,t=0}$	cm	Diameter at Breast Height (1,30 m)	PSPs inventory	See VCS-MR ***Appendix 05***	Inventory procedure	-
$V_{merch,t}$	m^3	Merchantable volume harvested in year t	Management Plan Total volumes given per UFP (5 years of harvesting)	See VCS-MR ***Appendix 07, Tab 1*** See annex of this document	UFP / years / V_{merch} (m^3) 1 / 2012-2016 / 389,099 2 / 2017-2021 / 348,468 3 / 2022-2026 / 381,689 4 / 2027-2031 / 307,910	+/- 6,48%
HI_x	dimensionless	Harvesting Intensity ratio for species x: annual percentage of Vmerch estimated in the FMP that will be really harvested	CIB harvesting data (2006-2012), CIB FMPs	See annex of this document		-
C_{AGB}	$tC.ha^{-1}$	Carbon in the AGB of the growing stock	Monitoring inventory	149.05	See VCS-MR ***Appendix 05***	+/- 8.3
VM0011: Net carbon from the Deadwood pool (3.3.1)						
k_{decay}	yr^{-1}		Chambers and al, 1999	0.186	Data for tropical evergreen forests with similar mean annual temperature (26,7°C) and superior mean WSG (0,69 $g.cm^{-3}$)	Conservative value: mean decomposition rate is 1.9 yr^{-1}, with a SE of 0.004 yr^{-1}
$f_{damages}$	$tC.m^{-3}$	Factor combining Branch-Trim factor and Residual Stand	Brown and al, 2005	0.6989	Specific for CIB operations Total tC impact per m^{-3} of	+/- 0.0907

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification	Uncertainty (CI95% or relative error)
		Damage factor (see deviation description paragraph 2.6 of VCS-PD)			merchantable volume extracted	
VM0011: Net Carbon from the long term HWP pool (3.3.2)						
$f_{lumber\_recovery}$	dimensionless	Proportion of merchantable log converted to LtHWP	CIB production data (2007-2012)	See VCS-MR ***Appendix 07, Tab 1***	Specific for CIB operations Species specific	
k_{ltHWP_ox}	yr^{-1}	Rate of oxidation for LtHWP	VM001, Table B5 p.114; adapted from IPCC, 2006b, chap. 12, Table 12-2	0.023	-	+/- 50%
VM001: Carbon in the Growth Foregone Due to Selective Logging (3.3.4) – See parameters monitored						
VM0011: Carbon in the Regrowth after Selective Logging (3.3.5) – See parameters monitored						
VM0011: Emissions due to Harvesting and On-site Preparation (3.4.1 & 3.4.2)						
$FC_{harvest+onsiteprep}$	$L.m^{-3}$	Fuel consumptions of equipment used for harvesting and trimming per m^3 of merchantable log produced	CIB production data 2012	0.0912	Based on production monthly reports	+/- 0,0091
EF_{fuel}	$kgCO_2\text{-}e.L^{-1}$	Fuel emission factor	DEFRA, 2012; Annex 1	2.7782	Value for 100% mineral petrol	-
VM0011: Emissions due to Log Hauling (3.4.3)						
$FC_{hauling}$	$L.m^{-3}$	Fuel consumptions of equipment used for hauling per m^3 of merchantable log produced	CIB production data 2012	4.7767	Based on production monthly reports	+/- 0.4841
EF_{fuel}	$kgCO_2\text{-}e.L^{-1}$	Fuel emission factor	DEFRA, 2012; Annex 1	3.6028	Value for Gas Oil	-
VM0011: Emissions due to Log Transport (3.4.4)						
Cap_{truck}	m^{-3}	Truck load capacity	CIB production	56.32	Based on transport monthly reports	-

