



2ND MONITORING REPORT NORTH PIKOUNDA REDD+ IFM PROJECT



Project title	North Pikounda REDD+ project
Project ID	1052
Monitoring period	01-January-2013 to 31-December-2019 (second monitoring period)
Original date of issue	10-February-2024
Most recent date of issue	31-July-2024
Version	05
VCS Standard Version	VCS AFOLU Requirement 3.3 (Oct. 2012)
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The North Pikounda REDD+ project is an emissions reduction project of Improved Forest Management (IFM), that aims to protect 92,530 hectares (ha) of unlogged native Congolese forest from planned logging through conservation. The forest is legally designated as a selective logging concession (the North Pikounda Unité Forestière d'Exploitation - UFE) by ministerial decree in 2002 and consists of 60% dry mixed forest and 40% designated wetland. The expected selective logging would normally have taken place on the dry land, which covers an area of 55,950 ha. These dry lands constitute the project credit area.

The concession is owned by Congolaise Industrielle des Bois (CIB), an established timber operator in the northern Republic of Congo (RoC) since 1968 (Figure 1). The company currently has five active sawmills, dryers and molding units in Pokola and Loundoungou, and employs over 900 permanent staff and more than 100 subcontractors. CIB was the first timber company in the RoC to submit a Forest Management Plan (FMP) in 2005 and the first to be certified by the Forest Stewardship Council (FSC) in 2006.

The project is located in the Sangha region, part of the northern RoC forest sector. The UFE is a component of the Pikounda Unité Forestière d'Aménagement [Forest Management Unit] (UFA), divided into two UFEs:

- the North Pikounda UFE, designated for timber extraction allocated to CIB; and

- the South Pikounda UFE, decreed to become the 'Tokou-Pikounda Protected Area'.

The main activity of the North Pikounda REDD+ project is to cancel planned degradation and deforestation activities in favour of promoting the decision to conserve and protect the forest area and its biodiversity. This is significant as the project area has considerable biodiversity, including one of the largest known lowland gorilla populations in the Congo Basin. From project startup (January 1, 2012), it is estimated that approximately 4,900,000 metric tons (t) of greenhouse gas (GHG) emissions will be avoided that would have been emitted into the atmosphere over a 30-year period (December 31, 2041) in the absence of the project (ex-ante), not including the project's non-permanent risk buffer amount and leakage (if any), which will be accounted for over the life of the project.

From the outset, in both monitoring periods, CIB (and no other actor) has not used the logging right in the project area and has kept the forest intact and the entire project area (55,950 ha) was monitored by measuring permanent plots. During the first monitoring period (January 1 to December 31, 2012), The logging rights come from the Arrêté n° 6406/MDDEFE/CAB of the Minister of Sustainable Development, of the Forestry Economy and Environment (MDDEFE)¹. The net amount of VCU's achieved for the project

¹ The document is available for consultation to the VVB and the Standard, under the name "EF-AR-92 - POKOLA & PIKOUNDA.pdf" (French and English version)

was 56,209. For the second monitoring period (January 1, 2013 to December 31, 2019), the net amount of VCUs achieved for the project is estimated to be 556,706.

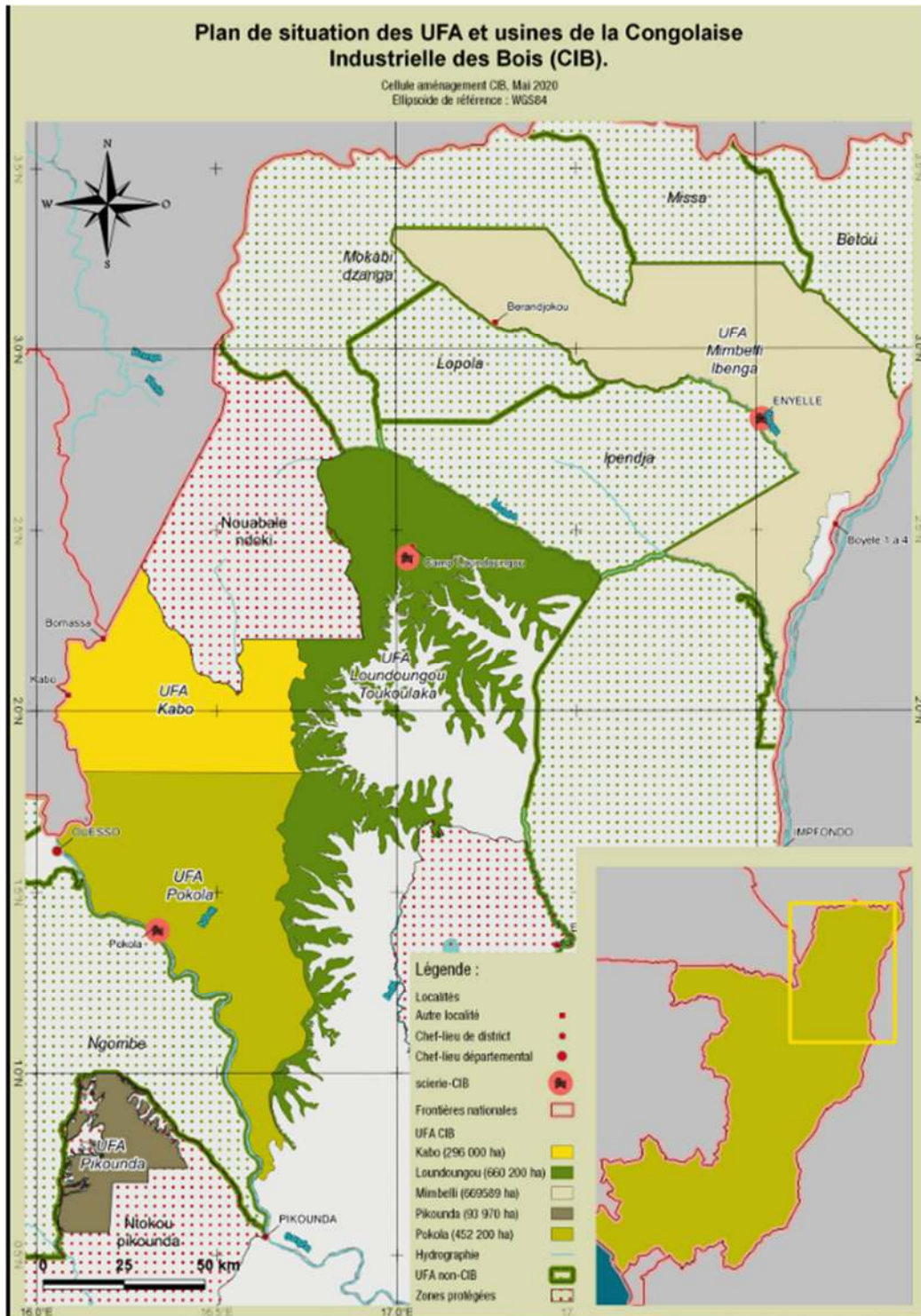


Figure 1: Forest Concessions Managed by CIB

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation and First Verification	01-01-2012 to 31-12-2012	VCS	DNV Climate Change Services AS	1 year
Second Verification	01-01-2013 to 31-12-2019	VCS	KBS Certification Services	7 years

1.3 Sectoral Scope and Project Type

Sectoral scope	14
AFOLU project category ²	Improved Forest Management (IFM).
Project activity type	Logged to Protected Forests - LtPF

1.4 Project Proponent

Organization name	Congolaise Industrielle des Bois
Contact person	Mr. Ashish Malik
Title	Director General, Congolaise Industrielle des Bois
Address	BP 41 Ouessou, Republic of Congo
Telephone	+41(0) 79 137 0406 M: +242 06 900 1305
Email	ashish.malik@olamagri.com (CIB is a fully subsidiary of OLAM Agri)

Organization name	Olam International Limited
Role in the project	Co-proponent, CIB is a fully subsidiary of OLAM Agri
Contact person	Mr. Ashish Malik
Title	Senior Vice President Wood Products

² See Appendix 1 of the VCS Standard

Address	Aeschengraben 6, 4051 Basel, Switzerland
Telephone	+41(0) 79 137 0406 M: +242 06 900 1305
Email	ashish.malik@olamagri.com

1.5 Other Entities Involved in the Project

Organization name	South Pole Carbon Asset Management Ltd.
Role in the project	Project Consultant
Contact person	Mrs. Tania Cencetti
Title	Senior Manager NBS Projects
Address	Technopark Str. 1, 8005 Zurich, Switzerland
Telephone	+ 41 43 501 35 50
Email	t.cencetti@southpole.com

1.6 Project Start Date

Project start date	01-January-2012
Justification	Which is the date when harvesting of the North Pikounda forest would have commenced based on the approval of the North Pikounda UFE FMP from the Republic of Congo Ministère du Développement Durable de l'Economie Forestière et de l'Environnement [Ministry of Sustainable Development, Forestry Economy and Environment] (MEFDD), and the moment where the conservation of this forest concession started.

1.7 Project Crediting Period

Crediting period	30 years, with a baseline reassessment every ten years as is asked in the VCS standard 4.5 for IFM projects.
Start and end date of first or fixed crediting period	01-January-2012 to 31-December-2041

1.8 Project Location

The project is located in the Sangha Department in the northern part of the African country of the RoC, near the border with Cameroon (see Figures 2 and 3). The largest city near the project is Ouésso, which is located on the Sangha River and the border with Cameroon. The project area is less than a degree north of the equator and sits within the northwestern portion of the Congo River Basin, which is renowned for its large stands of tropical rainforests and extensive biodiversity.

The North Pikounda UFE is a logging concession controlled by CIB in the northern part of the RoC, whose local operational headquarters are downstream of Ouésso in the town of Pokola. The limits of the North Pikounda UFE are defined by Ministerial Decree No. 8233/MEF/CAB of October 05, 2006 and are described below. The UFE is delineated by:

- in the west: from the $0^{\circ}33'42''$ N parallel, the limit follows the flooded forests of the Kandeko river and, subsequently, the Ebangapélé river up to the 1° N parallel;
- from north to northeast and east: the limit corresponds to the 1° N parallel until the Ebangui river. There, it follows the Ebangui river flooded forests until the $16^{\circ}25'07''$ E meridian; and
- from southeast to west: the limit follows the $0^{\circ}44'13''$ N parallel between meridian $16^{\circ}25'07''$ E and meridian $16^{\circ}18'35''$ E. Then, it follows the later meridian to the south until crossing the $0^{\circ}41'56''$ N parallel, before following this parallel straight to the west until it crosses the meridian $16^{\circ}12'38''$ E. There, it follows a line oriented at 186° until the points of geographic coordinates $0^{\circ}33'42''$ N– $16^{\circ}12'03''$ E. From there, the limit follows the $0^{\circ}33'42''$ N parallel until it crosses the Kandeko river.

According to the decree, the project area is 93,970 ha. However, when corrected by geographic information system (GIS), the project area is 92,530 ha, the dimension retained for this project. The project crediting area consists of all the 'dry land' within the North Pikounda UFE (Figure 3).

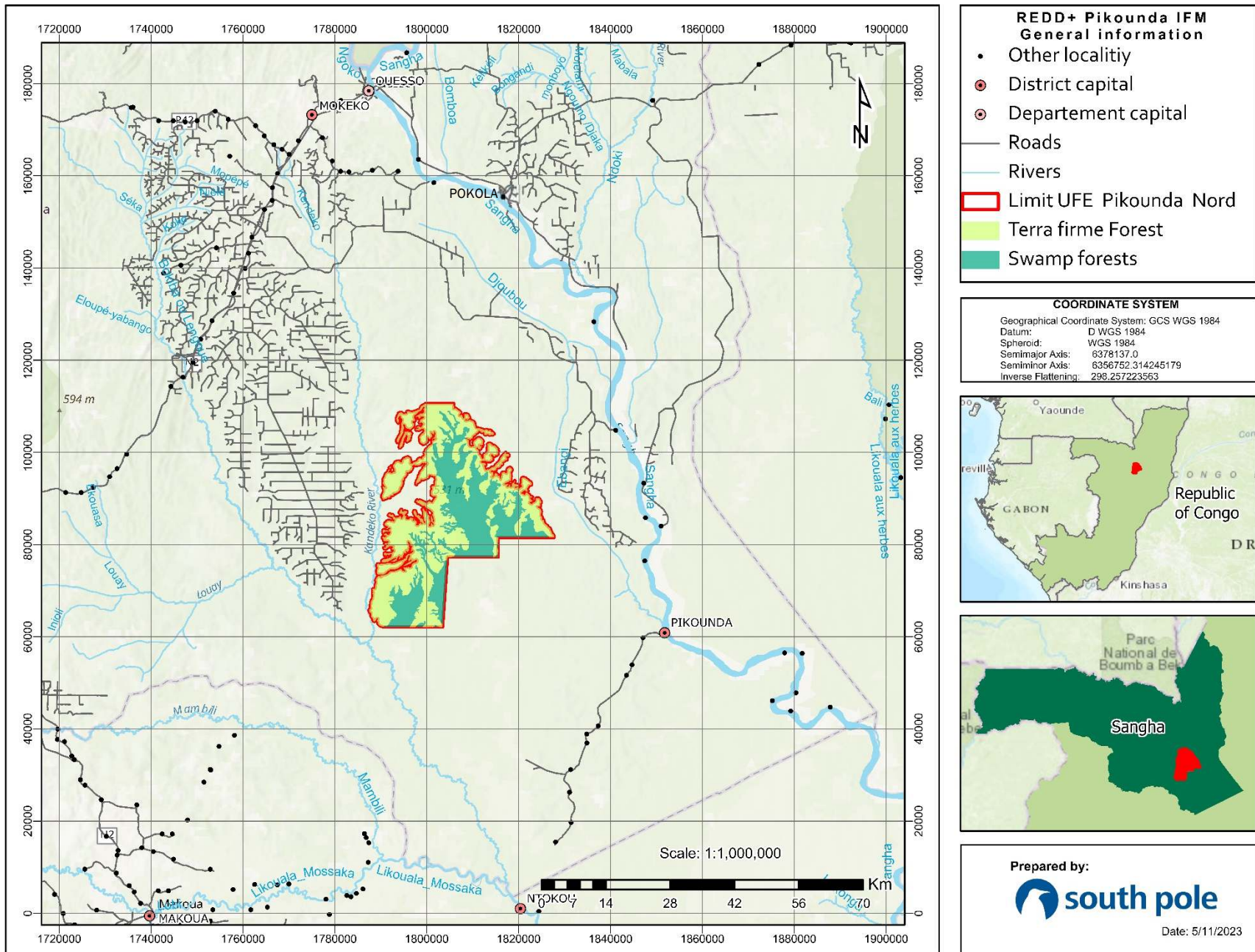
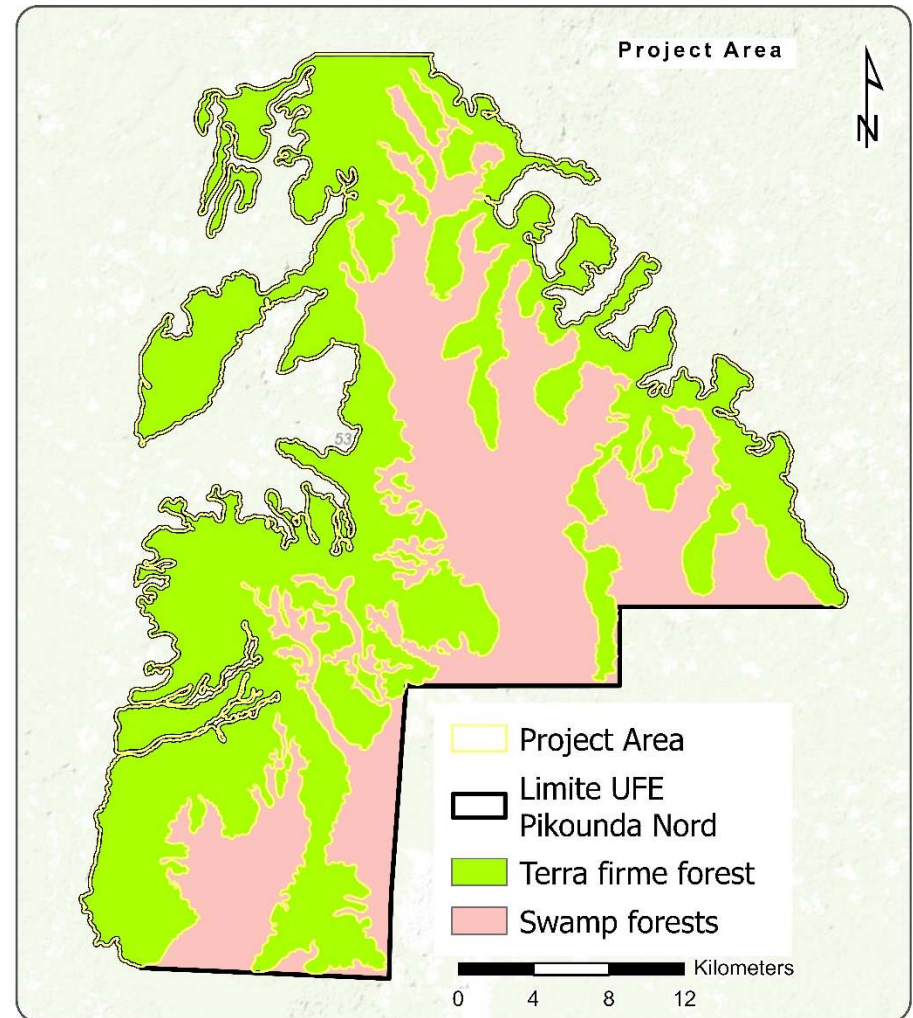
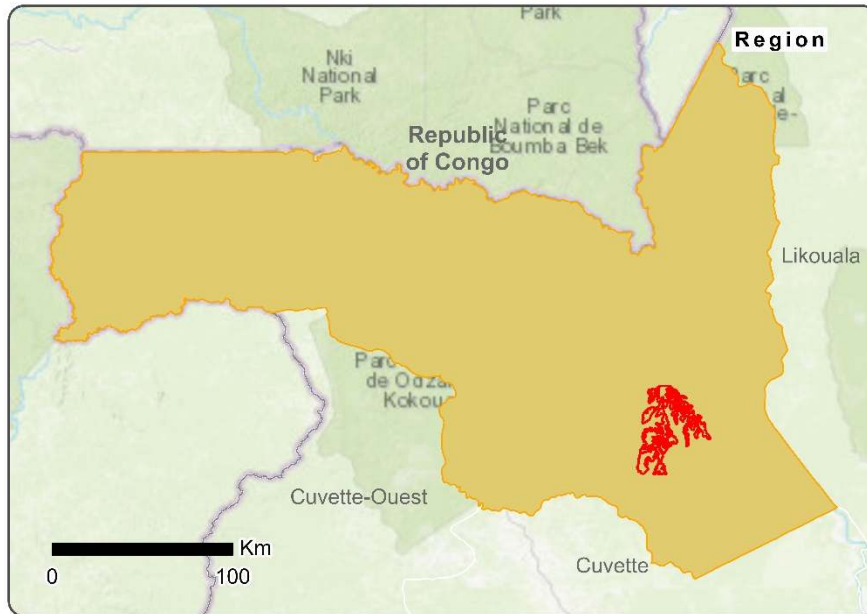
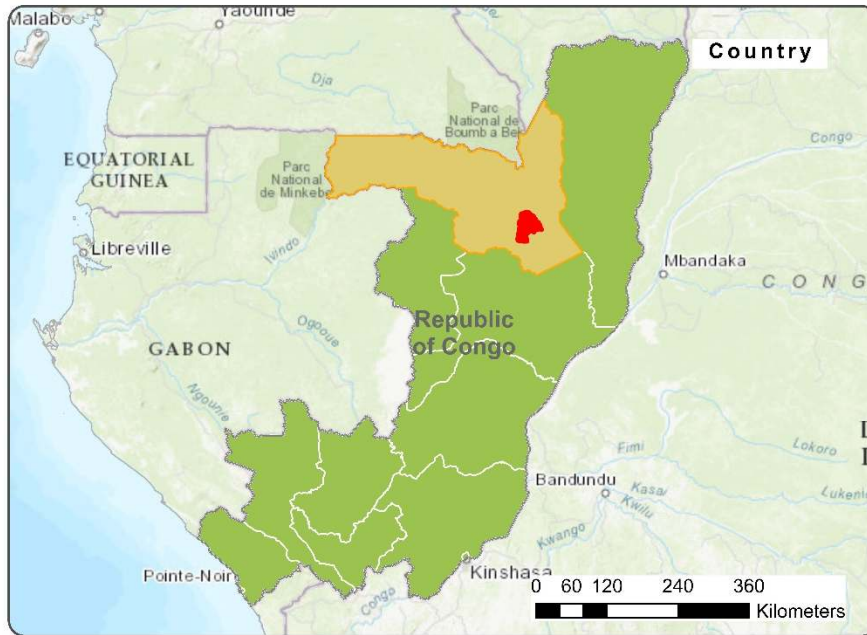


