RSPO GHG Assessment for New Plantings, Lot 3 Extension, Olam Palm Gabon

2/15/2017

Contents

1. Background

The revised P&C (2013) has a new criterion 7.8 requiring new plantation developments are designed to minimize net greenhouse gas (GHG) emissions. The indicators under this criterion include the identification and estimation of potential sources of emission and sinks of carbon associated with the new developments. Another indicator is that new developments must be designed to minimize GHG emission which takes into account avoidance of land areas with high carbon stocks and consideration of sequestration options.

1.1 Gabon and National Commitment on Emission Reduction

Gabon is a country of Central Africa bordering Cameroon to the north, the republic of Congo to the east and the Atlantic Ocean to the west. The country covers 25.8 million hectare of land, with 88% of forest cover, and approximately 2.9 million ha or 11% of these terrestrial areas has been gazetted as National Parks.

Gabon has one of the lowest deforestation rates in Africa, estimated at 0.12% per year (average between 1990 and 2000). The country has a population of approximately 1.67 million people; more than 40% of the population is living in the capital city, Libreville. 26% or one out of four adults in Gabon is currently unemployed.

Gabon's economy is highly dependent on oil export, mining and timber. Oil export contributes 34.9% of the country's GDP while agriculture sector (including livestock and fishing) only contributes 2.9% of GDP in 2014.

80% of food consumed in Gabon is mainly imported from France, Cameroon and South Africa, and increasing food import bill is touching above USD500 million today (or 12% of Gabon total import bill).

Since 2009, the government has committed to diversify its economy via its sustainable development strategy referred as Gabon Emergent. This strategy is based on three pillars:

"Gabon Vert" (Green Gabon): 22 million ha of conserved forest, 1 million ha of arable land, 13 national parks and 800km of coastline allocated for timber industry, agricultural development and eco-tourism.

Gabon Industriel (Industrial Gabon): Promotion of the local transformational of primary materials and export of high value-added products.

Gabon des Services (Services Gabon): Develop Gabonese workforce with the goal of becoming a regional leader in financial services, ICT, green economy, higher education and health.

Through implementation of Green Gabon strategy, the government aims to create up to 50,000 jobs in agricultural sector, increase GDP from agricultural sector to 20% by year 2025 and increase local food security.

Under its 2015 Climate Action Plan for the UNFCCC[1], Gabon committed to reducing its Greenhouse Gas emissions at least by 50% in 2025 relative to its year 2000 baseline, the first African country to

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[1] Gabon INDC

do so (April 2015). Achieving this reduction will depend on the rational use of Gabon's forest and agricultural land resources based on:

- The adoption of a new Forestry Code to prevent forest degradation
- The creation of 13 National Parks and other restrictions on land clearance
- The adoption of a National Land Use Plan that allocates land for different uses and explicitly excludes "intact forests, high conservation value forests and forests which are particularly rich in carbon".

Cumulative, Gabon's commitments should reduce GHG emissions over 1.5 million $GgCO_2$ between 2010 to 2025 or 65 % compared to the baseline scenario.

Today, the recently adopted Gabonese Republic Act No. 002/2014 on guiding Sustainable Development in the Gabonese Republic recognizes the need to control greenhouse gas emissions at national level. The National Climate Council is working on the development of a carbon diagnosis tool and develops a national carbon map that will enable companies to measure the impact of their activities in terms of GHG emissions[2].

1.2 Olam Palm Gabon

Olam Palm Gabon (OPG), a subsidiary under Olam International Ltd. has been a member of the Roundtable for Sustainable Palm Oil (RSPO) since February 2011; all developments had completed the RSPO New Plantings Procedure (NPP). OPG has commissioned an independent regulatory Environmental and Social Impact Assessment (Terea Gabon) and High Conservation Value assessment (HCV, Proforest UK, led by David Hoyle (ALS15008DH) as part of the requirements of the RSPO for the development of new plantings for Lot 3 extension. No development has started in the proposed area and verification by an accredited certification body was conducted in Oct 2016.

Olam Palm Gabon (OPG) is managing a total area of 181,096 ha through a public-private partnership between the Government of Gabon (GoG) and Olam International. The total area covers 11,250 ha of plantation acquired from SIAT in July 2016[3] and 58,400 ha of schemed smallholder development project namely Sotrader Ndende under OPG's direct management. Out of 181,069 ha, 83,054 ha has been identified as HCV and conservation area through the RSPO NPP process[4].