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification	Uncertainty (CI95% or relative error)
			data 2011			
$KM_{transport,t}$	km	Annual log transport distance from collection depot to processing plant	See Distance map in ***Appendix 07.a***	See ***Appendix 07.b*** See Annex of this document	$1/5^{th}$ of the average distance for each UFP. Estimated based on road network proposed in Management Plan	-
$FC_{transport}$	$L.km^{-1}$	Truck fuel consumption	CIB production data 2011	0.6014	Based on transport monthly reports	+/- 0,014
EF_{fuel}	$kgCO_2\text{-}e.L^{-1}$	Fuel emission factor	DEFRA, 2012; Annex 1	3.6028	Value for Gas Oil	-
VM0011: Emissions due to Timber Processing (3.4.5) – Only used while co-generation is not in place						
$FC_{processing}$	$L.m^{-3}$	Generators fuel consumption per m3 of timber entering the sawmill	CIB production data 2012	14.7	-	+/- 1.345
EF_{fuel}	$kgCO_2\text{-}e.L^{-1}$	Fuel emission factor	DEFRA, 2012; Annex 1	3.6028	Value for Gas Oil	-
$V_{sawn\_timber,t}$	m^{-3}	Volume of merchantable logs reserved for the sawmill in year t	Management plan, calculation based on $V_{merch,t}$	See VCS-MR ***Appendix 07, Tab 1***	-	-
$f_{export/sawn}$	dimensionless	Ratio of total merchantable volume reserved for the sawmill	CIB production data 2007-2012	See VCS-MR ***Appendix 07, Tab 1***	Species specific.	-
VM0011: Emissions due to Log Distribution (3.4.6)						
$V_{merch,vehicle,destination,t}$	m^3	Volume of merchantable logs/sawn timber transported to destination d, by vehicle v, in year t	Management plan, CIB production data 2007-	See VCS-MR ***Appendix 07, Tab 1***	Depends on destination	-

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification	Uncertainty (CI95% or relative error)
			2012			
$Cap_{vehicle}$	m^3	Truck load capacity	CIB production data 2011 Legal threshold for Cameroon	48.2 49.4	Based on transport monthly reports Based and Cameroon legislation	-
$KM_{distrib,destination,t}$	km	Distance between Pokola and export point	GIS software	See VCS-MR ***Appendix 07, Tab 2.1*** See Annex of this document	**Destination** / Distance (km) / **PKL-BZV** / 880 / Road **PKL-BZV** / 850 / River **BZV-PTN** / 510 / Rail **PKL-DOU** / 1350 / Road **PKL-BELABO** / 750 / Road **BELABO-DOU** / 650 / Rail	-
FC_{truck}	$L.km^{-1}$	Truck fuel consumption	CIB production data 2011	0.6014	Based on transport monthly reports	+/- 0.014
EF_{fuel}	$kgCO_2\text{-}e.L^{-1}$	Fuel emission factor	DEFRA, 2012; Annex 1	3.6028	Value for Gas Oil	-
EF_{rail}	Kg CO_2-e/t/km	Rail freight emission factor	DEFRA, 2012, Annex 7	0.03634	Value for Rail Freight	-
VM0011: Emissions due to Leakage (Chapter 5)						
$V_{historical\_harvest,l,t=0}$	m^3	Annual volume of harvest for land *l*, (*where l = 1,2,3,…..L*), that is owned and/or operated by the Project Proponent over the historical reference period K	CIB production data	See ***Appendixes 03.a and 03.b***	Annual volumes have been calculated for each years between 2002 and 2011 (Historical reference period), for the concessions of Pokola, Kabo, Toukoulaka and Loundoungou	-
$V_{c,M}$	m^3	Annual volume of timber	MEFDD	See	Annual volumes have been	-

Data / Parameter	Unit	Description	Source	Value	Purpose / Justification	Uncertainty (CI95% or relative error)
		production in each concession, *c*, with the same forest types or tree species composition in the country in each year, m, of the historical reference period (M).	compilation of production data	***Appendixes 03.a and 03.c***	calculated for each years between 2002 and 2011 (Historical reference period), for the concessions of the department of Sangha (namely SOCALIB, SIFCO, SEFYD, IFO) and Likouala (namely BPL, Cristal, ITBL, Likouala Timber, Mokabi SA, Thanry Congo, Bois Khassa, Pietistes)	

4.2 Data and Parameters Monitored

Data / Parameter	Unit	Description	Source	Value	Monitoring equipment	QA / QC	Uncertainty (CI95% or relative error),
VM0011: General							
$DBH_{n,i,s,t}$	cm	Diameter at Breast Height (1,30 m)	PSPs inventory	see VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	see VCS-MR
VM0011: Net carbon from the Deadwood pool (3.3.1): see parameters available at validation							
VM0011: Net Carbon from the long term HWP pool (3.3.2): see parameters available at validation							
VM001: Carbon in the Growth Foregone Due to Selective Logging (3.3.4)							
$B_{AGBmerch,t}$	$(t.d.m).ha^{-1}$	Average aboveground biomass of the merchantable trees in the project area in year t	PSPs inventory	See VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	See VCS-MR
$C_{growth\_foregone,t}$	$tC.ha^{-1}.yr^{-1}$	Annual carbon lost due to the growth foregone in the above ground biomass in the project area in year t	PSPs inventory	see VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	see VCS-MR