Figure 2: General Localization and the Main Cities Around the Project Area (terra firme forest)



Date: 5/11/2023

Coordinate System:
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere..

Source: Project Cartography
Esri, © OpenStreetMap contributors, HERE, Garmin, USGS, NGA, Esri, HERE, Garmin, FAO, NOAA, USGS

Prepared by:

Figure 3: General Localization and Zones in the Project Area (Mainland Rainforest)

1.9 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	VM0011	VM0011 Methodology for Calculating GHG Benefits from Preventing Planned Degradation	1.0
Tool	VT0001	VT0001 Tool for the Demonstration and Assessment of Additionality in Verified Carbon Standard (VCS) AFOLU Project Activities	3.0
Tool		AFOLU Non-Permanence Risk Tool	4.0

1.10 Double Counting and Participation under Other GHG Programs

1.10.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

Yes No

1.10.2 Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

Yes No

The project is also currently registered under the “Emission Reduction Program in Sangha and Likouala” (located in the Sangha and Likouala departments, Republic of Congo), under the Forest Carbon Partnership Council (FCPF) Standard of the World Bank (<https://www.forestcarbonpartnership.org/country/congo-republic>). The FCPF project will be active and generate credits from 2020 to 2024, so after the finish of the considered monitoring period for the VCS project. This means that the project has been registered for the 2013-2019 period. There’s thus no risk of double counting for the current VCS project.

1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

There is no risk of double claiming for this verification period because the verification period goes from the 1st of January 2013 to the 31st of December 2019. Therefore, this verification will not overlap

with the Forest Carbon Partnership Facility (FCPF) program in the Republic of Congo³, financed by the World Bank, starting on the 1st of January 2020 until the 31st of December 2024⁴.

1.11.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

Yes No

1.11.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

Yes No

1.11.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

Yes No

1.12 Sustainable Development Contributions

The implementation of the project has helped to promote climate mitigation, strengthening the conservation of ecosystems and their services, such as peatland regulation, wildlife refuge and carbon storage. Through the emissions avoidance and removals that the project has been carrying out, it is possible to demonstrate the project's contribution to climate mitigation and carbon storage, the Emission Reduction (ER) measurements attached to this monitoring report confirm how the forest conservation has contributed to this. Although for the present monitoring period no specific activities have been implemented for the demonstration of peatland regulation and wildlife refuge, the absence of impacting activities such as selective logging or encroachment, allows inferring that the project area is a safe place for wildlife and to ensure the health of the peatlands. The year-by-year land cover classification, attached to this monitoring report, shows how the peatlands have maintained their area throughout the monitoring period,

³ FCPF. Republic of Congo. Link: <https://www.forestcarbonpartnership.org/country/congo-republic>

⁴ FCPF (2024, May). Republic of Congo: Emission Reductions Program, Country PProfile. Link: https://www.forestcarbonpartnership.org/sites/default/files/documents/congo_roc_country_profile_fcpf.pdf

indicating that at least in terms of area, their protection has been ensured for the current carbon project.

Due to the isolation of the project area, this forest has not been dependently used by the local communities, as verified during an interview process conducted during December 2022 (Appendix 9, separate excel file), and from which the most common response was the impossibility of harvesting the Pikounda area due to the great distance of the project from the communities of Molenda and Pikounda, and the low necessity to do that displacement to cover their needs, especially since the communities are surrounded by natural forests. Although the risk of encroachment in Pikounda is low, CIB has maintained permanent employees who have helped prevent illegal harvesting within and around all their concessions, including the entrance and surroundings of the Pikounda area.

The development of this project has directly contributed to the RoC government's vision of maintaining a low rate of deforestation while diversifying its economy, all within the framework of the REDD+ strategy, the Congo Basin Forest Partnership and the Central African Forest Initiative (CAFI). Specifically, the RoC's vision for REDD+⁵ is to reduce emissions from deforestation and forest degradation without compromising socioeconomic development capacities, for which the North Pikounda project largely contributes to this purpose by generating carbon sequestration instead of forest degradation, as was envisaged in its initial timber concession use. The carbon project has contributed to diversify the economy in the region by generating a different income from ecosystem benefits that has reduced the forest degradation on the entire region and has become an example for other forest concessions on the clear opportunities in parallel markets based on ecosystem services finance and not just based on forest degradation.

Also, under CAFI⁶, since 2019 the RoC has committed "to protect peatlands by prohibiting any drainage and desiccation and preventing the conversion of more than 20,000 hectares of forest per year, and this only outside forests with high carbon stocks and high conservation value". Because the area around the project site is classified as peatland, not clearing in the dryland (forest belonging to the project area) directly benefits the conservation of these wetlands, contributing to the above-mentioned commitment, at least during two years in the monitoring period (2019 - 2021), and before since the concession permit was granted in 2012.

Stakeholders (see section 2.2), have not changed during the current monitoring period (2013 - 2019)

At the current time, the project proponent (CIB - OLAMAgri) has not received revenues for the issuance of credits. Because the amount for the first verification was small (56,196 credits) compared to the expected credits for the second verification, once revenues from both

⁵ CAFI. 2018. 2018 - Plan d'Investissement de la Stratégie Nationale REDD+ de la République du Congo 2018-2025 (version 7b). [http://www.cafi.org/sites/default/files/2021-03/2018%20-%20Plan%20d%27Investissement REDD RoC version%20Finale7b.pdf](http://www.cafi.org/sites/default/files/2021-03/2018%20-%20Plan%20d%27Investissement%20RoC%20version%20Finale7b.pdf)

⁶ CAFI. 2021. Consolidated report. <https://www.cafi.org/sites/default/files/2023-04/CAFI%202021%20Consolidated%20Annual%20Report%20-%20V3%20FINAL%20.pdf>

verifications are received, CIB - OLAMAgri will disburse the benefits agreed with the government and the communities of Molenda and Pikounda, following the next plan:

- Project development costs have been shared with the government for audit.
- The project requires that 20% of the net profit be shared with the government, which also includes the community share (included in the Memorandum of understanding, Article 3, Activity 10).

Table 1: Sustainable Development Contributions

Row number	SDG target	SDG indicator	Net impact on SDG indicator	Current project contributions	Contributions over project lifetime
1)	8.5	8.5.1 Average hourly earnings of employees, by sex, age, occupation, and persons with disabilities	Implemented activities to increase	Average earnings during this monitoring period (i.e., 2013–2019) were 8,966 XAF/day (CURRENCY/DAY), representing an increase of 38% compared with average earnings in the last nine years	In the last 10 years, the project has employed people with average earnings of 9,308 XAF/day (CURRENCY/DAY), whereas average earnings before the start of the project were 6,520 XAF/day (CURRENCY/DAY) (payroll report is attached)
2)	8.5	Percentage of workers linked to CIB in relation to the total number of permanent and temporary employees	Implemented activities to increase	People contracted for the project during this monitoring period (i.e., 2013–2019) were 38	In the last 10 years, the project has employed at least 24 people, of which two have been women. These two women have been involved in community relations (Hortense Benabo) and data management (Diane Ockhembat); CVs are attached.

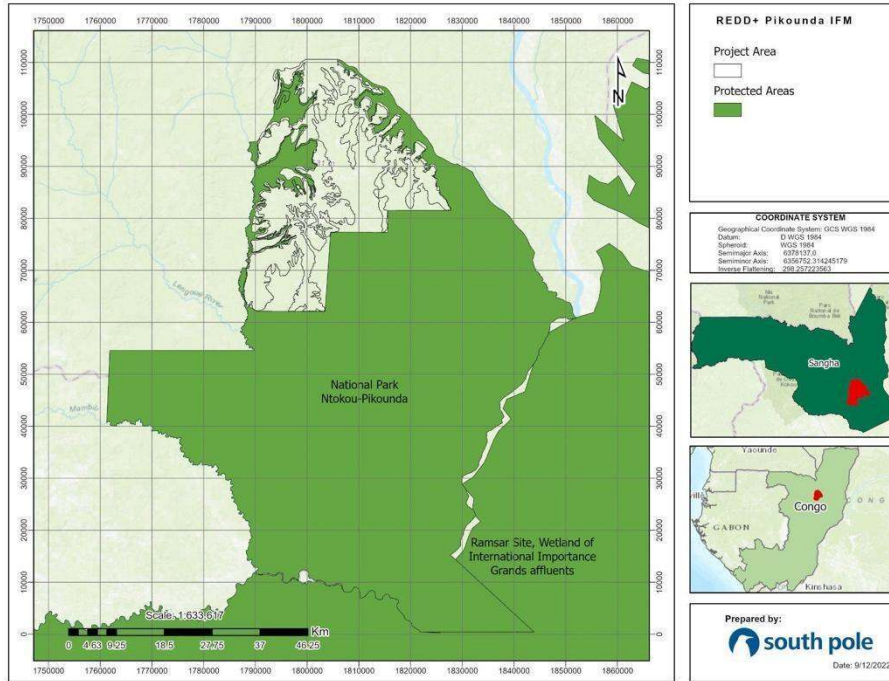
3)	13.0	tons of GHG emissions avoided or removed	Implemented activities to increase (activities in this case refer to forest conservation and to stop the intention of logging)	During the second monitoring period (2013-2019) the conservation of the forest continued, and 92,530 ha of rainforest were protected, including the peat swamp surrounding the project area (dryland forest). During the second monitoring period, the project 1052 has avoided the emission of 556,706 t of carbon dioxide equivalent into the atmosphere, as can be verified through the estimation of the emissions reductions presented as an appendix of this report (appendix 4).	The emission of 556,706 t of carbon dioxide equivalent into the atmosphere has been avoided by preserving the project area (activity), cancelling any logging intentions. The avoided emissions correspond to the emissions due to the reference scenario in which Pikounda could have been converted in the absence of the IFM carbon project, in short, the emissions due to the conversion of the forest into processed timber.
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4)	15.1	15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	Implemented activities to increase	<p>During the 2nd monitoring period, CIB-OLAMAgri made an agreement with WWF . The agreement sought authorization to conduct reconnaissance missions in the North Pikounda FMU by WWF, which is the entity in charge of the management and control of the adjacent park, the Ntokou Pikounda National Park (figure 4).</p>	<p>Over the entire period since registration, the project has protected 92,530 ha, of which 55,950 ha are dry land mixed forests and 36,570 ha are wetlands (e.g., flooded forests, riparian and riverine forests, and marshes). By avoiding logging, these forests have kept their natural values intact.</p> <p>In addition, the agreement signed with WWF, the organization in charge of the Ntokou Pikounda National Park, adjacent to Pikounda, enhances the monitoring of the project area that CIB-OLAMAgri has been doing in this area, by contributing to this indicator, 15.1, in the protection of important sites, in this case mixed dryland (60.5%) and wetland forests (39.5%). Within the framework of this project, the North Pikounda FMU can be considered a protected area due to CIB-OLAMAgri's legal permission to use it and their interest in maintaining it as a conservation area, plus its isolation and boundaries with other private concessions and a national park.</p>
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5)	15.5	15.5.1 Red List Index	Implemented activities to increase	<p>During the monitoring period no activities were implemented directly by CIB on this regard. However, under the agreement that CIB has with WWF and the RoC National government, there were monitoring patrols in the east and north side of the project area to avoid the presence of poachers. As a result of these patrol operations along the northern border adjoining the Pikounda North UFE and in particular in the Pikounda sector, a tendency for the progressive return of elephants has been observed along the Kandeko river, specifically in the area associated with herbaceous aquatic plants. (See Appendix 1)</p>	<p>The protection of the project area has maintained the population of gorillas, apes, elephants, ungulates, and other animal species with International Union for Conservation of Nature and/or Convention on International Trade in Endangered Species of Wild Fauna and Flora status according to sampling conducted in the project area in 2014. According to a recent report (December 2022)⁷ the area has efficiently kept free of poaching and other threats related to the illegal hunting. In addition, the area in the south borders the Ntokou-Pikounda National Park, an exceptional priority area for the conservation of species within the Odzala/Lossi/Pikounda/Ngombé/Ntokou complex in the northern RoC.⁸</p>
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⁷ Appendix 1 Threats of poaching.