OPG has now acquired an extension (14,530 ha) to the Mouila Lot 3 concession located to the south of the city of Mouila, in the Ngounié Province, southern Gabon.

Location	Total Area	HCV and Buffer Zones	Area for Plantation*
Awala	20,030	12,852	6,810
Mouila 1	35,354	18,324	16,000

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[2] [Reducing Carbon Emissions from Forest Conversion for Oil Palm Agriculture in Gabon, Conservation Letter, C. Stewart *et. al*, 2016](#)

[3] Acquisition announcement http://olamgroup.com/news/q3-2016/#sthash.TFmlNZDA.dpbs

[4] NPP documents http://olamgroup.com/products-services/food-staples-packaged-foods/palm/faq-and-reports/

Mouila Lot 2	31,969	17,920	11,573
Mouila Lot 3	24,066	6,680	17,000
Makouke	11,250	TBD	TBD
Sotrader Ndende	58,400	27,278.5	30,000
Total	**181,096**	**83,054.5**	**81,383**

* Final planted areas may vary slightly from this figure, based on operational surveys and cultural "chance finds", other infrastructures such as roads, mill are not included in this table.

1.3 NPP Site, Lot 3 extension

The Mouila Lot 3 Extension concession would be the latest development in an area of the country which has been highlighted as the most suitable for oil palm cultivation in analyses by both the National Parks Authority (ANPN) and WWF, based on criteria ranging from accessibility and infrastructure to favourable amounts of rainfall and a minimisation of biodiversity loss. These analyses both identify the "fingers" of grassland ecosystems associated with the Niari-Nyanga[5] syncline as suitable for oil palm.

The extension concession is predominantly savannah grassland with forests restricted to riparian and gallery forest, all forest patches were identified as HCV 4 and should thus be conserved. A HCS assessment has been conducted based on HCS approach to map carbon stock of the area, vegetation is categorized into young regenerating forest (YRF), low density forest (LDF), medium density forest (MDF) and high density forest (HDF). It was assumed that YRF was equivalent to forest of >=35tC/ha but less than 75tC/ha. And that LDF contained >=75tC/ha.

The site does not overlap with any national parks, The closest conservation areas are the national parks of Waka to the north and Moukalaba-Doudou to the west, both over 50 km away, and as such unlikely to be impacted by the planned activities.

The soils had been extensively surveyed and characterised in Ndendé and Mouila Lot 3 as part of the ESIA following a two-pronged approach:

1. Desk based study of existing information on the soils of Gabon and in particular the Mouila Lot 3 extension area; and

2. Soil sampling and analysis of the six main soil types found within the concession area. **No peat** soil has been identified in the proposed area.

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[5] http://www.pangeaminerals.org/2013/07/28/3101/

Activity	Area (ha)
Total concession	14,530
A.) HCV 1, 3, 4, 5 & 6 area	9,466
B.) Plantable area excluding (C)	4,878
C) Infrastructures and roads	186

Notes to area table: All forest/ area with higher carbon stock will be set asides as part of HCV. All areas are approximate based on current assessments, and may change following further surveys and FPIC negotiations.