Data / Parameter	Unit	Description	Source	Value	Monitoring equipment	QA / QC	Uncertainty (CI95% or relative error),
VM0011: Carbon in the Regrowth after Selective Logging (3.3.5)							
$B_{AGB\_regrowth,t}$	$(t.d.m).ha^{-1}$	Average aboveground biomass of trees in the regrowth estimated from the growth of trees in the regeneration sub-plot of the PSPs	PSPs inventory	See VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	See VCS-MR
$G_{regrowth,t}$	$(t.d.m).ha^{-1}$	Average regrowth per hectare per year of the AGB after logging in year t	PSPs inventory	See VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	See VCS-MR
$C_{regrowth,t}$	$tC.ha^{-1}.yr^{-1}$	Average regrowth of the AGB in gaps after selective logging	PSPs inventory	see VCS-MR	Tape-meter, relascope (see inventory procedure)	Control procedure	see VCS-MR
VM0011: Emissions due to Harvesting and On-site Preparation (3.4.1 & 3.4.2): see parameters available at validation							
VM0011: Emissions due to Log Transport (3.4.4): see parameters available at validation							
VM0011: Emissions due to Timber Processing (3.4.5): see parameters available at validation							
VM0011: Emissions due to Log Distribution (3.4.6): see parameters available at validation							
VM0011: Emissions due to Natural Disturbances (4.4)							
$A_{nd,j,t}$	ha	Annual area of natural disturbance “nd” in stratum j in year t	Annual Monitoring	see VCS-MR	Satellite images analyse, Tape-meter	Monitoring plan	see VCS-MR
$f_{natdisturb,j,t}$	dimensionless	Fraction of the growing stock naturally damaged in year t, in stratum j	Annual Monitoring	see VCS-MR	Satellite images analyse, Tape-meter	Monitoring plan	see VCS-MR
$DBH_{tree\_nd,i,snd,j,t}$	cm	Diameter at breast height for individual tree n, of species i, in sample plot in the naturally disturbed area snd, of stratum j in year t	Annual Monitoring	see VCS-MR	Tape-meter	Monitoring plan	see VCS-MR
VM0011: Emissions due to Illegal Harvesting (4.5)							
$A_{illegal\_harvest,t}$	ha	Annual area of illegal harvest in stratum j in year t	Annual Monitoring	see VCS-MR	Satellite images analyse, Tape-meter	Monitoring plan	see VCS-MR
$V_{illegal\_harvest,t}$	tC	Annual volume of wood sold	Annual	see VCS-MR	Satellite images analyse,	Monitoring	see VCS-MR

Data / Parameter	Unit	Description	Source	Value	Monitoring equipment	QA / QC	Uncertainty (CI95% or relative error),
		as determined from field survey in year t	Monitoring		Tape-meter	plan	
VM0011: Emissions due to Leakage (Chapter 5)							
$V_{actualharvest,l,t}$	$m^3.yr^{-1}$	Annual actual volume of harvest for land l, operated by the project proponentin year t	Annual Monitoring	see VCS-MR	Sharma and al, 2012	-	see VCS-MR
$V_{marketleakage, M}$	$m^3.yr^{-1}$	Average annual volume of timber production after the implementation of an IFM-LtPF project from the same forest types or tree species composition and in the same climatic region within the host country, for the monitoring period, *M*	Annual Monitoring	see VCS-MR	Sharma and al, 2012	-	see VCS-MR

4.3 Description of the Monitoring Plan

The North Pikounda REDD+ Project is required to undertake periodic monitoring of the project and leakage areas.

The North Pikounda REDD+ Project Monitoring System uses a dynamic system that seeks to identify, assess and create a mitigation plan for potential risks that might arise in relation to the Project. In order to ensure a process for monitoring Project progress and documenting lessons learned or corrections that may be needed, and incorporating them into project decision-making in future monitoring periods, the Project adopts the system that is already in place and implemented for CIB. The company being FSC certified, it has a set of procedures and systems in place (verified annually during the FSC verification audits) that regulate the documents management, the procedures verification and validation, etc, and for which CIB staff is used to work with. The QA/QC system already in place will serve as a "backbone" for the Project QA/QC system, for example to handle complaints or non-conformities, etc.