⁸ https://interholco.com/images/pdfs/Maisels-et-al-2015-Wildlife-and-human-impact-survey-of-Ngombe-Ntokou-Pikounda-EN-v2_FINAL.pdf



	<p>community and a presentation on REDD+ given in “easy French”. The meeting was closed by a consultation with community representatives. A movie summarizing all aspects of the consultation has been made; and</p> <ul style="list-style-type: none"> the MEFDD - Ministry of Forest Economy, Republic of Congo <p>The results of such interactions between CIB and the listed entities can be found on page 103, Section 6 ('Stakeholder comments') in the Project Design Document (PDD). In summary, no stakeholder expressed any conflict with the project implementation.</p>
<p>Legal or customary tenure/access rights</p>	<p>At the moment just CIB has legal rights on the project area through a logging concession permit granted in 2012. Communities of Molanda and Pikounda do not have any land tenure right over the project area, indeed both communities are apart from the project area for more than 20 km (figure 5).</p>
<p>Stakeholder diversity and changes over time</p>	<p>Stakeholders consulted for the validation and in the first verification period have not changed in the last nine years</p>
<p>Expected changes in well-being</p>	<p>The inhabitants of the Molanda and Pikounda communities neither before the project nor now have had livelihood activities in the project area due to the remoteness of their settlements. At the current time, the project proponent (CIB - OLAMAgri) has not received revenues for the issuance of credits. Because the amount for the first verification was small (56,196 credits) compared to the expected credits for the second verification, once revenues from both verifications are received, CIB – OLAM Agri will disburse the benefits agreed with the government and the communities of Molanda and Pikounda, following the next plan:</p> <ul style="list-style-type: none"> Project development costs have been shared with the government for audit. The project requires that 20% of the net profit be shared with the government, which also includes the

	community share (included in the Memorandum of understanding, Article 3, Activity 10).
<p>Location of stakeholders</p>	<p>Molanda and Pikounda are located on the Sangha River, 20 km to the eastern border of the project. The closest community (Molenda) is over 20 kilometers away, and access to the concession would require crossing the Ebangue River and then trekking 20 kilometers overland through dense and mostly swampy forest with no paths, let alone roads.</p>
<p>Location of resources</p>	<p>There are no resources of which the communities have made any use.</p>

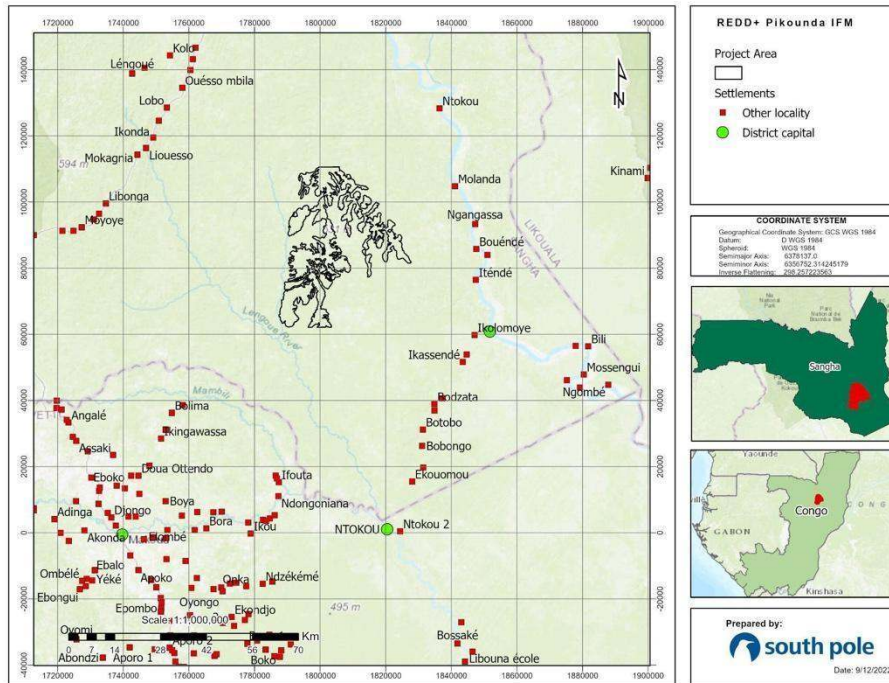


Figure 5: General Localization and Settlements Around the Project Area

2.1.2 Stakeholder Consultation and Ongoing Communication

No formal stakeholder consultation was conducted prior to this verification, other than the stakeholder engagement conducted at the first verification. At the time the monitoring plan was validated there was no request for an ongoing communication plan from the standard, then although there were informal communications with the nearest communities (20 km away), there was no supporting documentation from them. As part of the FSC certification that the Pikounda

project recently obtained, meetings were held in the communities of Molanda and Pikounda in December 2022 (it is not part of the current monitoring period 2013-2019) applying a brief survey about their knowledge of possible encroachments in the project area.

Ongoing consultation	NA
Date(s) of stakeholder consultation	NA
Communication of monitored results	NA
Consultation records	NA
Stakeholder input	NA

2.1.3 Free, Prior, and Informed Consent

No FPIC was developed for this monitoring period.

Consent	NA
Outcome of FPIC	NA

2.1.4 Grievance Redress Procedure

No grievances were raised during this monitoring period. CIB team use to go to communities of Molenda and Pikounda because of different matters, in those moments there is the possibility to communicate about the concerns people have regarding the project.

Grievances received	Resolution and outcome
NA	NA

2.1.5 Public Comments

No comments were received during the monitoring period 2013-2019.

Summary of comments received	Actions taken
NA	NA

2.2 Risks to Stakeholders and the Environment

Use the table below describe the risks identified at validation. Describe the mitigation or preventative measure in place to address the identified risk during the monitoring period. Where no risk was identified, write “No risk identified” in the first column, and provide justification in the second column.

	Risk identified	Mitigation or preventative measure taken
Risks to stakeholder participation	No risk identified	All the stakeholders that have or could have any influence on the project were identified since the beginning.
Working conditions	No risk identified	CIB follows right procedures to manage adequate working conditions in all the concessions granted.
Safety of women and girls	No risk identified	The project does not have influence on this group in particular.
Safety of minority and marginalized groups, including children	No risk identified	The project does not have influence on this group in particular.
Pollutants (air, noise, discharges to water, generation of waste, release of hazardous materials)	No risk identified	The project does not have any activity related with pollutants.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

Use the table below to demonstrate the project’s respect for rights related to work and labor during the monitoring period.

Discrimination and sexual harassment	During the second monitoring period no discrimination and sexual harassment occurred. In section 1.12 sustainable development contributions is stated how the project contribute in this regard. Two women were participated during the second monitoring period
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	and were involved in community relations (Hortense Benabo) and data management (Diane Ockhembat).
Management experience	South Pole is now doing the documentation to present as support for the current verification. South Pole is a company with more than 20 years of experience in the carbon market and has experience in the quantification of avoided emissions from the conservation of natural forests.
Gender equity in labor and work	Although just two women from CIB participated in the development of activities relating to the project, CIB manage good practices to promote gender equity in labor and work.
Human trafficking, forced labor, and child labor	Project does not use people for the development of activities in the project without any contract (in section 1.12 this is explained)

2.3.2 Human Rights

The right to the land in the project area is temporarily granted to CIB because Pikounda Nord belongs to the State and is one of a dozen FMUs in this part of northern Congo whose development has been entrusted to private companies. While the residents of the Molanda and Pikounda communities assert that they do not currently utilize resources within the project area, it is noteworthy that the envisaged land use, centered around forest conservation, aligns harmoniously with their existing activities such as fishing or gathering fruits in areas closer to their communities than the designated project zone. Consequently, if conservation measures are effectively implemented in the Pikounda project, downstream benefits may indirectly accrue to these communities, as the absence of pressures upstream could potentially yield more abundant resources. Moreover, it is crucial to emphasize that the residents' right to mobility remains unimpaired, and they retain the freedom to access the project area should they choose to do so. Furthermore, the workforce engaged for the project adheres to the requisite conditions mandated by the Republic of Congo's government, as evidenced in Section 1.12 on Sustainable Development Contributions.

2.3.3 Indigenous Peoples and Cultural Heritage

Project activities does not imply any influence on indigenous people and cultural heritage.

2.3.4 Property Rights

Disputes over rights to territories and resources	N/A
Respect for property rights	N/A

2.3.5 Benefit Sharing

Where the project impacts property rights as described in Section 2.5.4 above, use the table below to describe the benefit sharing that occurred during the monitoring period, in accordance with the validated agreement.

<p>Summary of the benefit sharing plan</p>	<p>CIB - OLAM Agri, as the project proponent, is entitled to receive the proceeds from the sale of the credits. CIB is committed to disburse the benefits agreed with the government and the communities of Molenda and Pikounda, following the next plan:</p> <ul style="list-style-type: none"> • Project development costs have been shared with the government for audit. • The project requires that 20% of the net profit be shared with the government, which also includes the community share (included in the Memorandum of understanding, Article 3, Activity 10).
<p>Benefit sharing during the monitoring period</p>	<p>At the moment no income has been received, once the income corresponding to the first and second verification is under the responsibility of the CIB the plan will be implemented.</p>

2.4 Ecosystem Health

Identify and summarize risks to the environment identified at validation and the steps taken to mitigate them during the monitoring period. Where no risk is identified, write "No risk identified" in the first column, and provide justification in the second column.

	Risk identified	Mitigation or preventative measure taken during the monitoring period
<p>Impacts on biodiversity and ecosystems</p>	<p>No risk identified</p>	<p>The project has only positive impacts on biodiversity and ecosystems, as its main activity is forest conservation.</p>
<p>Soil degradation and soil erosion</p>	<p>No risk identified</p>	<p>The project does not have any activities that contribute to soil degradation or erosion.</p>

Water consumption and stress	No risk identified	There are no human settlements in the project area, so no water is consumed.
Usage of fertilizers	No risk identified	The project does not use fertilizers, as no activity requires their use.

2.4.1 Rare, Threatened, and Endangered species

Swamp forests	The project does not have any activities that adversely affect the swamp forests adjacent to the project area in the eastern part. In fact, under Pikounda conservation these swamp forests are protected against any degradation. It is clear from the analysis of satellite imagery that no degradation is detected around the project area, especially in the swamp forests on the eastern boundary (appendix 13).
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2.4.2 Introduction of species

N/A. The project does not have planting or species introduction.

Species introduced	Classification	Justification for use	Adverse effects and mitigation
N/A	N/A	N/A	N/A

Existing invasive species	Mitigation measures to prevent spread or continued existence of invasive species
N/A	N/A

2.4.3 Ecosystem conversion

N/A

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activities follow the implementation procedure outlined in the monitoring plan included in the PDD and are provided in Appendix 8 of the PDD validated, and Appendix 16 for the present Monitoring report.

Table 2 describes the precise implementation of each sub-activity of the monitoring plan during the 2013–2019 monitoring period.

Table 2: Implementation Status of Project Activities

Activities and sub-activities	Description
1) Permanent sample plot (PSP) monitoring	
1.1) PSP inventory	Inventory of the 57 PSPs on different dates: 06/13/2021, between 07/05/2021 and 07/19/2021, and between 09/04/2021 and 09/16/2021. (Appendix 10 about the methodology followed, and Appendix 11 for the sampling estimation procedure)
1.2) Data capture	PSP inventory data was captured in the Excel database at the end of field work in October 2021.
1.3) Monitoring maps creation	No maps were created during the second monitoring period as the same plots were visited and measured as in the first monitoring period.
1.4) Estimating aboveground biomass (AGB)	<p>After controlling 100% of the PSPs, the AGB has been estimated based on the following equations in the PDD:</p> <p>Tree between 5–156 centimeter (cm) diameter at breast height (DBH) (Chave, 2005):</p> $AGB = 0.0509 \times \rho \times DBH^2 \times H$ <p>Tree above 156 cm DBH (Chave, 2004):</p> $AGB = \frac{\rho}{0.6} \times e^{[-3.742 + (3.45 \times \ln(DBH)) - (0.148 \times (\ln(DBH))^2)]}$ <p>Tree height (CIB, 2012; based on Feldpausch, 2012):</p> $H = 58.3423 \times (1 - e^{[-0.017254 \times (DBH^{0.95289})]})$
1.5) Estimation growth foregone	After controlling 100% of the PSPs, growth foregone has been estimated based on the growth of commercial trees monitored in the PSPs between the first (2012) and the second (2021) monitoring events.
1.6) Estimating	After controlling 100% of the PSPs, regrowth after logging has been

Activities and sub-activities	Description																																																		
regrowth	estimated based on the growth of smaller trees (i.e., 5–20 cm DBH) monitored in the PSPs between the first (2012) and the second (2021) monitoring events.																																																		
2) Remote-sensed monitoring: illegal/natural disturbances																																																			
2.1) Acquiring Landsat and Sentinel images	During the monitoring period, a total of 9 images from the Landsat and 3 from Sentinel programs were used for classification analysis (appendix 13), The identification of images used and the process followed are both presented in Appendix 13.																																																		
2.2) Image analysis	<p>No degradation occurred in the project area during the monitoring period. No sign of illegal degradation around the project area.</p> <table border="1" data-bbox="602 814 1395 1287"> <thead> <tr> <th>Year</th> <th>Forest (ha)</th> <th>Non-forest (ha)</th> <th>Non-data (ha)</th> <th>Total (ha)</th> </tr> </thead> <tbody> <tr> <td>2013</td> <td>55,763</td> <td>0</td> <td>187</td> <td>55,950</td> </tr> <tr> <td>2014</td> <td>55,950</td> <td>0</td> <td>-</td> <td>55,950</td> </tr> <tr> <td>2015</td> <td>55,799</td> <td>0</td> <td>151</td> <td>55,950</td> </tr> <tr> <td>2016</td> <td>54,732</td> <td>0</td> <td>1,218</td> <td>55,950</td> </tr> <tr> <td>2017</td> <td>55,950</td> <td>0</td> <td>-</td> <td>55,950</td> </tr> <tr> <td>2018</td> <td>55,593</td> <td>0</td> <td>357</td> <td>55,950</td> </tr> <tr> <td>2019</td> <td>55,728</td> <td>0</td> <td>222</td> <td>55,950</td> </tr> <tr> <td>2020*</td> <td>55,950</td> <td>0</td> <td>-</td> <td>55,950</td> </tr> <tr> <td>2021*</td> <td>55,950</td> <td>0</td> <td>-</td> <td>55,950</td> </tr> </tbody> </table> <p>(*) 2020, and 2021 were used for the assessment for the sake of conservativeness but they are not part of the monitoring period</p>	Year	Forest (ha)	Non-forest (ha)	Non-data (ha)	Total (ha)	2013	55,763	0	187	55,950	2014	55,950	0	-	55,950	2015	55,799	0	151	55,950	2016	54,732	0	1,218	55,950	2017	55,950	0	-	55,950	2018	55,593	0	357	55,950	2019	55,728	0	222	55,950	2020*	55,950	0	-	55,950	2021*	55,950	0	-	55,950
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2.3) General monitoring	During the first monitoring event, a road was opened between Pikounda and Ekouamou village. However, the road is a distance of 28 km away from the project area at its nearest point (see .kmz files in Appendices 2a and 2b of the PDD).																																																		
3) Field monitoring: illegal activities																																																			
3.1) Controlling access from the southeast	Southeastern access has been controlled since September 2012, with no signs of illegal activities or encroachment being reported by the neighboring park managed by the World Wide Fund for Nature (WWF).																																																		
3.2) In-concession	During PSP monitoring, CIB teams have checked that no illegal																																																		

Activities and sub-activities	Description
control	activities have happened within the concession and PSP areas.
3.3) Controlling access from the north	Northern access, together with access to all blocks, was controlled during the monitoring period, notably during the inventory period and field missions. No sign of illegal harvesting or community encroachment was identified within the project area during these controls.
3.4) Controlling access from the west	No access is possible through the western boundary of the project area. The neighboring certified forestry company, <i>Industrie Forestière d'Ouessou</i> (IFO), has not reported any illegal activity during the monitoring period
4) Natural disturbances emission monitoring	
4.1) Estimating the area of natural disturbances and the fraction of growing stock naturally damaged	Not calculated as no natural disturbances occurred during the monitoring period.
4.2) Estimating the carbon stored by regrowth in the natural disturbance area	Not calculated as no natural disturbances occurred during the monitoring period
4.3) Calculating the annual total carbon losses due to natural disturbances	Not calculated as no natural disturbances occurred during the monitoring period
5) Illegal harvesting emissions monitoring	
5.1) Estimating the area of illegal harvesting and merchantable volumes illegally harvested	Not calculated as no illegal harvesting occurred during the monitoring period.
5.2) Calculating the annual total carbon	Not calculated as no illegal harvesting occurred during the

Activities and sub-activities	Description
losses due to illegal harvesting	monitoring period.
6) Leakage monitoring	
6.1) Collecting leakage data	Data provided by the MEFDD has been collected for the 2002–2011 reference period and for the 2013–2019 monitoring period.
6.2) Calculating activity-shifting leakage	No activity-shifting leakage for the monitoring period (see the 'Leakage Report' in Appendix 3a and 3b).
6.3) Calculating market leakage	Market leakage was found for the monitoring period (see the 'Leakage Report' in Appendix 3d and 3e).
7) Uncertainty monitoring	
7.1) Calculating uncertainty	Uncertainty has been calculated as 5.46%. This is below the 10% threshold, meaning that no uncertainty deduction will be done. See the uncertainty calculation spreadsheet for both baseline activity emissions and baseline degradation in Tabs 2.3 and 3.2 of Appendix 4, respectively.
8) Non-permanence risk assessment	
8.1) Reviewing non-permanence risk and analysis	A non-permanence risk assessment has been conducted and completed, with an estimated 23% of originated credits to be set aside for the non-permanence pooled buffer account. See the non-permanence risk assessment report in Appendix 5a and the non-permanence risk buffer calculation tool completed in Appendix 5b (see supports of the NPRT in the same folder).
9) Quality assurance (QA)/quality control (QC)	
9.1) Controlling PSP inventory data	100% of the data captured was controlled by CIB and South Pole between November 2021 and June 2022 and compared with the data of the first monitoring (Appendix 6).
9.2) PSP inventory field control	100% of the PSPs inventoried in October 2021 were controlled by CIB in the field before to leave the project area.