The concession is located approximately half way between the provincial towns of Mouila to the north and Ndendé to the south. Mouila is the provincial capital with approximately 23,000 inhabitants. The town of Ndendé currently counts just over 4,500 inhabitants, a population in decline as the rural exodus continues towards bigger towns and cities. The recent road development between Ndendé town and Mouila has made exchanges and movement of people easier, and consequently has increased the human influence on the area. With the exception of OPG and SOTRADER investments in the area there are no other significant industrial or development projects in close proximity.
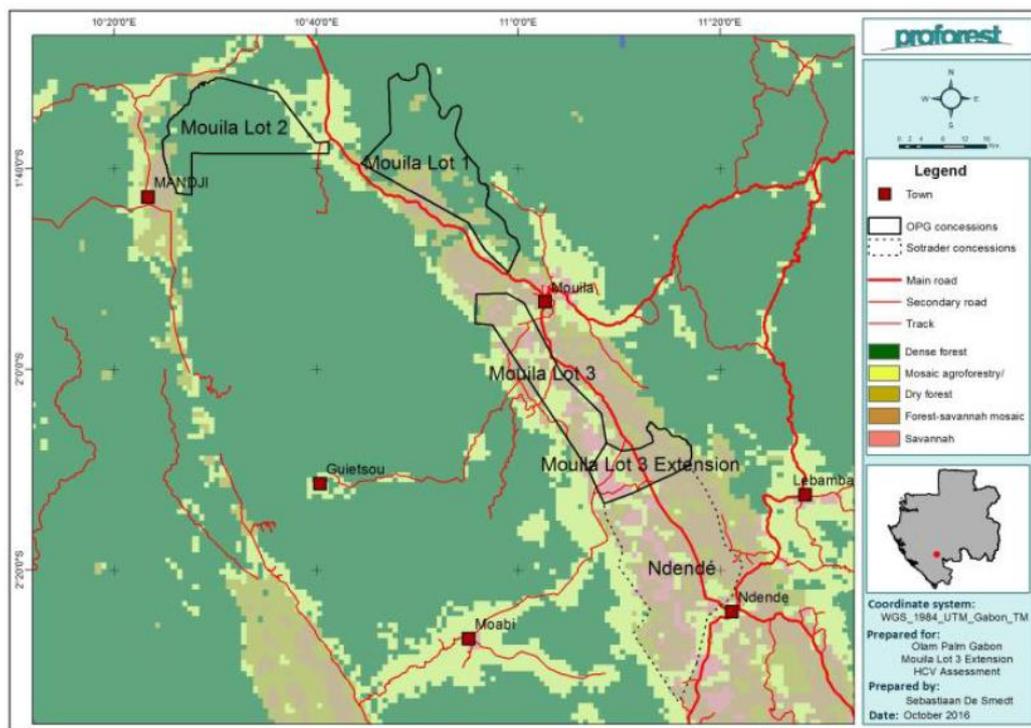

Figure 1: Location map and vegetation map showing OPG's and Sotrader's palm oil development projects in the Mouila Lot 3 Extension area. (Landcover data source: http://www.wri.org/our-work/project/congo-basin-forests/gabon#project-tabs)
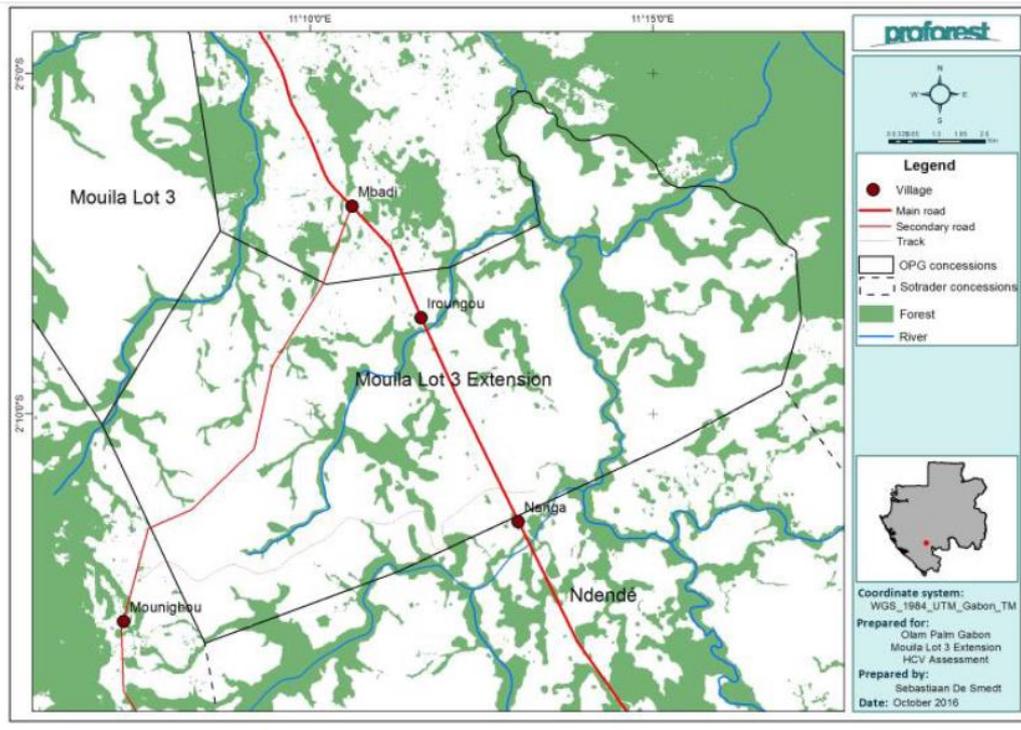
Figure 2: Map of the concession area with the location of the surrounding villages and infrastructure. The land cover data was based upon ALOS/PALSAR remote sensing imagery made available by OPG / SOTRADER.