The Monitoring Plan described in detail in VCS-MR, ***Appendix 08***, is based on 12 main activities that are briefly described below. This appendix "Monitoring Plan for the North Pikounda REDD+ project" can be considered as the procedure that will be implemented in order to collect all the necessary information for the Verification audits.

1. **PSPs inventory**
   The PSPs network will be monitored before each verification event. Tree parameters and dynamic will be measured, analysed and compiled in order to estimate the Carbon stock variations (AGB), the growth foregone and the regrowth factors.
2. **Remote Sensed Monitoring - Illegal/Natural Disturbances**
   Spot 5 images will be acquired annually through the partnership between CIB and *Portail de l'Observation Spatiale des Forêts du Congo* and Astrium. Those images will be analysed to determine any evidences of illegal activities or natural disturbances.
3. **Field Monitoring - Illegal Activities**
   Illegal logging is not a viable threat in the early stage of the Project, as there are no communities within the Project Area and any nearby communities are at least 20km away. However, much can change in a developing country in 30 years such as RoC, including increased population pressures.
   Annual field control will be organised with CIB teams, during PSPs inventory or if needed after satellite images analyse. Community consultation will also allow monitoring any kind of illegal activities in the area. CIB-Olam's significant community experience from its FSC certification activities will be leveraged in this area to ensure a robust monitoring.
4. **Natural Disturbances Emissions Monitoring**
   If natural disturbances are identified, the associated emissions will be monitored following VM0011 and Monitoring Plan.
5. **Illegal Harvesting Emissions Monitoring**
   If illegal harvesting activities are identified, the associated emissions will be monitored following VM0011 and Monitoring Plan.
6. **Leakage Monitoring**
   Appropriate production data from the Leakage Area will be collected, analysed and compiled upon each verification event to estimate activity shifting and market leakage.
7. **Uncertainty Monitoring**
   Uncertainty linked to the parameters monitored will be automatically calculated using excel models.
8. **Non-Permanence Risk Assessment**
   The non-permanence risk tool will be reviewed upon each verification event and actualised if necessary, in view of the any relevant data collected.

9. **Quality Assurance / Quality Control**
   The Project implement a rigorous quality assurance and quality control (QA/QC) system to ensure the long-term accuracy of the data that is collected, to ensure a robust data storage system and to create a systematic data management structure. This QA/QC systems is entirely integrated in the already existing QA/QC system that has been implemented for FSC certification. This system is reviewed annually during FSC Verification audits, that is a guarantee of the quality and dynamic nature of the QA/QC System.
10. **Training**
    All new personal participating in PSPs inventory/control are trained following PSPs Inventory/Control/Monitoring Procedures specifications and standard CIB practices, as much as is reasonably possible.
11. **Documentation Management**
    All documents are properly controlled managed and stored in a manor that complies with standard CIB practices. Hard-copy of project documentation will be stored in the “Aménagement” office and soft-copy are stored in the “Public” folder used for the project. This folder is automatically saved on a daily basis. All documents will be archived for at least two years after the crediting period.
12. **VCU Calculation**
    For each verification event, VCU vintage is estimated and updated based on the parameters monitoring results.

Table 34 - Monitoring Plan

Activities and sub-activities	Description	Frequency
PSP MONITORING		
1.1 PSPs inventory	Maintain PSPs and monitor tree growth. Circumference of trees monitored is measured.	1/yr
1.2 Data Capture	PSP inventory data are captured onto the excel database	1/yr
1.3 Monitoring maps creation	Mapping inventory data capture Prepare maps for next inventory	1/yr
1.4 AGB estimation	Estimate AGB carbon stock from inventory data.	1/yr
1.5 Growth Foregone estimation	Estimate carbon stored in Growth Foregone from inventory data.	1/yr
1.6 Regrowth estimation	Estimate carbon stored in Regrowth from inventory data.	1/yr
REMOTE SENSED MONITORING – ILLEGAL/NATURAL DISTURBANCES		
2.1 Spot Images acquisition	Contact IGN (Institut National de l'Information Geographique et Forestière) / Portail de l'Observation Spatiale des Forêts du Congo to obtain annual Spot5 images of Project Area.	1/yr
2.2 Images Analyse	Prepare image and estimate impacted area from Spot5 images in order to determine whether a change in biomass occurred.	1/yr
2.3 General Monitoring	Collect data on industrial activities planned in the Sangha Department in general and more specifically around the Project Area: i.e. road construction, industrial and agricultural projects, etc.	Monthly
FIELD MONITORING – ILLEGAL ACTIVITIES		
3.1 Control SE access	After community consultation, a field control will be organized to check that no illegal activities have happened on the Eastern boundary of the UFE.	1/yr