Activities and sub-activities	Description
9.3) Teamwork quality	Due to CIB having four more concessions, the teams in charge of measurements in the field are trained to be familiar with the specific biodiversity of each (e.g., tree measurements and botanical lexicon). The data collected was compared with that from the first monitoring period, identifying the trees that had died or which were new for the second monitoring period (see the Measurements comparison in Appendix 6).
9.4) Managing documentation	All documents have been stored in the ' <i>Aménagement</i> ' office in Pokola.
10) Documentation management	
10.1) PSP field records	All documents have been stored at the ' <i>Aménagement</i> ' office in Pokola.
10.2) PSP control records	All documents have been stored at the ' <i>Aménagement</i> ' office in Pokola.
10.3) Database	All documents have been stored at the ' <i>Aménagement</i> ' office in Pokola.
11) Verified Carbon Unit (VCU) calculation	
11.1) Final VCU calculation	The VCU vintage has been estimated based on the results of the parameters monitored and the volumes of the baseline (Appendix 4). Inventory data was processed into the Excel spreadsheet and the AGB carbon stock per ha, the growth foregone, and the regrowth factors calculated (see Appendix 7). Then, the ex-ante annual merchantable volumes and other timber volumes used under the baseline scenario were modeled (see Tab 1, Appendix 4), followed by the annual baseline activities emissions based on annual volumes harvested (see Tab 2.2, Appendix 4). Finally, the annual baseline GHG emissions and removals were estimated in Tab 3.1, Appendix 4.

3.2 Deviations

3.2.1 Methodology Deviations

The deviations from the methodology are the same as those used during the validation and first verification period, additionally a new deviation has been included for this verification period regarding the monitoring period. The current deviations are listed in Table 3.

Table 3: Methodology Deviations

Methodology section	Deviation										
2.2.2 Temporal Boundaries	<p>Subsection 2.2.2.2.2 Monitoring and Reporting Periods states that the maximum interval between a monitoring event and the immediately following one should not exceed five years; however, for this second monitoring period it has not been possible to comply with this interval. The project asked for a temporary change in this sense according to what was stated in the monitoring plan (periodicity of one year).</p> <p>As a background, the project faced during this monitoring period a delay due to several political, environmental and health issues that affected this region in Africa. The first verification covered the monitoring period from January 2012 to December 2012, and the second verification was planned to cover maximum the period from January 2013 to December 2017. Unfortunately, several political, environmental, and social issues occurred between 2017 and 2019 that did not allow the project to perform the field monitoring and the verification process in 2017 as expected. These issues which have been very complex for the country and the African region, created unsafe conditions to perform a site visit for the local monitoring team, the project's team and also for the VVB personnel (which come from other countries due to the lack of local VVBs internally in Congo). Some of these complexities are presented and explained in the table below:</p>										
	<table border="1"> <thead> <tr> <th data-bbox="597 1507 683 1535">Date</th> <th data-bbox="691 1507 992 1535">Summary</th> <th data-bbox="1000 1507 1248 1535">Source</th> <th data-bbox="1256 1507 1414 1535">Link</th> </tr> </thead> <tbody> <tr> <td data-bbox="597 1539 683 1696">6/06/2017</td> <td data-bbox="691 1539 992 1696"> Security emergency: The security situation in Congo has remained volatile since October 2015, following a constitutional referendum which </td> <td data-bbox="1000 1539 1248 1696"> ACAPS - Independent information provider: Republic of Congo, Conflict in Pool department. Briefing note June 2017. </td> <td data-bbox="1256 1539 1414 1696"> Conflict Pool </td> </tr> </tbody> </table>	Date	Summary	Source	Link	6/06/2017	Security emergency: The security situation in Congo has remained volatile since October 2015, following a constitutional referendum which	ACAPS - Independent information provider: Republic of Congo, Conflict in Pool department. Briefing note June 2017.	Conflict Pool		
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Methodology section	Deviation			
	27/07/2017	reinstated the position of Prime Minister and eliminated presidential term limits. Violent conflict in the department of Pool (started in April 2016) and the neighboring country (RDC). Although it was a ceasefire agreement in December 2017,	OCHA - UN Office for the Coordination of Humanitarian Affairs: Relief web. Republic of Congo Humanitarian Response Plan, July - December 2017	Humanitarian response
	15/08/2018	humanitarian emergency and security tension remains. Potential affectations to the mobility to the project area due to Pool is located along the highway to Pikounda, due to several months of	UNICEF - Situation Report. WFP Republic of Congo country Brief, June 2018	Congo situation
	3/09/2019	insecurity in some districts of the Pool region. This situation not only affects the Pool region but the entire country as well. Supplies are disrupted as the railway between Pointe-Noire and Brazzaville has been severed, and security force officers from various regions of the country have been killed. The solution to this situation cannot just be humanitarian, but there are lives at stake and action must be taken urgently. Also, high risk of violence along the country because of the 2017 legislative elections.	ACTED (Agency for Technical Cooperation and Development). Unicef Congo, Humanitarian Situation Report, June 2019	Congo situation
	19/06/2019	Due to the emergency high risk of spreading of the Ebola Virus Disease outbreak from DRC's trough the people's displacements on Congo River and to Likouala (neighboring department of Sangha).	WFP - World Food Programme: En République du Congo, ACTED fournit une aide d'urgence aux déplacés de République Démocratique du Congo (RDC). June 2019	ACTED urgency
	8/05/2018	Ebola Virus Disease Outbreak: In 2018, the Democratic Republic of Congo declared the second-largest Ebola virus disease (EVD) in the north-	WHO - News and press release: New Ebola outbreak declared in Democratic Republic of Congo. May 2018	ebola-outbreak

Methodology section	Deviation			
	14/06/2018	<p>western border of the country, since the Republic of Congo is among the countries prioritized because a risk of a potential spread of an Ebola Virus Disease outbreak. During this period there was a high risk in the provinces of Likouala (neighboring of Sangha) and Brazzaville according to the WHO. An aggravating factor in this situation is that flights operated to Brazzaville normally stopover in Kinshasa, the capital of DRC, thus increasing the risk of contagion. These reasons increased the risk of mobilization between the capital and the project area, forcing to reduce activities related to monitoring and verification.</p>	<p>IFRC -Situation Report (International Federation of Red Cross And Red Crescent Societies). Republic of Congo: Ebola Virus Disease Preparedness - Emergency plan of action (EPoA) DREF no. MDRCG015/PCG017. June 2018</p>	<u>ebola virus disease</u>
			National Library of Medicine	<u>ebola</u>
	7/09/2018	<p>Yellow fever: During this period there has been an alert for potential risk of spread of Yellow fever within the Congo, especially to the capital city of Brazzaville. The risk at the regional level is considered to be moderate due to the lack of information to describe the scope and the dynamics of the outbreak. During this period mobilization and some activities were reduced by the company to reduce health risks.</p>	<p>WHO - News and press release: Yellow fever - Republic of the Congo: Disease outbreak news - 7 September 2018</p>	<u>yellow-fever-congo-outbreak</u>

Methodology section	Deviation			
	1/05/2019	<p>Chikungunya Disease outbreak: On 9 February 2019, the government of Congo officially declared an outbreak of chikungunya virus disease, affecting Brazzaville (capital of Republic of Congo and the main airport in the country). Based on available information, the risk of continued transmission and spread of chikungunya to unaffected areas cannot be ruled out. The overall risk is considered moderate at both the national and regional levels, and mobilization was restricted between the capital and other regions.</p>	<p>WHO - News and press release: Chikungunya – Congo (The) Disease outbreak news, May 2019.</p>	<p>chikungunya-Congo-outbreak</p>
	23/01/2020	<p>Floods along the Congo basin: The torrential rains that fell over a large part of the territory of the Republic of Congo between October and December 2019 resulted in a complex and persistent flooding situation over a large part of the country, particularly in the northern departments (Likouala, Cuvette, Plateaux and Sangha). Access to the affected areas is very difficult, as these regions are particularly isolated in normal times. Humanitarian access is mainly by river, with food being delivered by barges and speedboats.</p>	<p>OCHA - UN Office for the Coordination of Humanitarian Affairs. Republic of Congo: Floods Flash Update no. 3, January 23rd, 2020</p>	<p>congo-floods</p>

During the 2017-2019 period, it was not possible to carry out field monitoring due to the health and safety complexities described above. The unsafe conditions (social, health, and safety) for both, the technical monitoring team from the company, the company's external personnel (who would have supported the fieldwork), and the potential VVBs coming from India or Europe (main active VVBs at that moment) and not only in the pool sector but throughout the country, made it difficult to guarantee adequate conditions for all these stakeholders. Additionally, between 2019 and 2021, the COVID-19 outbreak also posed additional mobility restrictions that made it

Methodology section	Deviation																								
	<p>impossible to conduct the monitoring field work. It wasn't until 2021 and 2022 that the company envisioned a field campaign and in 2022 the verification could have a green light in terms of the possibility of flights worldwide, and the possibility of performing fieldwork and verification activities.</p> <p>The current monitoring period covers almost nine years, from January 2013 until December 2019. However, this deviation does not adversely affect the permanence of the forest and the project, since during the site visit and with all GIS technology is has been possible to prove the presence of the forest in the entire project area. Additionally, this deviation does not affect the conservatism of the quantification of GHG emission reductions, as demonstrated in Appendix 15, where a test for significant differences between ex-ante and ex-post estimates was performed. This test showed that ex-post VCU estimates, although lower, do not differ significantly from ex-ante estimates:</p> <table border="1" data-bbox="597 894 1133 1287"> <thead> <tr> <th>Year</th> <th>VCU ex ante</th> <th>VCU ex post 2019</th> </tr> </thead> <tbody> <tr> <td>2013</td> <td>74,529</td> <td>52,934</td> </tr> <tr> <td>2014</td> <td>90,271</td> <td>63,638</td> </tr> <tr> <td>2015</td> <td>103,870</td> <td>72,797</td> </tr> <tr> <td>2016</td> <td>115,689</td> <td>80,672</td> </tr> <tr> <td>2017</td> <td>124,727</td> <td>89,317</td> </tr> <tr> <td>2018</td> <td>131,501</td> <td>95,829</td> </tr> <tr> <td>2019</td> <td>137,692</td> <td>101,519</td> </tr> </tbody> </table>	Year	VCU ex ante	VCU ex post 2019	2013	74,529	52,934	2014	90,271	63,638	2015	103,870	72,797	2016	115,689	80,672	2017	124,727	89,317	2018	131,501	95,829	2019	137,692	101,519
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<p>3.1 Estimation of Emissions from Degradation</p>	<p>Data used to model the volumes that would have been harvested by CIB in the baseline scenario imply the merchantable volumes estimated in the North Pikounda FMP and the normal harvesting practices based on real volumes historically harvested by CIB in its concession. As the merchantable volumes estimated in the FMP are based on sampling, it is possible that, for some species, the real harvested volumes either exceed or fall short of those defined in the FMP. To take this aspect into account, a new 'harvesting intensity ratio' parameter has been defined. This species-specific parameter, expressed in percent, is equal to the mean historical harvested volumes divided by the volume estimated for this species in the FMP:</p> $HI_x = \frac{V_{merch,x}}{V_{merchFMP,x}} + corr$																								

Methodology section	Deviation
	<p>Where:</p> <p>$H_{I,x}$: the harvesting intensity ratio for the species x;</p> <p>$V_{merch,x}$: the mean merchantable volumes of species x harvested over the reference period in CIB concessions;</p> <p>$V_{merchFMP,x}$: the merchantable volumes for species x as estimated in the North Pikounda FMP; and</p> <p>corr: a correcting factor that can be added or subtracted to represent the advantages/disadvantages that the North Pikounda REDD+ project presents compared to other UFAs (e.g., distance, old-growth forest, and better timber quality).</p>
<p>3.2.1.1 Validation of existing forest inventory data</p>	<p>The methodology states that data used from the FMP should be no older than five years. The actual FMP, approved in 2012 by the government of the RoC, 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 the RoC, with the stratification used for the inventory being similar to that used for the IFM-LtPF project. This situation is the cause of a deviation for the North Pikounda project, as government approval of the FMP means that data must be used from it. Therefore, this FMP constitutes the legal base for South Pole's degradation estimations under the baseline scenario. Developing a new FMP is out of the question (see 'VM0011' methodology, Section 3.2.3.2, p. 40) as doing so would interfere with a ministerial decree.</p> <p>Furthermore, validating data from the management plan has been possible using both the results from PSPs and recommendations from the 'VM0011' methodology (see Section 3.2.1.1). A demonstration of this is presented in Appendix 2a, Chapter 5 of the PDD. With the AGB of both growing stock and merchantable trees having naturally increased during the time left between the forest resources inventory for the FMP and the carbon inventory for the IFM-LtPF project, South Pole considers use of the volumes stated in the FMP report to be the conservative approach.</p>
<p>3.3.1 Net Carbon from the Deadwood Pool</p>	<p>As recommended by the methodology, South Pole have used the study by Brown et al. (2005) to estimate the carbon from residual stand damage. It appeared that, while this study provided CIB with site-specific data for both the residual stand damage (f_{RSD}) and branches and trimming factors (f_{Branch_Trim}), the results were aggregated without the possibility of differentiation between f_{RSD} and f_{Branch_Trim}. Therefore, a new factor called $f_{damages}$ will be used, and the</p>

Methodology section	Deviation
	<p>following equation will replace equations 3.18, 3.19, and 3.20:</p> $C_{DWin,t} = f_{damages} \times V_{merch,t}$ <p>With:</p> $f_{damages} = f_{RSD} + f_{branch_trim}$ <p>$f_{damages}$ is expressed in t of carbon (C)/cubic meter (m³) harvested.</p>
<p>3.3.5 Carbon in the Regrowth after Selective Logging</p>	<p>To calculate the factor called $G_{regrowth,t}$, South Pole followed the method proposed in the PDD which for the second monitoring was based on the results of PSP monitoring for both 1st and 2nd. Using the differences in growth for all timber species in the PSPs between two monitoring events, the differences in AGB for trees between 5–20 cm in diameter ($B_{AGB_regrowth,t}$) can be estimated. South Pole considers this as corresponding to the carbon that would have been stored during regrowth occurring in the gaps after logging under the baseline scenario. As this model allows for the growth between two monitoring events to be estimated for every tree once the wood specific gravity (WSG) has been taken into account, $G_{regrowth,t}$ is therefore expressed as tC/ha⁻¹/yr⁻¹ instead of t of dry matter (DM)/ha⁻¹/yr⁻¹.</p> <p>Equation 3.38 is therefore replaced by the following equation:</p> $C_{regrowth,t} = G_{regrowth,t} \times \sum_{t=1}^{t^*} A_{NHA_annual,t}$ <p>Appendix 2, Chapter 4.2.5 of the PDD gives more details about regrowth estimation</p>
<p>3.3.5 Carbon in the Regrowth after Selective Logging</p>	<p>While the 'VM0011' methodology states that it applies a conservative approach “by considering that the entire annual harvest area would permit regrowth each year”, South Pole concluded that, in the context of this project, this approach did not represent the reality.</p> <p>Indeed, while there is a fixed annual area that can be legally harvested annually, the baseline scenario for reduced-impact logging indicates that, regardless of the extent of the logging activity, 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 (e.g., via the combined impact of felling gaps, hauling damages, and road networks). As such, only 12.4% of the annual harvesting area will allow regrowth. This percentage will be applied to the parameter $A_{NHA_annual,t}$, described above in the regrowth</p>