2. Assessors and Credentials

Relevant experts are listed below. Carbon stock assessment was conducted as part of the HCV by Proforest, led by David Hoyle.

Name	ALS Licence	Organisation	Role	Expertise
David Hoyle david@proforest.net	ALS15008DH	Proforest	Lead Assessor	Biodiversity Conservation Social
Dr. Mike Senior mike@proforest.net		Proforest	Assessor	Conservation GIS
Dr. Audrey Versteegen audrey@proforest.net		Proforest	Assessor (scoping only)	Conservation GIS
Dr. Olivia Scholtz Olivia_scholtz@hotmail.com		Consultant with Proforest	Assessor	Conservation Mammals
Aubin Mboumba a.mboumba@tera.net		Consultant with TEREA & lead for ESIA	Assessor	Environment social impacts

3. Methods and Procedures Used for Conducting Carbon Stock and GHG Assessments

The HCS assessment was based on the HCS Approach as developed by Greenpeace, TFT and GAR, and the latest version of the HCS Forest Patch Analysis Decision Tree (v2, see HSC Approach Toolkit Chapter 6) was applied.

The carbon stock map is integrated with other conservation set asides identified during HCV, ESIA and FPIC process. The integrated map serves as a guide to project emission from landuse change and projecting GHG emission from different development scenarios. Final GHG emission is summarized based on optimum scenario for low emission development plan.

3.1 Core datasets

- 100 m-resolution biomass map derived from LiDAR remote sensing data for the area.
- The Mouila 3 Extension concession boundaries.
- Polygons of identified HCV 1-4 in the concession.
- HCVs were NOT identified for the 200 m outside the concession (as advised in the HCS Approach Toolkit Chapter 6), but applied as biomass layer to identify forest patches outside the concession for connectivity.
- There are no peatlands in the area, so no peatland layer was used.
- Although the negotiations between Olam Palm Gabon and the local communities are still ongoing, and attempt was made to delimit the areas which will be set aside for use for the community usage. **This layer is only for illustrative purposes.**
- A layer with the settlements in the area and a layer of the road network (for the risk assessment). Waterways are in this specific context not considered as being used for transportation/navigation (in contract to projects in highly forested areas), and are thus excluded from the risk analysis.

3.2 Techniques and thresholds

As stated above, the methodology used in this study is based upon the HCS Approach toolkit and the latest version of the decision tree. When the toolkit or the decision tree could not be followed for whatever reason, this is indicated in the report.

The forest classification into Young Regenerating Forest (YRF), Low Density Forest (LDF), Medium Density Forest (MDF) and High Density Forest (HDF) had to be based upon the biomass layer as no field data was available for this study. Firstly, a carbon map was derived from the biomass layer by dividing the biomass by two. It was assumed that YRF was equivalent to forest of >= 35 tC/ha but less than 75 tC/ha, and that LDF contained >= 75 tC/ha.

3.3 Soil carbon

The preliminary desk based study was conducted in July 2016 by Param Agricultural Soil Survey (M) Sdn. Bhd to study soil and land suitability of the area (14,530ha). The site is classified as level to rolling terrain (0-12⁰). Soil suitability map is presented in the summary of ESIA and HCV.

Additional soil sampling was conducted as part of the ESIA baseline study. **No peat** soil has been identified in the proposed area. Riparian buffers have been identified as HCV 4 and will be managed for soil and water conservation. (Refer to summary of ESIA and HCV).