3.2 In-concession control	During PSP monitoring, CIB teams will be in charge of controlling that no illegal activities have happened within the concession and the PSP areas.	1/yr
3.3 Control North access	During PSP monitoring, CIB teams will be in charge of controlling that no illegal activities have occurred. IFO will be contacted in order to know if illegal activities have occured in the part of Ngombe concession close to the project area.	2/yr
3.4 Control Western access	Because of difficulty of access, this control will be undertaken by analysing satellite images. Ground verification will only be undertaken if illegal activities are identified.	1/yr
3.5 Community Consultation	Monitoring of local communities activities through CIB social service, in particular Molenda community; as well as seeking relevant monitoring data input from local communities.	1/yr
NATURAL DISTURBANCES EMISSION MONITORING		
4.1 Estimate Area of Natural Disturbances and fraction of the growing stock naturally damaged	Based on known natural disturbances and also through satellite images analyses and field teams checking, the area of natural disturbance ($A_{nd,j,t}$ – chap. 4.4 of VM0011) and the fraction of the growing stock naturally damaged ($f_{natdisturb,j,t}$ – chap. 4.4 of VM0011) are estimated.	-
4.2 Estimation of carbon stored by regrowth in Natural Disturbance Area	Special PSPs dedicated to the monitoring of regrowth will be established in the naturally disturbed area based on VM0011 and Pearson *et al* (2005) recommendations.	-
4.3 Calculation of annual total carbon losses due to Natural Disturbances	The total GHG emissions due to natural disturbances are calculated using outputs of sub-activities 4.1 and 4.2 of the present plan and equation 4-20 of VM0011.	-
ILLEGAL HARVESTING EMISSIONS MONITORING		
5.1 Estimate Area of Illegal Harvesting and Merchantable	Based on satellite images analyses and field teams checking, the area of illegal harvesting ($A_{illegal\_harvest,t}$ – chap. 4.5 of VM0011) and the volume of merchantable timber	-

volumes illegally harvested	illegally harvested ($V_{illegalharvest,t}$ – chap. 4.5 of VM0011) are estimated.	
5.2 Calculation of annual total carbon losses due to Natural Disturbances	The total GHG emissions due to illegal harvesting are calculated using outputs of sub-activity 5.1 of the present plan and equation 4-22 of VM0011.	-
LEAKAGE MONITORING		
6.1 Collect leakage data	Collect CIB harvesting data for years passed since last Verification event. Collect harvesting data for industrial operators in Sangha and Likouala department for years passed since last Verification event, through MDDEFE.	1/yr
6.2 Calculate Activity Shifting Leakage	Calculate carbon losses due to baseline activity shifting due to intensification of harvest volumes	1/yr
6.3 Calculate Market Leakage	Calculate carbon losses due to market leakage effects	1/yr
UNCERTAINTY MONITORING		
7.1 Calculate uncertainty	Calculate overall IFM-LtPF uncertainty for the baseline, project activity and leakage emissions and associated carbon credit deductions	Upon every Verification
NON-PERMANENCE RISK ASSESSMENT		
8.1 Non Permanence Risk Review and Analysis	Review current and future risk issues as required for verification by the then current VCS Non-Permanence Risk Tool.	Upon every Verification
QUALITY ASSURANCE / UALITY CONTROL		
9.1 PSPs inventory data control	The captured data of all of the PSPs is controlled after each inventory (maps and measurements)	1/yr
9.2 PSPs inventory field control	Each monitoring period, 10% of the PSPs will be re-measured to control the validity of the data collected during the PSP inventory	1/yr
9.3 Team work quality	Each team is given a “Quality Mark” after each inventory, which influence the quality bonus that is awarded. If the quality of inventory is not sufficient, additional training/work	1/yr