Methodology section	Deviation
	calculation (Appendix 7).
3.4.1 Emissions Due to Harvesting Operations and 3.4.2 Emissions Due to On-site Preparation	<p>Fuel used for harvesting operations (e.g., logging, on-site preparation, and hauling) is assimilated into two categories: 'mixed petrol' (i.e., petrol and oil), used for chainsaws, and 'gas oil', used for heavy machinery (e.g., skidders, bulldozers, and loading machines). As differentiation between the mixed petrol used in chainsaws for cutting trees and for preparing trees is impossible, South Pole have decided to combine the emissions from harvesting and on-site preparation into one category. Equation 3.40 (p. 61) will therefore be replaced by the following equation:</p> $E_{harvest+onsite_prep,t} = FC_{harvest+onsite_prep,t} \times EF_{fuel} \times V_{merch,t}$ <p>Where $FC_{harvest+onsite_prep}$ is the fuel consumption of chainsaws employed for felling, snigging, and trimming per m³ of harvested material.</p>
3.4.4 Emissions Due to Log Transport	<p>In equation 3.46, the fuel consumption of trucks ($FC_{transport,t}$ in liters [L]/km⁻¹) has been used instead of their fuel efficiency ($Eff_{vehicle}$ in km/kiloliters [kL]⁻¹). This will not impact the final results.</p>
3.4.5 Emissions Due to Timber Processing	<p>Electricity is produced by six generators with different power ratings (i.e., four with 1,250 kilovolt-amperes [kVA], one with 1,275 kVA, and one with 1,375 kVA) and load capacities. These generators work together to provide electricity at the required frequency. The project's transformation units, administrative units, workshops, etc., are all equipped with energy meters which allow for electricity consumption to be tracked on a daily basis, while the fuel consumption of each generator is also monitored. Consequently, linking the production of sawn timber with the electricity consumption for each transformation unit and this consumption in turn with the generator's fuel consumption is a straightforward procedure.</p> <p>The following equations are replacing equations used to estimate $E_{processing}$ in Section 3.4.5 of the 'VM0011' methodology:</p> $E_{processing,t} = FC_{generators} \times EF_{fuel} \times V_{sawn_timber,t}$
3.4.6 Emissions Due to Log Distribution	<p>The 'VM0011' methodology only considers the distribution of logs and/or sawn timber by road, whereas, in the baseline scenario, some timber products are transported by river and/or train. Additional fuel consumption and fuel emission factors have therefore been considered in the calculation of $E_{distribution,t}$.</p>

Methodology section	Deviation
	<p>For example, the emission factors $EF_{distriboat}$ and $EF_{distrirail}$ have been created for boat and train transport, respectively. In terms of distribution by road, South Pole have used fuel consumption for the calculations instead of fuel efficiency. Two specific truck capacities have been calculated, with one for trucks travelling to Cameroon ($CAP_{cameroon}$) where there is a legal limit for truck capacity, and the other for trucks travelling to the RoC (CAP_{congo}).</p>

3.2.2 Project Description Deviations

During the second monitoring period, there a project description deviations related to market leakage. For the first monitoring period, the project description deviation was related to the estimation of the growth foregone due to selective logging. This approach was not followed for the second monitoring period due to the difference in growth between PSPs being calculated. During the first monitoring period, the deviation from the project description included was as follows (table 4):

Table 4: Project Description Deviations

Methodology section	Project Description Deviation
3.3.4	<p>For the first monitoring event, it has logically not been possible to estimate the Growth Foregone by calculating the growth of commercial trees monitored in the PSPs between the difference of two monitoring events.</p> <p>In order to have an accurate estimation for this factor, species specific mean Annual Growth Rates were applied to each commercial tree monitored.</p> <p>Those mean Annual Growth Rates were selected from the three following sources:</p> <ul style="list-style-type: none"> - PSPs set-up by Nature+ in CIB concessions between 2005 and 2009: those plots have been specifically designed to monitor the growth rates of commercial species in CIB concessions. The results are available in the report “Croissance en diamètres des principaux essences commerciales sur les dispositifs de suivi de la CIB” (2011); - Forest Management Plan: growth rates approved by MDDFE; - Growth rates selected from CIRAD for most common species in Central Africa (Picard and Gourlet-Fleury, 2011). <p>This deviation was only used for the first monitoring event, as it is no longer necessary for this second monitoring due to it is possible to perform the difference between the values reported from the PSP in the first and the second monitoring.</p>

Methodology section	Project Description Deviation												
3.3.2 Market Leakage	<p>The ‘VM0011’ proposes that the Project Proponent must demonstrate how market leakage has been accounted for in accordance with the most recent version of applicable VCS rules.</p> <p>In the first verification, market leakage was calculated using the method determined by Sharma et al. (2012)⁹ as stated in section 3.3.2 Market Leakage of the Project Description document. However, according to the VCS Standard v4.5, the market leakage should be quantified using the default values depicted in Table 3 of that document.</p> <div style="border: 1px solid #ccc; padding: 5px; margin: 10px 0;"> <p style="font-size: small; margin: 0;">Table 3: Leakage Discount Factors for IFM Projects</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #1a3d4d; color: white;"> <th>Project Action</th> <th>Leakage Risk</th> <th>Leakage Discount Factor</th> </tr> </thead> <tbody> <tr> <td style="font-size: x-small;">IFM activity with no effect or minimal effect on total timber harvest volumes (e.g., RIL with less than 25% reduction)</td> <td style="text-align: center;">None</td> <td style="text-align: center;">0%</td> </tr> <tr> <td style="font-size: x-small;">IFM activity that leads to a shift in harvests across time periods but minimal change in total timber harvest over time (e.g., ERA with rotation extension of 5-10 years)</td> <td style="text-align: center;">Low</td> <td style="text-align: center;">10%</td> </tr> <tr> <td style="font-size: x-small;">IFM activity that substantially reduces harvest levels permanently (e.g., RIL activity that reduces timber harvest across the project area, or project that halts logging by at least 25%)</td> <td style="text-align: center;">Moderate to High</td> <td style="font-size: x-small;"> Conditional upon where timber harvest is likely to be shifted, as follows: <ul style="list-style-type: none"> Where the ratio of merchantable biomass to total biomass is higher within the area to which harvesting is displaced compared to the project area, 20% Where the ratio of merchantable biomass to total biomass is similar within the area to which harvesting is displaced compared to the project area, 40% Where the ratio of merchantable biomass to total biomass is lower within the area to which harvesting is displaced compared to the project area, 70% </td> </tr> </tbody> </table> </div> <p>Therefore, the market leakage calculation has been determined using the method proposed in the table above by comparing the merchantable biomass to total biomass within the area to which harvesting is displaced compared to the project area.</p> <p>The calculation and the final result are depicted in section 5.3.2 of this document and in Appendix 3a¹⁰ and Appendix 3e¹¹.</p>	Project Action	Leakage Risk	Leakage Discount Factor	IFM activity with no effect or minimal effect on total timber harvest volumes (e.g., RIL with less than 25% reduction)	None	0%	IFM activity that leads to a shift in harvests across time periods but minimal change in total timber harvest over time (e.g., ERA with rotation extension of 5-10 years)	Low	10%	IFM activity that substantially reduces harvest levels permanently (e.g., RIL activity that reduces timber harvest across the project area, or project that halts logging by at least 25%)	Moderate to High	Conditional upon where timber harvest is likely to be shifted, as follows: <ul style="list-style-type: none"> Where the ratio of merchantable biomass to total biomass is higher within the area to which harvesting is displaced compared to the project area, 20% Where the ratio of merchantable biomass to total biomass is similar within the area to which harvesting is displaced compared to the project area, 40% Where the ratio of merchantable biomass to total biomass is lower within the area to which harvesting is displaced compared to the project area, 70%
Project Action	Leakage Risk	Leakage Discount Factor											
IFM activity with no effect or minimal effect on total timber harvest volumes (e.g., RIL with less than 25% reduction)	None	0%											
IFM activity that leads to a shift in harvests across time periods but minimal change in total timber harvest over time (e.g., ERA with rotation extension of 5-10 years)	Low	10%											
IFM activity that substantially reduces harvest levels permanently (e.g., RIL activity that reduces timber harvest across the project area, or project that halts logging by at least 25%)	Moderate to High	Conditional upon where timber harvest is likely to be shifted, as follows: <ul style="list-style-type: none"> Where the ratio of merchantable biomass to total biomass is higher within the area to which harvesting is displaced compared to the project area, 20% Where the ratio of merchantable biomass to total biomass is similar within the area to which harvesting is displaced compared to the project area, 40% Where the ratio of merchantable biomass to total biomass is lower within the area to which harvesting is displaced compared to the project area, 70% 											

3.3 Grouped Projects

The project is not a grouped project.

⁹ Sharma, S. K., Telfer, M., Phua, S. T., & Chandler, H. (2012). A pragmatic method for estimating greenhouse gas emissions from leakage for Improved Forest Management projects under the Verified Carbon Standard. *Greenhouse Gas Measurement and Management*, 2(1), 22-32.

¹⁰ Supporting information/Appendix 3a Leakage Assessment Report

¹¹ Supporting information/Appendix 3e 2nd monitoring market leakage effect FINAL

3.4 Baseline Reassessment

Did the project undergo baseline reassessment during the monitoring period?

- Yes No

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$A_{\text{project},t=0}$
Data unit	ha
Description	Project area
Source of data	FMP
Value applied	55,950 ha
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of baseline and project emissions
Comments	Dryland forest

Data/parameter	$f(\text{DBH}_{n,l,s,j,t=0}, H_{n,l,s,j,t=0})$
Data unit	Dimensionless
Description	Allometric equations for calculation of AGB
Source of data	Chave et al., 2005; Feldspauth et al., 2012
Value applied	N/A
Justification of choice of data or description of measurement methods and procedures applied	<p>For trees under 156 cm diameter (Chave and al, 2005):</p> $\text{AGB} = 0,0509 * \text{WSG} * \text{DBH}^2 * H$ <p>(Valid for Moist tropical forests with rainfall > 1500 mm and dry seasons < 5 months)</p> <p>For trees above 156 cm diameter (Chave and al, 2004):</p> $\text{AGB} = \text{WSG} / 0,6 * \text{EXP}(-3,742 + 3,45 * \text{LN}(\text{DBH}) - 0,148 * (\text{LN}(\text{DBH}))^2)$ <p>(Pan-tropical)</p> <p>Each tree height is estimated using Felspauth equation (Feldspauth and al, 2012):</p> $H = 50,453 * (1 - \text{EXP}(-0,0471 * \text{DBH}^{0,812}))$ <p>(valid for Central Africa tropical forests)</p>

Purpose of data	Calculation of baseline emissions
Comments	Estimation of regrowth and growth foregone

Data/parameter	$DBH_{n,i,s,t=0}$
Data unit	cm
Description	Diameter at breast height (1.30 meters [m])
Source of data	PSP inventory
Value applied	N/A
Justification of choice of data or description of measurement methods and procedures applied	Inventory procedure
Purpose of data	Calculation of baseline emissions
Comments	N/A

Data/parameter	$V_{merch,t}$															
Data unit	m^3															
Description	Merchantable volume harvested in year t															
Source of data	FMP total volumes given per <i>Unités Forestières de Production</i> [Forest Production Unit] (UFP) (five years of harvesting)															
Value applied	N/A															
Justification of choice of data or description of measurement methods and procedures applied	<table border="1"> <thead> <tr> <th>UFP</th> <th>Years</th> <th>$V_{merch} (m^3)$</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2012-2016</td> <td>389,099</td> </tr> <tr> <td>2</td> <td>2017-2021</td> <td>348,468</td> </tr> <tr> <td>3</td> <td>2022-2026</td> <td>381,689</td> </tr> <tr> <td>4</td> <td>2027-2031</td> <td>307,910</td> </tr> </tbody> </table>	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
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														
Purpose of data	Calculation of baseline emissions															
Comments	Uncertainty- +/- 6.48%															

Data/parameter	HI_x
Data unit	Dimensionless
Description	Harvesting intensity ratio for species x : annual percentage of V_{merch} estimated in the FMP that will actually be harvested

Source of data	CIB harvesting data (2006–2012) and CIB FMPs
Value applied	See Appendix 4 Tab 1.2
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of baseline emissions
Comments	N/A

Data/parameter	C_{AGB}
Data unit	tC/ha ¹
Description	Carbon in the AGB of the growing stock
Source of data	Monitoring inventory
Value applied	0.49 (see Appendix 7)
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of baseline emissions
Comments	Estimation of regrowth and growth foregone

Data/parameter	k_{decay}
Data unit	yr ¹
Description	Carbon in the AGB of the growing stock
Source of data	Chambers et al., 1999
Value applied	0.186
Justification of choice of data or description of measurement methods and procedures applied	Data for tropical evergreen forests with a similar mean annual temperature (26.7 °C) and a superior mean WSG (0.69 g/cm ⁻³)
Purpose of data	Calculation of baseline emissions
Comments	Necessary for the estimation of the Annual fraction of carbon in the DW pool that remains in the DW pool. Conservative value: mean decomposition rate is 1.9 yr ⁻¹ , with a standard error of 0.004 yr ⁻¹

Data/parameter	f_{damages}
Data unit	tC/m ³
Description	Factor combining branch-trim factor and residual stand damage factor (see Deviation Description Paragraph 2.6 of the VCS project design document [PDD])
Source of data	Brown et al., 2005
Value applied	0.6989
Justification of choice of data or description of measurement methods and procedures applied	Specific to CIB operations: total tC/m ³ of merchantable volume extracted
Purpose of data	Calculation of baseline emissions
Comments	Necessary for the estimation of the Carbon input to the DW pool

Data/parameter	$f_{\text{lumber_recovery}}$
Data unit	Dimensionless
Description	Proportion of merchantable log converted to long-term harvested wood products (LHWPs)
Source of data	CIB production data (2007–2012)
Value applied	See Appendix 4
Justification of choice of data or description of measurement methods and procedures applied	Specific to CIB operations: species specific
Purpose of data	Calculation of baseline emissions
Comments	Necessary for the estimation of the Sawn timber that is exported

Data/parameter	$K_{\text{LHWP_ox}}$
Data unit	yr ⁻¹
Description	Rate of oxidation for LHWPs
Source of data	'VM0011' v1.0, Table B5, p. 141; adapted from Table 12-2, Chapter 12 of the Intergovernmental Panel on Climate Change, 2006b
Value applied	0.023
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of baseline emissions

Comments	Necessary for the estimation of the Annual fraction of ItHWP that would remain in the ItHWP pool in year t
Data/parameter	$FC_{\text{harvest+onsiteprep}}$
Data unit	L/m ³
Description	Fuel consumption of equipment used for harvesting and trimming per m ³ of merchantable logs produced
Source of data	CIB production data from 2012
Value applied	0.0912
Justification of choice of data or description of measurement methods and procedures applied	Based on monthly production reports
Purpose of data	Calculation of baseline emissions
Comments	Necessary for the estimations of the baseline activity emissions

Data/parameter	EF_{fuel}
Data unit	kilograms (kg) of carbon dioxide equivalent (CO ₂ e)/L ¹
Description	Fuel emission factor
Source of data	Department for Environment, Food & Rural Affairs (Defra), 2012; Annex 1
Value applied	2.7782
Justification of choice of data or description of measurement methods and procedures applied	Value for 100% mineral petrol
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Sections 3.4.1 Emissions Due to Harvesting Operations and 3.4.2 Emissions Due to On-site Preparation

Data/parameter	FC_{hauling}
Data unit	L/m ³
Description	Fuel consumption of equipment used for hauling per m ³ of merchantable logs produced
Source of data	CIB production data from 2012
Value applied	4.7767
Justification of choice of data or description of	Based on monthly production reports

measurement methods and procedures applied	
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.3 Emissions Due to Log Hauling

Data/parameter	EF_{fuel}
Data unit	kgCO _{2e} /L
Description	Fuel emission factor
Source of data	Defra, 2012; Annex 1
Value applied	3.6028
Justification of choice of data or description of measurement methods and procedures applied	Value for gas oil
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.3 Emissions Due to Log Hauling

Data/parameter	Cap_{truck}
Data unit	m ³
Description	Truck load capacity
Source of data	CIB production data from 2011
Value applied	56.32
Justification of choice of data or description of measurement methods and procedures applied	Based on transport monthly reports
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.4 Emissions Due to Log Transport

Data/parameter	$KM_{transport,t}$
Data unit	km
Description	Annual log transport distance from collection depot to processing plant
Source of data	Management plan North Pikounda (Appendix 8)
Value applied	See Appendix 4 Tab 2.2
Justification of choice of data or description of	One-fifth of the average distance for each UFP. Estimated based on the road network proposed in the FMP

measurement methods and procedures applied	
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.4 Emissions Due to Log Transport

Data/parameter	$FC_{transport}$
Data unit	L/km
Description	Truck fuel consumption
Source of data	CIB production data from 2011
Value applied	0.6014
Justification of choice of data or description of measurement methods and procedures applied	Based on monthly transport reports
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.4 Emissions Due to Log Transport

Data/parameter	EF_{fuel}
Data unit	kgCO ₂ e/L
Description	Fuel emission factor
Source of data	Defra, 2012; Annex 1
Value applied	3.6028
Justification of choice of data or description of measurement methods and procedures applied	Value for gas oil
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.4 Emissions Due to Log Transport