3.4 Carbon Stock Map

Figure below gives an overview of the carbon stored in the vegetation (derived from the biomass layer as supplied by OPG) of the concession. Most of the concession consists of herbaceous

savannah vegetation with low carbon content, and most of the biomass in the area is concentrated in riparian and gallery forest patches.
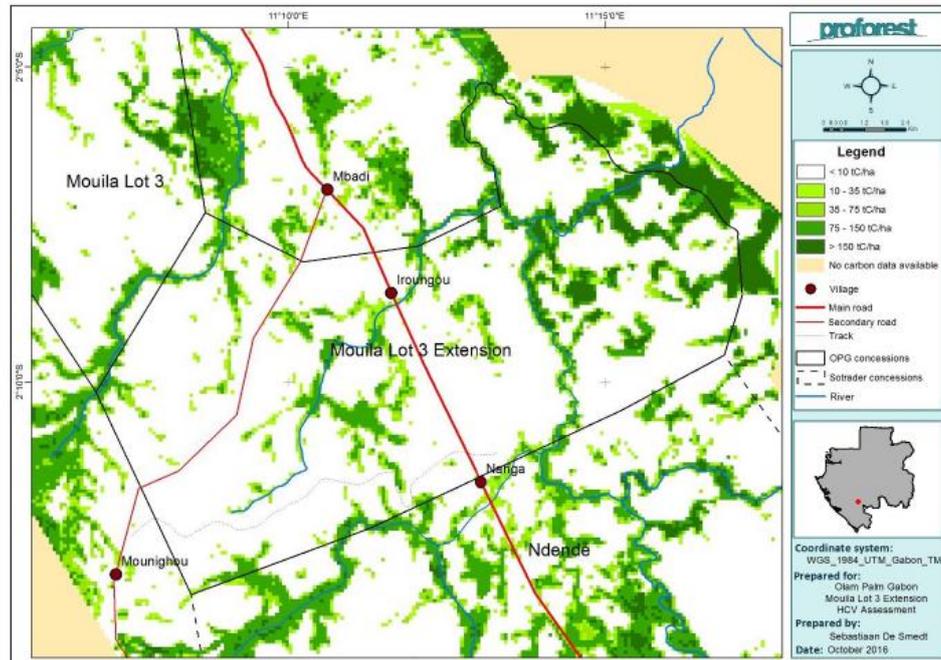

Figure 3: Carbon map for the Mouila Lot 3 Extension concession.

The carbon map showed in Figure 3 was used as the basis for the HCS patch analysis. The results of the patch analysis decision tree after Step 10 are shown in Figure 4. At this point in the analysis, the decision tree splits the patches into 3 clear categories as shown on the map, these are:

- HCS areas for conservation
- HCS areas for conservation in need of targeted mitigation action. These areas consist of viable HCS areas that occur within proximity to towns/villages or roads and hence are considered at high risk of encroachment. Therefore, their protection is considered to be contingent on adequate mitigation measures to prevent encroachment, and
- Non-HCS areas for development ('Develop')

AGB (tC/ha)	Area (ha)
<10	11,324
10-35	625
35-75	782
75-150	1,195
>150	604
Total	14,530

At Step 10, the patch analysis determined that most of the riparian and gallery forest in the Mouila Lot 3 Extension concession should be set aside for conservation, and indeed the majority of this forest is connected, suggesting that it has considerable value for conservation. The areas shown in