	can be planned	
9.4 Documentation management	The project coordinator controls that documentations is recorded and stored as specified in this Monitoring Plan	1/yr
TRAINING		
10.1 New elements	All new personal participating in PSPs inventory/control are trained following PSPs Inventory/Control/Monitoring Procedures specifications.	-
10.2 Additional training	Depending on PSPs control results, teams receive additional training following recommendations of PSPs Control Procedure.	As needed
DOCUMENT MANAGEMENT		
11.1 PSPs field records	After each inventory field records are archived and kept for at least two years after the crediting period. They are available at the “Aménagement” office in Pokola	-
11.2 PSPs control records	After each PSPs control, control reports are archived and kept for at least two years after the crediting period. They are available at the “Aménagement” office in Pokola	-
11.3 Database	All softcopies of project documents are stored in the “public” folder used for the project. The data are automatically saved on a daily basis and will be archived for at least two years after the crediting period. In additon, after each inventory, updated database are sent to the project coordinator for archiving.	Upon Verification
11.4 Training records	Each given training is recorded and records are kept for at least 5 years	-
VCU CALCULATION		
12.1 Final VCU calculation	Estimate total VCUs for Verification Audit	1/yr

Monitoring Frequency

Annually. See Monitoring Plan above.

Other

The verification report drafted for each Verification Audit will ensure that the 12 points described above have been properly considered and monitored.

5 ENVIRONMENTAL IMPACT

No environmental impact study is required for the project. The Project does not anticipate any negative environmental impacts within the area surrounding the Project since the project scenario consists entirely of protecting the forest as it currently exists.

Offsite impacts will be positive since larger habitat and forest areas will improve the long-term viability of fauna and flora populations offsite by maintaining connectivity and avoiding fragmentation of habitats. Avoiding selective logging also avoids the construction of infrastructure (i.e. roads, logging trails, etc) which in turn avoids bringing more workers into the area in general, an activity that would typically result in increased hunting.

If any negative impacts are identified, the CIB social team and the community representative will address such problems with fast and effective solutions. The issue will be discussed and mitigation actions will be designed.

The Project is not expected to have negative social impacts on the communities surrounding the Project area since the project maintains the forest as it currently exists and there is no human habitation close to the Project Area. It is not expected that the Project will negatively impact any offsite communities. In the case of any potential negative impacts, representatives of the impacted community will bring it to the attention of the CIB community representative. No unmitigated social or economic impacts are expected from the Project.

Environmental impacts of the project are conservatively projected to be positive for biodiversity, water quality, air quality, and climate impacts.

6 STAKEHOLDER COMMENTS

The North Pikounda REDD+ project met and consulted with a range of stakeholders, for the development of the Project. Stakeholders included, national and local government bodies in the Republic of Congo, International IGOs and NGOs, local communities near the project area and local civil society representatives.

In interacting with communities surrounding the Project Area, the Project would use CIB's *in situ* Social Teams and apply FSC principles to such interactions and the results.

1. REDD+ Technical Meeting with RoC / MDDEFE / CIB-Olam - Singapore.

October 2011

CIB-Olam and the MDDEFE representatives for REDD+ activities in RoC met in order to discus the integration of the North Pikounda REDD+ Project within the RoC's emerging REDD+ Readiness activity. The meetings resulted in an "in principal" agreement for the RoC to pursue REDD+ with CIB-Olam.

2. North Pikounda Awareness Workshop - Ouesso, Dept. Sangah, Republic of Congo

November 2011

In November 2011 the North Pikounda Awareness Workshop was held where two main presentations were made regarding Congo and REDD+ and the North Pikounda Project. The presentation were attended by 99 persons and stakeholders; from local and national government, civil society, private companies, local and indigenous communities, bank services, forest companies, schools manager, etc. After the presentations, the workshop had enhanced on-the-ground understanding of climate change and associated risks, as well as the aim and concept of the North Pikounda Project. The workshop also validated the pursuit of the Project and want to be involved in that process and be aware of the developments of it.

4. Molanda Mission - Molanda, Dept. Sangah, Republic of Congo

October 2012

Molanda is the community that is closest to the Project areas and is thus most likely to be impacted by the Project.

CIB's FSC certified Social Teams as well as local CSO representatives visited with the communities in order to raise their awareness on climate changing. This was done by screening of a movie and subsequent discussion on REDD+ issues and the North Pikounda Project. The Communities support the North Pikounda REDD+ Project and have sent further representatives to the REDD+ Pilot Project Steering Committee.

The outcome was that the villagers understood the concept of climate changing and were able to identify some key changes in their own environment. They further understood and supported the REDD+ project that was happening in their location.

Regular contact is planned with the village for on-going communication and monitoring.