Data/parameter	$FC_{processing}$
Data unit	L/m ³
Description	Generators fuel consumption per m ³ of timber entering the sawmill
Source of data	CIB production data from 2012
Value applied	14.7
Justification of choice of data or description of	N/A

measurement methods and procedures applied	
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.5 Emissions Due to Timber Processing—only used while co-generation is not in place

Data/parameter	EF_{fuel}
Data unit	kgCO ₂ e/L ¹
Description	Fuel emission factor
Source of data	Defra, 2012; Annex 1
Value applied	3.6028
Justification of choice of data or description of measurement methods and procedures applied	Value for gas oil
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.5 Emissions Due to Timber Processing—only used while co-generation is not in place

Data/parameter	$V_{sawn_timber,t}$
Data unit	m ³
Description	Volume of merchantable logs reserved for the sawmill in year <i>t</i>
Source of data	FMP; calculation based on $V_{merch,t}$
Value applied	See Appendix 4 Tab 1.2
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.5 Emissions Due to Timber Processing—only used while co-generation is not in place

Data/parameter	$f_{export/sawn}$
Data unit	Dimensionless
Description	Ratio of total merchantable volume reserved for the sawmill
Source of data	CIB production data from 2007–2012
Value applied	See Appendix 4 Tab 1.2

Justification of choice of data or description of measurement methods and procedures applied	Species specific
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.5 Emissions Due to Timber Processing—only used while co-generation is not in place

Data/parameter	$V_{\text{merch,vehicle,destination,t}}$
Data unit	m ³
Description	Volume of merchantable logs/sawn timber transported to destination <i>d</i> , by vehicle <i>v</i> , in year <i>t</i>
Source of data	FMP; CIB production data from 2007–2012
Value applied	See VCS MR Tab 1, Appendix 7
Justification of choice of data or description of measurement methods and procedures applied	Depends on destination
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.6 Emissions Due to Log Distribution

Data/parameter	C_{pvehicle}
Data unit	m ³
Description	Truck load capacity
Source of data	CIB production data from 2011; legal threshold for Cameroon
Value applied	48.2 Based on monthly transport reports; 49.4 Based on Cameroonian legislation
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.6 Emissions Due to Log Distribution

Data/parameter	$KM_{\text{distrib,destination,t}}$
Data unit	km
Description	Distance between Pokola and export point

Source of data	See Appendix 4 Tab 2.1																					
Value applied	<table border="1"> <thead> <tr> <th>Destination</th> <th>Distance (km)</th> <th></th> </tr> </thead> <tbody> <tr> <td>PKL-BZV</td> <td>880</td> <td>Road</td> </tr> <tr> <td>PKL-BZV</td> <td>850</td> <td>River</td> </tr> <tr> <td>BZV-PTN</td> <td>510</td> <td>Rail</td> </tr> <tr> <td>PKL-DOU</td> <td>1350</td> <td>Road</td> </tr> <tr> <td>PKL-BELABO</td> <td>750</td> <td>Road</td> </tr> <tr> <td>BELABO-DOU</td> <td>650</td> <td>Rail</td> </tr> </tbody> </table>	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
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																				
Justification of choice of data or description of measurement methods and procedures applied	Based on CIB's export spots and routes																					
Purpose of data	Calculation of baseline emissions																					
Comments	'VM0011' v1.0, Section 3.4.6 Emissions Due to Log Distribution																					

Data/parameter	FC_{truck}
Data unit	L/km
Description	Truck fuel consumption
Source of data	CIB production data from 2011
Value applied	0.6014
Justification of choice of data or description of measurement methods and procedures applied	Based on monthly transport reports
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.6 Emissions Due to Log Distribution

Data/parameter	EF_{fuel}
Data unit	kgCO ₂ e/L
Description	Fuel emission factor
Source of data	Defra, 2012
Value applied	3.6028

Justification of choice of data or description of measurement methods and procedures applied	Value for gas oil
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.6 Emissions Due to Log Distribution

Data/parameter	EF_{rail}
Data unit	kgCO ₂ e/t/km
Description	Rail freight emission factor
Source of data	Defra, 2012
Value applied	0.03634
Justification of choice of data or description of measurement methods and procedures applied	Value for rail freight
Purpose of data	Calculation of baseline emissions
Comments	'VM0011' v1.0, Section 3.4.6 Emissions Due to Log Distribution

Data/parameter	$V_{historical_harvest,l,t=0}$
Data unit	m ³
Description	Annual volume of harvest for land <i>l</i> (where <i>l</i> = 1,2,3,.....L) that is owned and/or operated by the project proponent over the historical reference period <i>K</i>
Source of data	CIB production data
Value applied	See Appendix 3b
Justification of choice of data or description of measurement methods and procedures applied	Annual volumes have been calculated for each year between 2002 and 2011 (i.e., the historical reference period) for the concessions of Pokola, Kabo, Toukoulaka, and Loundoungou
Purpose of data	Calculation of leakage
Comments	'VM0011' v1.0, Section 5 Leakage Assessment and Management

Data/parameter	$V_{c,N}$
Data unit	m ³

Description	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)
Source of data	MEFDD compilation of production data Public data from other concessions
Value applied	See Appendix 3e
Justification of choice of data or description of measurement methods and procedures applied	Annual volumes have been calculated for each year between 2002 and 2011 (i.e., the historical reference period) for the concessions of the Sangha (namely <i>Société Congolaise Arabe Libyenne</i> [SOCALIB], <i>Société industrielle et forestière du Congo</i> [SIFCO], <i>Société d'Exploitation Forestière Yuan Dong</i> [SEFYD], and IFO) and Likouala Departments (namely <i>Bois et Placages de Lopola</i> [BPL], Cristal, <i>Industrie de Transformation des bois de Likouala</i> [ITBL]).
Purpose of data	Calculation of leakage
Comments	'VM0011' v1.0, Section 5 Leakage Assessment and Management

4.2 Data and Parameters Monitored

Data/parameter	DBH _{n,i,s,t}
Data unit	cm
Description	DBH (1.30 m) for individual tree n, of species i, in sample plot s, in year t
Source of data	PSP inventory
Description of measurement methods and procedures to be applied	Measured at a height of 1.30 m using a tape measure with cm gradations, this value is applied to estimate the biomass of the growth foregone and the regrowth after logging
Frequency of monitoring/recording	Each time a verification is conducted
Value monitored	Ex-post
Monitoring equipment	Tape measure and relascope (see inventory procedure)
QA/QC procedures to be applied	In the field and comparison with the first monitoring data
Purpose of the data	Calculation of project emissions
Calculation method	N/A
Comments	N/A

Data/parameter	B _{AGBmerch,t}
Data unit	tDM/ha ⁻¹

Description	Average AGB of merchantable trees in the project area in year t
Source of data	PSPs inventory
Description of measurement methods and procedures to be applied	<p>Tree between 5–156 cm DBH (Chave, 2005):</p> $AGB = 0.0509 \times \rho \times DBH^2 \times H$ <p>Tree above 156 cm DBH (Chave, 2004):</p> $AGB = \frac{\rho}{0.6} \times e^{[-3.742 + (3.45 \times \ln(DBH)) - (0.148 \times (\ln(DBH))^2)]}$ <p>Tree height (CIB, 2012; based on Feldpausch, 2012):</p> $H = 58.3423 \times (1 - e^{[-0.017254 \times (DBH^{0.95289})]})$
Frequency of monitoring/recording	Each time an estimation is conducted
Value monitored	Ex-post
Monitoring equipment	Tape measure and relascope (see inventory procedure)
QA/QC procedures to be applied	Comparison with the first monitoring data
Purpose of the data	Calculation of project emissions
Calculation method	Using above equations
Comments	N/A

Data/parameter	$C_{\text{growth_foregone},t}$
Data unit	tC/ha ⁻¹ /yr ⁻¹
Description	Annual carbon lost due to growth foregone in the AGB in the project area in year t
Source of data	PSP inventory
Description of measurement methods and procedures to be applied	N/A
Frequency of monitoring/recording	Each time a verification is conducted
Value monitored	Ex-post
Monitoring equipment	Tape measure and relascope (see inventory procedure)
QA/QC procedures to be applied	Comparison with the first monitoring data
Purpose of the data	Calculation of baseline emissions

Calculation method	'VM0011' v1.0, Section 3.3.4 Carbon in the Growth Foregone Due to Selective Logging, Equation 3-37a
Comments	N/A

Data/parameter	$B_{AGB_regrowth,t}$
Data unit	tDM/ha ⁻¹
Description	Average AGB of trees in the regrowth estimated from the growth of trees in the regeneration sub-plot of the PSPs (i.e., trees with a diameter between 5–20 cm)
Source of data	PSP inventory
Description of measurement methods and procedures to be applied	Tree between 5–156 cm DBH (Chave, 2005): $AGB = 0.0509 \times \rho \times DBH^2 \times H$ Tree height (CIB, 2012; based on Feldpausch, 2012): $H = 58.3423 \times (1 - e^{[-0.017254 \times (DBH^{0.95289})]})$
Frequency of monitoring/recording	Each time a verification is conducted
Value monitored	Ex-post
Monitoring equipment	Tape measure and relascope (see inventory procedure)
QA/QC procedures to be applied	Comparison with the first monitoring data
Purpose of the data	Calculation of baseline emissions
Calculation method	'VM0011' v1.0, Section 3.3.5 Carbon in the Regrowth after Selective Logging
Comments	N/A

Data/parameter	$G_{regrowth,t}$
Data unit	tDM/ha ⁻¹
Description	Average regrowth of AGB per ha per year after logging in year t
Source of data	PSP inventory
Description of measurement methods and procedures to be applied	Estimation derived from the $B_{AGB_regrowth,t}$ and extrapolated to ha
Frequency of monitoring/recording	Each time a verification is conducted
Value monitored	Ex-post

Monitoring equipment	N/A
QA/QC procedures to be applied	
Purpose of the data	Calculation of baseline emissions
Calculation method	'VM0011' v1.0, Section 3.3.5 Carbon in the Regrowth after Selective Logging
Comments	N/A

Data/parameter	$C_{\text{regrowth},t}$
Data unit	tC/ha ⁻¹ /yr ⁻¹
Description	Average regrowth of AGB in the gaps after selective logging
Source of data	PSP inventory
Description of measurement methods and procedures to be applied	See Appendix 4 tab 3.1
Frequency of monitoring/recording	Each time a verification is conducted
Value monitored	Ex-post
Monitoring equipment	N/A
QA/QC procedures to be applied	
Purpose of the data	Calculation of baseline emissions
Calculation method	'VM0011' v1.0, Section 3.3.5 Carbon in the Regrowth after Selective Logging
Comments	N/A

Data/parameter	$A_{nd,j,t}$
Data unit	ha
Description	Annual area of natural disturbance (<i>nd</i>), in stratum <i>j</i> , in year <i>t</i>
Source of data	Annual monitoring
Description of measurement methods and procedures to be applied	Satellite imagery and field measurement
Frequency of monitoring/recording	Annually

Value monitored	Ex-post
Monitoring equipment	9 images from the Landsat (for the period 2013-2021) and 3 from Sentinel (to confirm no data) (Appendix 13).
QA/QC procedures to be applied	
Purpose of the data	Calculation of project emissions
Calculation method	'VM0011' v1.0, Section 4.4 Emissions Due to Natural Disturbances
Comments	N/A

Data/parameter	$f_{natdisturb,j,t}$
Data unit	Dimensionless
Description	Fraction of the growing stock naturally damaged in stratum j in year t
Source of data	Annual monitoring
Description of measurement methods and procedures to be applied	Derived from the analysis of the area of natural disturbance through satellite images
Frequency of monitoring/recording	Annually
Value monitored	Ex-post
Monitoring equipment	Satellite images analyzed
QA/QC procedures to be applied	
Purpose of the data	Calculation of project emissions
Calculation method	'VM0011' v1.0, Section 4.4 Emissions Due to Natural Disturbances
Comments	N/A

Data/parameter	$DBH_{tree_nd,i,snd,j,t}$
Data unit	cm
Description	DBH for individual tree n , of species i , in sample plot of naturally disturbed areas and in stratum j in year t
Source of data	Annual monitoring
Description of measurement methods and procedures to be applied	Derived from the analysis of the area of natural disturbance through satellite images. If, during the year evaluated, there were no areas of natural disturbance, then any tree was measured

Frequency of monitoring/recording	Each time a verification is conducted
Value monitored	Ex-post
Monitoring equipment	Tape measure
QA/QC procedures to be applied	No disturbances detected
Purpose of the data	Calculation of project emissions
Calculation method	'VM0011' v1.0, Section 4.4 Emissions Due to Natural Disturbances
Comments	N/A

Data/parameter	$A_{\text{illegal_harvest},t}$
Data unit	ha
Description	Annual area of illegal harvest in stratum j in year t
Source of data	Annual Monitoring
Description of measurement methods and procedures to be applied	9 images from the Landsat (for the period 2013-2021) and 3 from Sentinel (to confirm no data) were analyzed and classified in order to have a land cover classification for the project area (Appendix 13).
Frequency of monitoring/recording	Annually
Value monitored	Ex-post
Monitoring equipment	Satellite images analyzed and tape measure
QA/QC procedures to be applied	No disturbances detected
Purpose of the data	Calculation of project emissions
Calculation method	'VM0011' v1.0, Section 4.5 Emissions Due to Illegal Harvesting
Comments	<i>Satellite Pour l'Observation de la Terre</i> (SPOT) images used for the first monitoring period were replaced with images from the Landsat and Sentinel missions

Data/parameter	$V_{\text{illegal_harvest},t}$
Data unit	m^3
Description	Volume estimated in areas where illegal harvesting was detected. If, during the year evaluated, there were no areas of illegal harvesting, then any volume was estimated
Source of data	Annual monitoring
Description of measurement methods	'VM0011' v1.0; field survey

and procedures to be applied	
Frequency of monitoring/recording	Annually
Value monitored	Ex-post
Monitoring equipment	Satellite images analyzed and tape measure
QA/QC procedures to be applied	
Purpose of the data	Calculation of project emissions
Calculation method	'VM0011' v1.0, Section 4.5 Emissions Due to Illegal Harvesting
Comments	N/A

Data/parameter	$V_{\text{actualharvest},l,t}$
Data unit	m ³ /yr
Description	Annual actual volume of harvest for land <i>l</i> operated by the project proponent in year <i>t</i> (2013 – 2019)
Source of data	Annual monitoring
Description of measurement methods and procedures to be applied	'VM0011' v1.0
Frequency of monitoring/recording	Annually
Value monitored	Ex-post
Monitoring equipment	
QA/QC procedures to be applied	-
Purpose of the data	Calculation of shifted leakage
Calculation method	'VM0011' v1.0, Section 5 Leakage Assessment and Management
Comments	N/A

Data/parameter	$R_{\text{merch-total biomass}}$
Data unit	percentage (%)
Description	Ratio of merchantable to total biomass expressed in percentage. For the concession of the project and all the concession in the Shanga region for a representative period of time. These are: <ul style="list-style-type: none"> • Pikounda Nord (Congolaise Industrielle des Bois (CIB)) • Pokola (Congolaise Industrielle des Bois (CIB))

	<ul style="list-style-type: none"> • Kabo (Congolaise Industrielle des Bois (CIB)) • Ngombe (INTERHOLCO (IFO)) • Tala-Tala (Société Forestière et Industrielle du Congo) • Jua-Ikie (La Société d' Exploitation Forestière Yuan Dong (SEFYD))
Source of data	Annual monitoring
Description of measurement methods and procedures to be applied	'VM0011' v1.0
Frequency of monitoring/recording	Annually
Value monitored	Ex-post
Monitoring equipment	
QA/QC procedures to be applied	-
Purpose of the data	Calculation of market leakage
Calculation method	'VM0011' v1.0, Section 5 Leakage Assessment and Management; Table 3 VCS Standard 4.5
Comments	See Appendix 3e

4.3 Monitoring Plan

The North Pikounda REDD+ project is required to undertake periodic monitoring of the project and leakage area. The North Pikounda REDD+ project monitoring system is 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 guarantee the process for monitoring project progress, 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. As CIB is FSC-certified, it follows a set of procedures and systems, verified annually during the FSC verification audits, which regulate document management, verification, and validation (among other processes). As these are the systems that CIB staff are used to working with, CIB's current QA/QC system will serve as the 'backbone' for this project's QA/QC system, e.g., when handling complaints or non-conformities. The monitoring plan, described in detail in Appendix 8 of the PDD, is based on 12 main activities (briefly described below). The Appendix 'Monitoring Plan for the North Pikounda REDD+ project' can be considered as the procedure that will be implemented to collect all necessary information for the

verification audits. In Table 6 there is a summary of the monitoring plan followed for this verification (see Appendix 16 for more detail).