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red ('Develop') consist of small or isolated (non-viable) HCS patches that are allotted for conversion due to their negligible conservation value and viability over time. Only one small patch to the northern end of the concession was set aside for conservation in need of mitigation action.
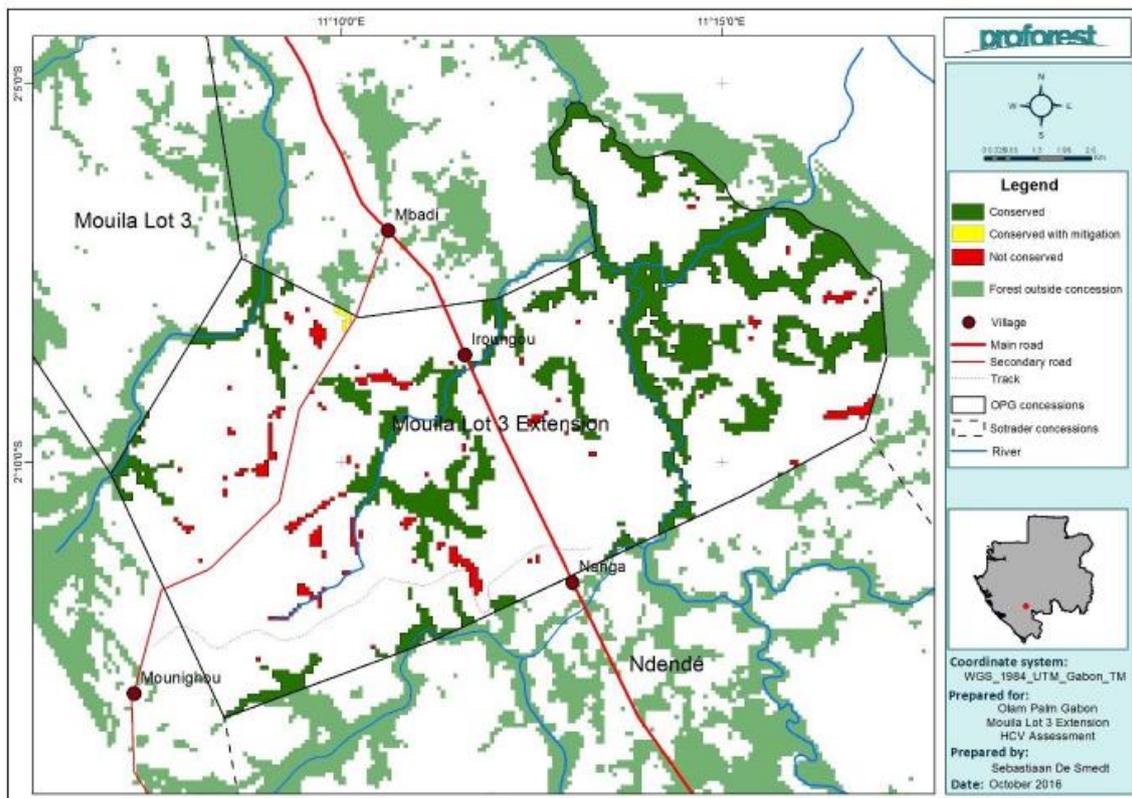

Figure 4: Results of the first 10 steps of the patch analysis tree.

Step 11 of the new version of the patch analysis decision tree indicates that an aggregated 'indicative conserve' are needs to be created by merging HCV 1-4 and peatland areas, riparian zones, and any other protection or conservation areas with the forest patches that have been identified to be conserved in step 1-10 of the decision tree, or with forest patches that provide connectivity with those areas. This layer will then form the basis of the last two steps to maximise viability and optimize.

In the HCV assessment, all forest patches were identified as HCV 4 and should thus be conserved. In practice, this means that also the patches that were set aside for development in the HCS decision tree will be conserved. Also, the 'give and take' exercise for improving the operational efficiency and minimizing the risk for conservation areas as described in Step 13 of the new version of the decision tree will thus not be executed as all HCVs need to be protected.