5. Side Event on the REDD+ initiatives in Congo – Durban, South Africa

November 2011

A formal side event was held at the UNFCCC COP/MOP 17 in Durban where CIB-Olam participated with the Congolese delegation in explaining REDD+ readiness activity to international CSO, IGO and climate change negotiators. It resulted in the later approval of the UN RPP, study on the deforestation rate by GAF and other National REDD+ Readiness activity.

Additionally, Senior Management and Timber Executives from CIB-Olam met with RoC MDDEFE Ministry and international stakeholder regarding the North Pikounda REDD+ Project with the ultimate outcome of the signing of the RoC & CIB-Olam North Pikounda REDD+ Pilot Project Agreement in May 2012.

6. REDD+ PILOT Project Steering Committee - Pokola, REPUBLIC OF CONGO

September 2012

On 04 September 2012 the first REDD+ Pilot Project Steering Committee was convened in Pokola, Republic of Congo in order to formally initiate and legalise the North Pikounda REDD+ Project. The following table sets forth an overview of the attendees and the organization they represented. A total of 21 delegates were invited. Included members of local communities and local CSO representatives.

The meeting was presided over by the President of the Pilot Steering committee.

Organismes	Délégués conviés
MDDEFE	DG du Développement Durable(VIP) Représentant de la DGEF Représentant de la DGE Coordonnateur National REDD(VIP)
	DVRF (Sachant)(VIP)
	Conseiller aux Forêts (Sachant)(VIP)
	Conseiller juridique (Sachant)(VIP)
Ministère du Plan et de l'Economie	Représentant du MPE
Ministère des Finances du Budget et du Portefeuille Public	Représentant du MFBPP
Conseil Départemental de la Sangha	Président du Conseil Départemental de la Sangha
Préfecture de la Sangha	Secrétaire Général de la Préfecture de la Sangha
	Directeur Départemental Economie Forestière Sangha
	Directeur Départemental Environnement Sangha
Sous-Préfecture de Pikounda	Sous-Préfet de Pikounda
Village Molanda	Président du Comité de village de Molanda Représentant des populations autochtones de Molanda
Plateforme REDD+ Sangha	Représentant Plateforme REDD+ Sangha
CIB/OLAM	4 Représentants
TOTAL	21 personnes

Table 35 - Attendees at the REDD+ Pilot Steering Committee

The meetings resulted in the formal Initiation of the steering committee and approval of the project time line. Budget issues remain under discussion.

7. World Bank Carbon Fund / UN-REDD Meetings - Brazzaville, Republic of Congo

October 2012

The North Pikounda REDD+ Project was invited by the World Bank and UN-REDD to attend concurrent meetings attended by the majority of the Congo Region's primary stakeholders. The meetings were attended by the entire spectrum of REDD+ stakeholders.

The North Pikounda REDD+ Project took part in a side event hosted by the UN REDD+ Program on the evening of Thursday 25 October. The UN-REDD+ Program formally hosted the event entitled Congo Basin MRV Side Event and had presentations from UN REDD+, Democratic Republic of Congo, Panama, World Bank and the North Pikounda REDD+ Project.

Participants and stakeholders of this regional REDD+ meeting were able to learn about the project and what its impacts might be in Congo and the Congo Basin.

The Project, in conjunction with the RoC, also organised a filed trip for the participants and delegates and as a result, nearly 70 persons were able to see first hand the activities of CIB in Pokola.

8. Ongoing Meetings with Republic of Congo National REDD+ Coordination Team

On-going

CIB-Olam and Carbon Conservation are in continuous contact with the RoC National REDD+ Coordinator. The teams meet regularly in order to ensure the integrity and longevity of the project, and to further ensure that Congolese forestry directives and norms are adhered to, especially in respect of the MRV aspects of the Project.

9. Stakeholder Comments

Throughout the stakeholder discussion, there were a number of key comments that were heard repeatedly from domestic and local stakeholders, they are summarised bellow:

1. How the benefits would be shared, especially with local communities;
2. Who would be interested in in purchasing the carbon certificates once they were made; and
3. How do you measure carbon in the forests?

Local communities (i.e. Molanda) were very interested in the notion of climate change and were able to provide telling stories regarding changes they have seen themselves in weather and weather related patterns in regards to fishing and agriculture activities. They were also keen to see the North Pikounda UFE protected. Naturally they also wanted to know if the protection of the forest for the REDD+ project would restrict their access to the North Pikounda UFE area. The Molanda community was in agreement in its belief that protecting the forest is beneficial for the climate and therefore for their daily living as they strongly rely on the natural resources for their survival

The only specific requests, and one that was heard both from international stakeholders right down through to the local NGO groups, was to ensure that the local communities would actually receive a benefit.