1) PSP inventory: the PSPs network will be monitored before each verification event

Tree parameters were measured, analyzed, and compiled in order to estimate the carbon stock variations in AGB, the growth foregone, and the regrowth factors.

2) Remote-sensed monitoring: illegal/natural disturbances

In Appendix 13, 9 images from the Landsat (for the period 2013-2021) and 3 from Sentinel (see Table 13 in Appendix 13) were analyzed and classified to have a land cover classification for the project area. The identification of images used, and the process followed is presented in Appendix 13: these images were analyzed to determine any evidence of illegal activities or natural disturbances. The analysis is presented below.

3) Field monitoring: illegal activities

Illegal logging seems not a viable threat during this monitoring period as there are no communities within the project area and any nearby communities are at least 20 km away. However, much can change in 30 years in a developing country such as the RoC, including increased population pressures. Annual field control has been doing by CIB and its neighbors, during PSP inventories, and after satellite images analyses. Community consultation for the validation of the project allowed a scan of the low probability of illegal activities in the project area.

4) Natural disturbances emissions

Natural disturbances have been monitored during this monitoring period (appendix 13), with no natural disturbances have been identified and no losses in the project area recorded. Consequently, no associated emissions have been included. In future monitoring periods, the field team will continue monitoring following the 'VM0011' methodology and the monitoring plan.

5) Illegal harvesting

Illegal harvesting activities have not been identified during this monitoring period (appendix 13). Future illegal activities and their associated emissions will be monitored following the 'VM0011' methodology and the monitoring plan.

6) Leakage monitoring

Appropriate production data from the leakage area was collected, analyzed to estimate activity-shifting and market leakage during the second monitoring period.

7) Uncertainty monitoring

Uncertainty linked to the parameters monitored was calculated using Excel models in Appendix 4.

8) Non-permanence risk assessment

The non-permanence risk tool was re calculated with the data corresponding to this monitoring period.

9) QA/QC

The project implements a rigorous QA/QC system to ensure the long-term accuracy of the data that is collected, a robust data storage system, and a systematic data management structure. This QA/QC system is entirely integrated into the pre-existing QA/QC system implemented for FSC certification and is reviewed annually during FSC verification audits, guaranteeing the quality and dynamic nature of the QA/QC system.

10) Training

All new personnel participating in the inventory/control of PSPs are trained following PSP inventory/control/monitoring procedure specifications and standard CIB practices to as high a degree as possible.

11) Documentation management

All documents are properly controlled, managed, and stored in a manner that complies with standard CIB practices, either fully or as much as is reasonably possible.

12) VCU calculation

For this verification event, the VCU vintage was estimated and updated based on the parameters of the monitoring results.

Table 6: Monitoring plan followed in this verification (Appendix 16)

Monitoring Plan approved in the validation of the PDD				APPLICABLE FOR THE SECOND MONITORING PERIOD	
Activities and sub-activities	Description	Responsible	Frequency	Actual Frequency	Last three years
1. PSPs Monitoring					
1.1 PSPs inventory	Maintain PSPs and monitor tree growth. Circumference of trees monitored is measured.	CIB-OLAMAgri	1/yr	At each verification. In the case of the second monitoring period was almost 9 years the time between the first and the second verification, but it has justification stated in CAR03.	The measurement and therefore the maintenance of the PSP was done in 2021, it means the last three years. For the field campaign in 2021, it was necessary to prepare maps of each PSP to locate the trees and plots. Also, after the measurement in the field, the AGB, growth foregone and regrowth were estimated (Appendices 4 and 7).
1.2 Data Capture	PSP inventory data are captured onto the excel database	CIB-OLAMAgri	1/yr		
1.3 Monitoring maps creation	Mapping inventory data capture	CIB-OLAMAgri	1/yr		
	Prepare maps for next inventory				
1.4 AGB estimation	Estimate AGB carbon stock from inventory data.	CIB-OLAMAgri	1/yr		
1.5 Growth Foregone estimation	Estimate carbon stored in Growth Foregone from inventory data.	CIB-OLAMAgri Technical Partner - South Pole	1/yr		
1.6 Regrowth estimation	Estimate carbon stored in Regrowth from inventory data.	CIB-OLAMAgri Technical Partner - South Pole	1/yr		
2. 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.	Technical Partner - South Pole	1/yr	The acquisition of imagery continues to be annual. However, imagery was changed to Landsat and Sentinel missions due to the possibility of acquiring them to analyze deforestation in the project area.	During the last three years, between 2021 and 2023, images of these years were acquired to detect deforestation in the project area.

Monitoring Plan approved in the validation of the PDD				APPLICABLE FOR THE SECOND MONITORING PERIOD	
Activities and sub-activities	Description	Responsible	Frequency	Actual Frequency	Last three years
2.2 Images Analyse	Prepare image and estimate impacted area from Spot5 images in order to determine whether a change in biomass occurred.	Technical Partner - South Pole	1/yr	The analysis of deforestation was done on a yearly basis using the set of Landsat and Sentinel images.	
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.	CIB-OLAMAgri	Monthly	CIB-OLAMAgri has been in contact with the local authorities to know about new developments around the project area.	This activity continues on a monthly basis.
3. 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.	CIB-OLAMAgri	1/yr	This activity has been done in a yearly basis since September 2012 in cooperation with WWF, no signs of illegal activities or encroachment have been reported.	This activity continues on an annual basis.
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.	CIB-OLAMAgri	1/yr	During the field campaign in 2021 no signs of illegal activities were detected. This activity was done not in a yearly basis because of the delayed in the time for the monitoring period.	Plots have been monitored and measured for the last three years, but not on the annual basis originally proposed for the reasons outlined in CAR03.
3.3 Control North access	During PSP monitoring, CIB teams will be in charge of controlling that no illegal activities have occurred.	CIB-OLAMAgri	2/yr		

Monitoring Plan approved in the validation of the PDD				APPLICABLE FOR THE SECOND MONITORING PERIOD	
Activities and sub-activities	Description	Responsible	Frequency	Actual Frequency	Last three years
	IFO will be contacted in order to know if illegal activities have occurred in the part of Ngombe concession close to the project area.	CIB-OLAMAgri		Communication with IFO and analysis of satellite imagery has been conducted on an annual basis. The northern and western boundaries of the project area are inaccessible. The neighboring certified forestry company, Industrie Forestière d'Ouessou (IFO), has not reported any illegal activities during the monitoring period. In addition, analysis of satellite imagery has shown no illegal activity in the project area.	These activities continue on a yearly basis or even in a smaller time range depending on the relevant data that comes from IFO or local communities.
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.	CIB-OLAMAgri	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.	CIB-OLAMAgri	1/yr		
4. Natural Disturbances Emissions Monitoring					

Monitoring Plan approved in the validation of the PDD				APPLICABLE FOR THE SECOND MONITORING PERIOD	
Activities and sub-activities	Description	Responsible	Frequency	Actual Frequency	Last three years
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.	CIB-OLAMAgri	-	Based on the analysis of satellite images to detect natural disturbances, this activity has been carried out on a yearly basis. No natural disturbances have occurred during the project period.	The monitoring of natural disturbances has continued on a yearly basis.
		Technical Partner - South Pole			
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 <i>et al</i> (2005) recommendations.	CIB-OLAMAgri	-		
		Technical Partner - South Pole			
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.	CIB-OLAMAgri	-		
		Technical Partner - South Pole			
5. Illegal Harvesting Emissions Monitoring					
5.1 Estimate Area of Illegal Harvesting and Merchantable volumes illegally harvested	Based on satellite images analyses and field teams checking, the area of illegal harvesting ($A_{illegal_harvest,t}$ – chap. 4.5 of VM0011) and	CIB-OLAMAgri	-	Based on the analysis of satellite images to detect illegal harvesting, this activity has been carried out on a yearly basis. No	Illegal logging monitoring has continued on an annual basis.

Monitoring Plan approved in the validation of the PDD				APPLICABLE FOR THE SECOND MONITORING PERIOD	
Activities and sub-activities	Description	Responsible	Frequency	Actual Frequency	Last three years
	the volume of merchantable timber illegally harvested (V _{illegalharvest,t} – chap. 4.5 of VM0011) are estimated.	Technical Partner - South Pole		illegal harvesting has occurred during the project period.	
5.2 Calculation of annual total carbon losses due to Illegal harvesting	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.	CIB-OLAMAgri Technical Partner - South Pole	-		
6. 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.	CIB-OLAMAgri	1/yr	For each verification. CIB-OLAMAgri has collected the information for their harvesting activity and for other concessions for the last monitoring period (Appendices 3a, 3d and 3e)	The monitoring of leakage continues on a yearly basis, since the data collected represent each year within the monitoring period.
6.2 Calculate Activity Shifting Leakage	Calculate carbon losses due to baseline activity shifting due to intensification of harvest volumes	Technical Partner - South Pole CIB-OLAMAgri	1/yr		
6.3 Calculate Market Leakage	Calculate carbon losses due to market leakage effects	Technical Partner - South Pole CIB-OLAMAgri	1/yr		
7. Uncertainty Monitoring					

Monitoring Plan approved in the validation of the PDD				APPLICABLE FOR THE SECOND MONITORING PERIOD	
Activities and sub-activities	Description	Responsible	Frequency	Actual Frequency	Last three years
7.1 Calculate uncertainty	Calculate overall IFM-LtPF uncertainty for the baseline, project activity and leakage emissions and associated carbon credit deductions	Technical Partner - South Pole	Upon every Verification	For each verification. Overall uncertainty was estimated in Appendix 4.	Uncertainty monitoring is still performed at each verification.
		CIB-OLAMAgri			
8. 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.	Technical Partner - South Pole	Upon every Verification	For each verification. Non Permanence Risk Analysis is show in Appendix 5a and 5b.	Non Permanence Risk Analysis is still performed at each verification.
		CIB-OLAMAgri			
9. Quality Assurance / Quality Control					
9.1 PSPs inventory data control	The captured data of all of the PSPs is controlled after each inventory (maps and measurements)	CIB-OLAMAgri	1/yr	At each verification. The PSP measure is an activity that will be carried out within a maximum of five years, but not less than two years, because access to the project area requires a high logistical development, so the QA/QC will only proceed after the field measurement campaign has been completed.	The QA/QC procedures for this verification were performed over the past two years after receiving the field measurements.
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	CIB-OLAMAgri	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 can be planned	CIB-OLAMAgri	1/yr		

Monitoring Plan approved in the validation of the PDD				APPLICABLE FOR THE SECOND MONITORING PERIOD	
Activities and sub-activities	Description	Responsible	Frequency	Actual Frequency	Last three years
9.4 Documentation management	The project coordinator controls that documentations is recorded and stored as specified in this Monitoring Plan	CIB-OLAMAgri	1/yr		
10. Training					
10.1 New elements	All new personal participating in PSPs inventory/control are trained following PSPs Inventory/Control/Monitoring Procedures specifications.	CIB-OLAMAgri	-	Training was conducted on a dummy plot prior to the last monitoring field campaign.	Training continues as needed. The last training took place in 2021 before the field campaign. Six people attended the training. Appendix 19.
10.2 Additional training	Depending on PSPs control results, teams receive additional training following recommendations of PSPs Control Procedure.	CIB-OLAMAgri	As needed		
11. Documentation 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	CIB-OLAMAgri	-	All PSP records are kept securely at the Pokola CIB office and are available to anyone who wishes to view them directly.	All records continue to be stored securely with each verification.

Monitoring Plan approved in the validation of the PDD				APPLICABLE FOR THE SECOND MONITORING PERIOD	
Activities and sub-activities	Description	Responsible	Frequency	Actual Frequency	Last three years
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	CIB-OLAMAgri	-		
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.	CIB-OLAMAgri	Upon Verification		
	In addition, after each inventory, updated database are sent to the project coordinator for archiving.				
11.4 Training records	Each given training is recorded and records are kept for at least 5 years	CIB-OLAMAgri	-		
12. VCU Calculation					
12.1 Final VCU calculation	Estimate total VCUs for Verification Audit	Technical Partner - South Pole	1/yr	At each verification	This was done after 2021.

Supervised classification

The supervised classification is a process where the user can select a variety of samples in an image that are representative of specific classes, which will be used as references by the processing software to classify all other pixels of the image: despite the variety of opinions on almost every aspect of the sampling process, there is a consensus that the size and quality of the training sample dataset, as well as the sample selection method used, can affect classification and accuracy assessments.

For the sake of this assessment, Landsat 8 multispectral images were downloaded for each year: the images have a spatial resolution of 30 meters, cover an area of 185km * 185km, and have a revisit period of 16 days from the same point; also, they were provided by the United States Geological Survey (USGS), and can be accessed and downloaded for free at <https://earthexplorer.usgs.gov/>. The images were accessed on April 5, 2023, obtaining ten multispectral images from 2013 to 2021 (see Appendix 13 for the specifics of the images). Despite the second monitoring period went from 2013 to 2019, two more years (2020, and 2021) were added for the sake of conservativeness. Also, for the analysis the following forest definition has been used: forest is defined as an area greater than 0.5 ha, with a crown density greater than 30% and a height greater than 5m (according to FREL for the Republic of Congo, 2016); the definition of other land cover classes is based on the 2006 Intergovernmental Panel on Climate Change (IPCC) methodology.

In the context of the Pikounda project, there was a relatively limited set of field data to carry out the land cover analysis, and these data are focused on a specific region within the project area: to mitigate possible biases, the sample size was calculated using a statistical approach based on these field data, and an online tool was used (<https://www.calculator.net/sample-size-calculator.html>). The resulting total sample size is a minimum of 385, and this means that more points or measurements are needed to have a confidence level of 95% that the real value is within +-5% of the measured value. The following figure shows the grid that was used to determine the final sample size: considering a distance between points of 1 kilometer, the final sample size is of 894 points, clearly higher than the minimum calculated. For each point a buffer of 45 meters on each side was generated, resulting in square polygons of 8,100 square meters. The total amount of samples was divided into training and validation, 70% and 30% respectively.

For the classification, the ENVI software and the Support Vector Machine algorithm were set up with the following parameters:

- Kernel type: Radial Basis Function;
- Gamma in Kernel function: 0.143;
- Penalty parameter: 100.

For the analysis of the outcomes, please refer to Appendix 13.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 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:

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

5.1.1 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.

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:

$$C'_{degradation,t} = [(C_{DWdecay,t} + C_{lthWPoxidation,t} + C_{regrowthforegone,t} - C_{regrowth,t}) * \frac{44}{12}]$$

$C'_{degradation,t}$ 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.
- 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);

$$C_{merch,j,t=0} = D * CF_{wood} * V_{merch,j,t=0}$$

$$C_{merch,t=0} = \frac{\sum_{j=1}^J (C_{merch,j,t=0} * A_{project,j,t=0})}{A_{project,j,t=0}}$$

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

$$C_{merch,t} = C_{merch,t=0} * A_{NHA_{annual,t}}$$

- 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:

$$C_{DWin,t} = f_{total_damages} * V_{merch,t}$$

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:

$$F_{DW_remain} = e^{-k_{decay}*t}$$

$$C_{DWpool,t} = \sum_{t=1}^{t*} (F_{DW_remain,t} * C_{DWin,t})$$

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

$$C_{DWdecay,t} = C_{DWout,t} - C_{DWout,t-1}$$

- 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.

$$C_{ltHWPoxidation,t} = C_{ltHWPresidues,t} + C_{ltHWPnet_{out,t}}$$

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

$$C_{ltHWPresidues,t} = C_{merch,p,t=0} * (1 - f_{lumber_{recovery}}) * A_{NHA_{annual,t}}$$

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:

$$C_{ltHWPin,t} = C_{merch,p,t=0} * f_{lumber_{recovery}} * A_{NHA_{annual,t}}$$

$$F_{ltHWP_remain,t} = e^{-k_{ltHWPox}*t}$$

$$C_{ltHWP_{pool,t}} = \sum_{t=1}^{t^*} (F_{ltHWP_{remain,t}} * C_{ltHWP_{in,t}})$$

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

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

- 7) 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 has 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)

$$G_{growth_foregone,t} = \frac{B_{AGB_{merch,m2}} - B_{AGB_{merch,m1}}}{\Delta m}$$

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).

$$C_{growth_foregone,t} = CF_{AGB} * G_{growth_foregone,t} * \sum_{t=1}^{t^*} A_{NHA_{annual,t}}$$

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

$$C_{regrowth,t} = G_{regrowth,t} * \sum_{t=1}^{t^*} A_{NHA_{annual,t}}$$

VM0011 suggest selecting 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. 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.

5.1.2 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 m³ 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 for one year has been used to calculate hauling Fuel Consumption factor (L per m³ 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: 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.