Taking Account of Stakeholder Comments

Although the design of the NPR+ Project was largely dictated as the result of the applied VM0011 methodology, the Proponents have when feasible, integrated feedback from stakeholders (including local ones) into the design of the project.

From a technical perspective, the questions of how the project would measure the carbon was one of intense interest from the RoC Forestry Ministry, and also those members of the RoC National REDD+ Coordination team, particularly from the MRV cell. The Proponents were keen to follow the requests of having the carbon inventory methods to be as similar as possible to the national forestry inventory methods. The MRV team from RoC were in fact invited to attend and validate the methods that were ultimately used and members of the National REDD+ coordination team participated in a portion of the inventory process as observers. The Proponents also organized numerous technical meetings and workshops with the National REDD+ Coordination team in order to not only review project progress, but to collaborate together on ensuring harmonization of the techniques of REDD+, especially in regards to carbon stock inventory matters.

From the perspective of ensuring community benefits, the Proponents were not only willing to listen to requests from local NGOs, local community leaders as well as national level stakeholders from the RoC ministries, but to seek to implement a world class community benefit program. This was a sensitive issue at the projects initial stakeholder pilot project steering committee meeting and one where the Proponents agreed needed to be addresses as effectively as possible. However as the NPR+ project as a VCS project sought to originate credits first, it was always represented that once the carbon component was proven to work, that the NPR+ Project would then integrate a CCBA approach. This was agreed to by CIB-Olam and the Roc in the REDD+ development agreement of May 2012, and was reiterated at further stakeholder discussions. The Proponents continue to plan to undertake a CCBA project validation.

The last major comment that was received was in regards to how the credits would be sold and who would buy them. However, as this is less of a project design issue, and instead one that requires a description of the markets, the project design was not impacted. However, the issues were always addressed with appropriate descriptions of the carbon market and how they worked.

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Annex

1. Allometric equations used for AGB estimation

- Tree between 5-156 cm DBH (Chave, 2005):

$$AGB = 0{,}0509\ \rho * D^2 * H$$

- Tree above 156 cm DBH (Chave, 2004):

$$AGB = \rho/0{,}6 * EXP\ [-3{,}742 + 3{,}45\ \ln(D) - 0{,}148\ (\ln(D))^2]$$

- Tree heigh (CIB, 2012; based on Feldpausch, 2012):

$$H = 58{,}3423*(1 - EXP(-0{,}017254*H^{0{,}95289}))$$

2. Total merchantable volumes harvested per year

UFP	Year	Volume (m^3)
1	2012	77820
	2013	77820
	2014	77820
	2015	77820
	2016	77820
2	2017	69694
	2018	69694
	2019	69694
	2020	69694
	2021	69694
3	2022	76338
	2023	76338
	2024	76338
	2025	76338
	2026	76338
4	2027	61582
	2028	61582
	2029	61582
	2030	61582
	2031	61582

3. Harvesting Intensity ratios retained per species

Species	HI_x (%)
Azobe	112
Bilinga	88
Bosse	94
Iroko	63
Padouk	16
Sapelli	120
Sipo	78
Tali	80
Wenge	95
Acajou	94
Dabema	2
Diania	0
Dibetou	8
Doussie	259
Ebene	10
Essessang	0
Etimoe	9
Eveuss	0
Frake	7
Iatandza	15
Ilomba	1
Kossipo	65
Kotibe	1
Koto	10
Lati	3
Limbali	0
Longhi abam	14
Longhi perp	0
Mambode	2
Niove	7
Ohia	0
Olon	0
Tiama	22

4. Mean distance between harvesting site and processing site ($KM_{transport,t}$)

UFP	$KM_{transport,t}$ (km)
1	66,19
2	86,58
3	88,19
4	97,84

5. Mean distance between processing site and export point ($KM_{distrib,destination,t}$)

Export point	Traject	Transport	$KM_{distrib,destination,t}$ (km)
Pointe-Noire	PKL-BZV	Road	880
	PKL-BZV	River	850
	BZV-PTN	Rail	510
Douala	PKL-DOU	Road	1350
	PKL-BEL	Road	750
	BEL-DOU	Rail	650

PKL: Pokola
BZV: Brazzaville
PTN: Pointe-Noire
DOU: Douala
BEL: Belabo