- 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 of the PDD) but remains conservative.

$$E_{processing,t} = FC_{generators} * EF_{fuel} * V_{sawn_{timber},t}$$

$$V_{sawn_{timber},t} = V_{merch,t} * f_{export/sawn}$$

- 5) 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.
- 6) Finally, the emissions due to log distribution are to be calculated. In the baseline scenario, exported volumes are transiting through two different routes:

- a. 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;
 - b. Cameroon Route: timber is transported by road from Pokola to Douala or by road to Belabo where it joins Douala by train.
- 7) 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:

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

$$KM_{distrib_{total,vehicle,destination,t}} = KM_{distrib,destination,t} * N_{vehicle,transport,t} * 2$$

$$E_{distribution,vehicle,destination,t} = FC_{distrib,vehicle,destination,t} * EF_{fuel} * KM_{distrib_{total,vehicle,destination,t}}$$

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

$$E_{distribution,rail,destination,t} = EF_{rail} * V_{merch,rail,destination,t} * 0.6014 * KM_{distrib,destination,t}$$

- 8) 0,6014 represent the average WSG for merchantable tree species harvested under the baseline scenario. EF_{rail} is expressed in kg CO₂-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 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.

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

Please refer to Appendix 4 for detailed calculations of the baseline degradation emissions and emissions stemming from baseline activities.

Table 4: Baseline Emissions for the Monitoring Period 2013–2019

Year	Emissions leaving the dead wood (DW) pool	Emissions leaving the lthWP pool	Carbon in the growth foregone	Carbon due to regrowth	Emissions due to degradation	Emissions due to degradation	Emissions due to harvesting and processing operations	Emissions due to baseline activity
	CDW_decay	CitHWP_oxidation	Cgrowth_foregone	Cregrowth	Cdegradation	Cdegradation	Cemissions	Cbaseline
	tC	tC	tC	tC	tC	tCO _{2e}	tCO _{2e}	tCO _{2e}
2013	11,523	10,192	1,333	29	23,019	84,403	6.031	90,434
2014	15,864	10,321	2,000	44	28,141	103,183	6.031	109,214
2015	19,468	10,446	2,667	58	32,523	119,251	6.031	125,282
2016	22,460	10,570	3,334	73	36,291	133,067	6.031	139,098
2017	25,209	11,119	4,057	89	40,296	147,752	6.373	154,125
2018	27,494	11,243	4,780	105	43,412	159,177	6.373	165,550
2019	29,389	11,364	5,503	121	46,135	169,161	6.373	175,534

5.2 Project Emissions

According to what was approved in the PDD, emissions associated with the actual project implementation are given by equation 4-1, p.73 of VM0011:

$$C'_{actual,t} = E_{projplan,t} + E_{design,t} + E_{monitoring,t} + [(C_{natdisturb,t} + C_{illegalharvest,t}) \times 44/12]$$

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 compared 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 $E_{plantravel,t}$:

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

Emissions of flight or ground transport, whether they were 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) were monitored in the same way and were accounted for in the same way. For this purpose, all trips that had a link with the project were recorded for the year 2011 during the project onset. The travel log for the years 2011-2012 was estimated at 50 tCO_{2e}, which means 25 tCO_{2e} per year. These emissions were presented in the registered PDD.

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 than what would be emitted in the future

and the total GHG emissions for 2011 and 2012 is lower than 50 tCO₂-e. If a comparison is made between this value and the annual emissions related to baseline activities in Table 4, it can be easily seen that this value is far less than the significance threshold. The emissions due to $E_{projplan,t}$, $E_{design,t}$ and $E_{monitoring,t}$, compared to the annual estimated GHG reductions, are thus insignificant (far less than 5 %) and will therefore not be accounted for in the future. Equation 4-1 therefore becomes:

$$C'_{actual,t} = (C_{natdisturb,t} + C_{illegal_{harvest,t}}) \times 44/12$$

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 rainy season, those floods are annual and non-catastrophic thus not reducing the extent of the forests. However, this assertion was checked during this verification event not identifying any natural disturbance¹² at least in the plots measured neither during the visit of the VVB. Additionally, there was no evidence of new human settlements inside the project area, nor any evidence of slash-and-burn agriculture. Please refer to the monitoring Plan in Appendix 16 for more details about Natural Disturbances monitoring. The steps to monitor Natural Disturbances are the same as those explained here-after for Illegal Harvesting monitoring.

For the estimation of the parameter $C_{illegal_{harvest,t}}$, the satellite imagery analysis mentioned earlier¹³ and communication with the neighbors confirmed that no illegal encroachment happened in the project area during the monitoring period. However, illegal harvesting is very unlikely in the area as has been stated in both this monitoring and in the PDD. Please refer to the Monitoring Plan in Appendix 16 for more details about illegal harvesting monitoring. Finally, both the emissions related to illegal harvest ($C_{illegal_{harvest,t}}$) and natural disturbances ($C_{natdisturb,t}$) in the area were not identified, so during the current monitoring period:

$$C'_{actual,t} = 0$$

5.3 Leakage Emissions

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.

¹² See Appendix 13, regarding satellite image analysis during the monitoring period. This set of evidence is provided to the VVB and the Standard for consultation.

¹³ Appendix 13 Satellite Images Analysis

- 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:

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

This will be deducted from $C'_{baseline,t}$, as required in equation 1.1 of VM0011:

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

5.3.1 Activity shifting leakage

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

- 1) 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 IFMLtPF project, and
- 2) 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 $C_{SH_{activityshifting,t}}$ is the annual carbon losses due to the shifting of harvesting operations.

5.3.1.1 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 has been chosen and compared against the harvested volume in the monitoring period: the period between 2002 and 2011 (10 years) and the first monitoring period (2012) has been considered as the historical Leakage Reference Period, while the monitoring period goes from 2013 to 2019 (7year). The total leakage in terms of merchantable logs volume is calculated as given by Equation 5-7 in VM0011

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

The summation of the difference between the actual harvest in the monitoring period and the average annual harvest volume for each concession in the historical reference period resulted in a value of -109,489 m³. This negative value indicates that the Project Proponent harvested less by that amount than the threshold for the leakage due to intensification of harvest. **It means there is no leakage due to intensification of harvesting.**

5.3.1.2 Leakage due to shifting of harvesting operation

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. Therefore, **there is no activity shifting leakage due to shifting of harvesting operation for this monitoring period.**

5.3.2 Market leakage

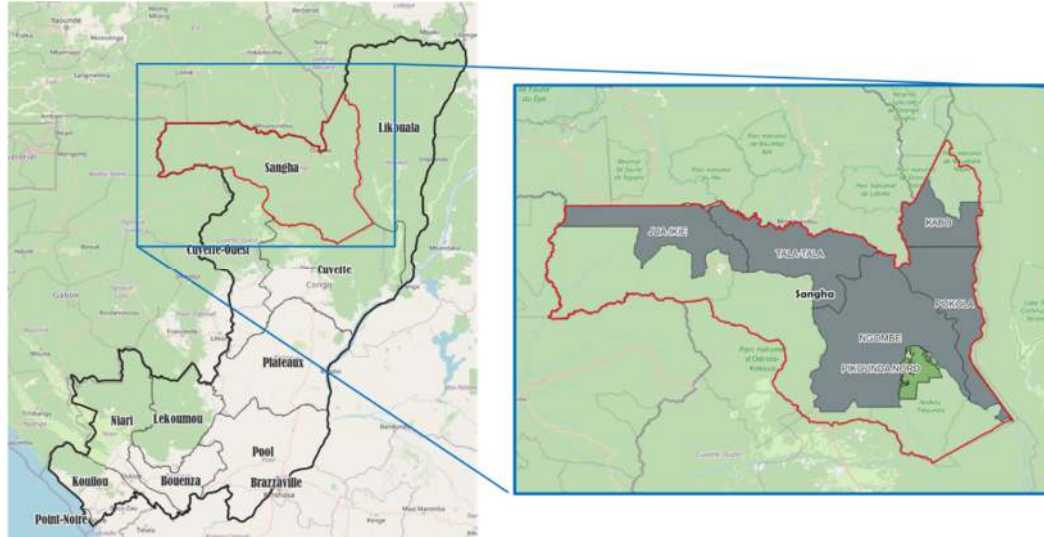
Leakage due to market effect is attributed to an IFM-LtPF project when the project significantly reduces the production of timber that affects the demand and supply equilibrium as well as results shifting of production elsewhere by the third party i.e. other than the Project Proponent, but within the host country. The applied methodology (VM0011) suggests following 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). Despite Sharma et al (2012) article was used for the validation and first verification, the methodology states that the most recent version of the applicable VCS rules need to be used. Therefore, the Table 3 (clause 3.15.10) from the VCS Standard v4.5 must be used.

Table 3: Market Leakage Discount Factors

Project Action	Leakage Risk	Market Leakage Discount Factor
IFM activity with no effect or minimal effect on total timber harvest volumes (e.g., RIL with less than 25% reduction)	None	0%
IFM activity that leads to a shift in harvests across time periods but minimal change in total timber harvest over time (e.g., ERA with rotation extension of 5-10 years)	Low	10%
IFM activity that substantially reduces harvest levels permanently (e.g., RIL activity that reduces timber harvest across the project area, or project that halts logging by at least 25%)	Moderate to High	Conditional upon where timber harvest is likely to be shifted, as follows: <ul style="list-style-type: none"> • Where the ratio of merchantable biomass to total biomass is higher within the area to which harvesting is displaced compared to the project area, 20% • Where the ratio of merchantable biomass to total biomass is similar within the area to which harvesting is displaced compared to the project area, 40% • Where the ratio of merchantable biomass to total biomass is lower within the area to which harvesting is displaced compared to the project area, 70% • Where the leakage is out of country, 0%

In the project case, the IFM activity falls into the 3rd project action (IFM activity that substantially reduces harvest levels permanently (e.g., RIL activity that reduces timber harvest across the project area, or project that halts logging by at least 25%)) causing a leakage risk of moderate to high.

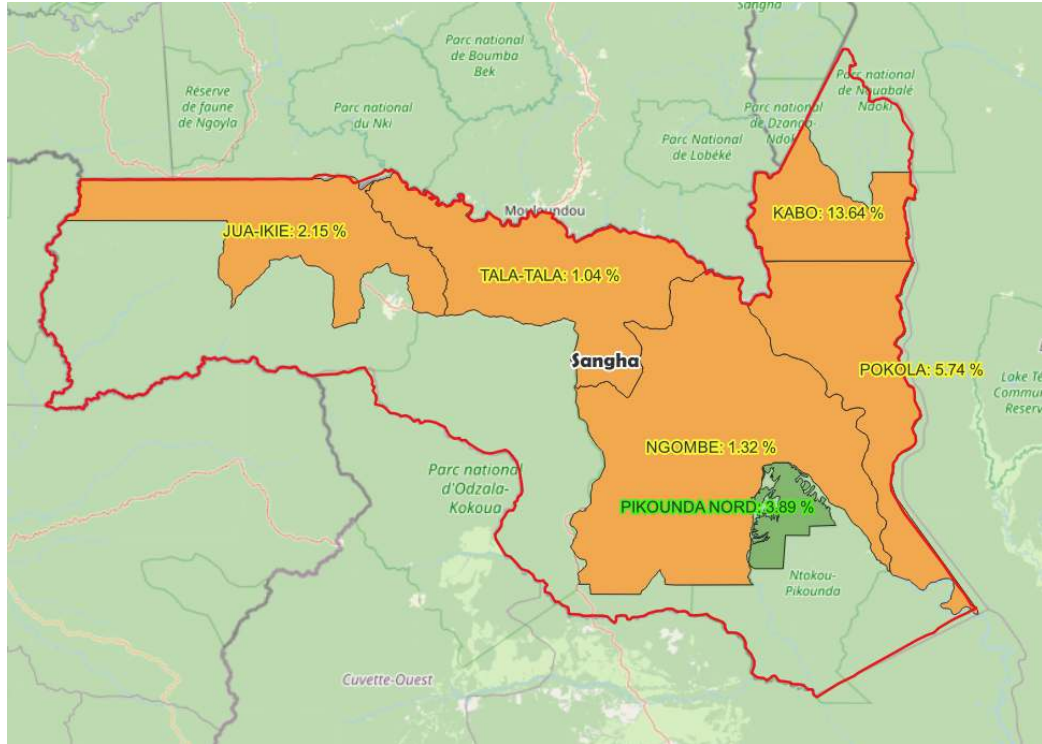
Therefore, the concessions within the Shanga region were selected because of proximity and the same type of forest. Furthermore, worth mentioning that information disposal was not the same for all the concessions so the values were calculated in different ways with the available data. The concessions selected for the analysis were the following: Kabo, Pokola, Ngombe, Tala-Tala, and Jua-Ikie; apart from Pikounda Nord.



The calculation of the ratio of merchantable biomass to total biomass was calculated in the Appendix 3e and the Leakage report¹⁴. The summary and (a map showing the ratio per concession) of the calculations is depicted below:

Concession	Ratio of merchantable biomass to total biomass (R _{merch-total biomass})	Aggregated ratio	
	% (AGB m3/ha)	% (AGB m3/ha)	
PIKOUNDA	3.89%	3.89%	Pikounda
POKOLA	5.74%	4.78%	Concessions in Sangha Region
KABO	13.65%		
NGOMBE	1.32%		
TALA-TALA	1.04%		
JUA-IKIE	2.15%		

¹⁴ Supporting information/Appendix 3a Leakage Assessment Report



Therefore and according to Table 3, the ratio of merchantable biomass to total biomass is higher within the area to which harvesting is displaced (4.78%) compared to the project area (3.89%), concluding that **the market leakage discount factor is 20%**.

The above mentioned procedure was followed to determine leakage: leakage emissions ($C_{leakage}$) are equal to 20% of the baseline for this monitoring period

5.4 GHG Emission Reductions and Carbon Dioxide Removals

State the non-permanence risk rating (%)	23%
Has the non-permanence risk report been attached as either an appendix or a separate document?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
For ARR and IFM projects with harvesting, state, in tCO _{2e} , the Long-term Average (LTA).	N/A
Has the LTA been updated based on monitored data, if applicable?	<input type="checkbox"/> Yes <input type="checkbox"/> No N/A because the project does not have harvesting.
State, in tCO _{2e} , the expected total GHG benefit to date.	652,628 tCO _{2e}

If a loss occurred (including a loss event or reversal), state the amount of tCO₂e lost: N/A

Uncertainty

The uncertainty has been calculated considering a mean percentage error of 6% for the “objective” species and an 11% error for the “promotion” species (see Appendix 4, tab 1.2 on the volumes in the baseline scenario): these percentages have been defined in the North Pikounda forest management plan (2012) and were used in deriving the uncertainties for the project calculations. The latter can be found in Appendix 4, in the 2.3 and 3.2 tabs. The average uncertainties for the 2013-2019 period for the emissions related to the baseline scenario have been calculated as 5.46% (U_{IFM-LTPF}, calculated in Appendix 4, tab 3.2). This is under the 10% threshold as set forth in the methodology and therefore no uncertainty deduction will be considered.

Vintage period	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Buffer pool allocation (tCO ₂ e)	Reductions VCU (tCO ₂ e)	Removals VCU (tCO ₂ e)	Total VCU issuance (tCO ₂ e)
01-Jan-2013 to 31-Oct-2013	90,434	0	18,087	19,413	52,934		52,934
01-Jan-2014 to 31-Dec-2014	109,214	0	21,843	23,732	63,638		63,638
01-Jan-2015 to 31-Dec-2015	125,282	0	25,057	27,428	72,797		72,797
01-Jan-2016 to 31-Dec-2016	139,098	0	27,820	30,605	80,672		80,672
01-Jan-2017 to 31-Dec-2017	154,125	0	30,825	33,983	89,317		89,317
01-Jan-2018 to 31-Dec-2018	165,550	0	33,110	36,611	95,829		95,829
01-Jan-2019 to	175,534	0	35,107	38,907	101,519		101,519

Vintage period	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Buffer pool allocation (tCO ₂ e)	Reductions VCU (tCO ₂ e)	Removals VCU (tCO ₂ e)	Total VCU issuance (tCO ₂ e)
31-Dec-2019							
Total	959,237	0	191,849	210,679	556,706		556,706

Vintage period	Ex-ante estimated reductions/removals	Achieved reductions/removals	Percent difference	Explanation for the difference
01-Jan-2013 to 31-Dec-2019	778,279	556,706	28.46%	The main difference between the ex-ante and ex-post estimates are the growth rate after logging and the growth foregone rate. While in the first monitoring period theoretical growth rates were used, in the second monitoring period the regrowth after logging was estimated as the difference of the measurements of saplings or young trees (5-20 cm diameter) that in the baseline scenario would grow (difference between first and second monitoring period), after a selective harvest; also the growth foregone rate was estimated as the difference of the measurements of mature or harvestable trees (5-20 cm diameter) that in the baseline scenario would grow (difference between first and second monitoring period),

APPENDIX: COMMERCIALLY SENSITIVE INFORMATION

No commercial sensitive information.

Section	Information	Justification
<u>N/A</u>	N/A	N/A