Based on the above results, a carbon balance exercise was done. Figure 5 gives an overview of i) the forested set-aside areas as identified in the HCS and HCV analysis, the ii) non-forest HCVs, and iii) tentative set-asides for communities. OPG is in the process of discussing the community set-asides with the local communities, and the areas shown are thus for illustrative purposes only.
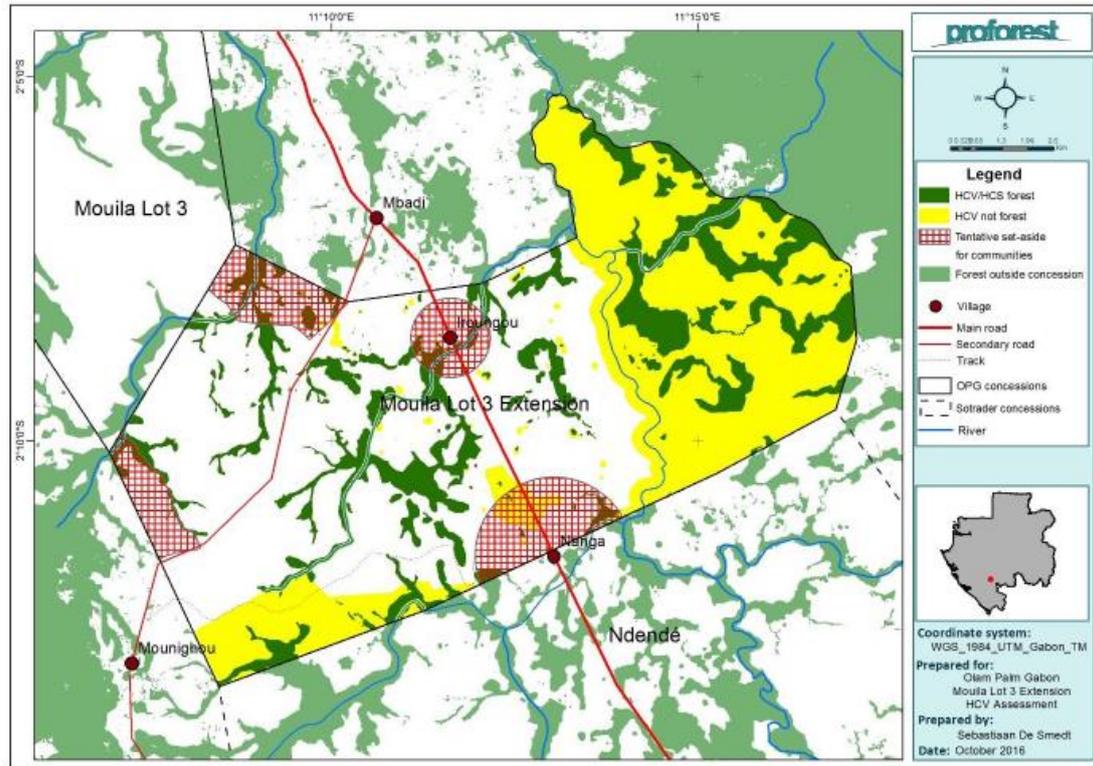
Figure 5: Integrated landuse map - Overview of the HCV, HCS and tentative set-aside areas for community use in the concession. The forest cover data was based upon ALOS/PALSAR remote sensing imagery made available by OPG / SOTRADER.

The results of the carbon accounting estimate are given in Table 1. For this exercise, Proforest used a medium carbon sequestration figure of 1.5 tC/ha/yr for forest set-asides, and we assumed that other HCVs (mainly savannahs) do not sequester any carbon. As no forest will be removed for the development of the plantations, this project will be highly carbon positive over the course of the plantation lifecycle. Oil palm planting will result in huge carbon gains because of carbon accrued in oil palm biomass. There is also estimated to be a substantial carbon gain in the forested set-aside areas, as these areas sequester carbon and regenerate towards later successional status.

	Area (ha)	Carbon gains (+) and loses (-) (tC)
Carbon accumulation rate (tC/ha/yr)		
Plantable		
Carbon loss	0	0
Carbon gain	4,878	146,340
Infrastructure*	186	0
Carbon balance from planting	**5,064**	**146,340**
Set asides forest	3,100	116,250
Set aside other vegetation	6,366	0
Carbon balance from set asides	**9,466**	**116,250**

Total	14,530	262,590

Infrastructure development is expected to occur on savannah areas and hence no carbon losses are assumed.

Table 1. Results of the carbon accounting exercise for the Mouila Lot 3 Extension Concession

4. GHG Emissions Assessment for New Plantings

Based on carbon stock and HCV maps, 2 scenarios are developed to estimate potential emission of the proposed NPP area.

Description of new development scenarios in Mouila Lot 3 extension

Scenario 1	All potential areas for new plantings is developed for oil palm, no clearing of HCV and HCS (all HCS has been incorporated as HCV 4). No methane captures facility and 100% conventional POME treatment using anaerobic pond.
Scenario 2	All potential areas for new plantings is developed for oil palm, no clearing of HCV and HCS (all HCS has been incorporated as HCV 4). With methane capture facility.

		S1	S2
Non plantable area	HCV area	9,466 ha	9,466 ha
Plantable area	Savannah	4,878 ha	4,878 ha
Infrastruture	Savannah	186 ha	186 ha
POME treatment	Conventional	Y	-
	Methane capture	-	Y

4.1 Projection of GHG Emission for Scenario 1

Field emissions & sinks (Assumes vigorous growth for oil palm - for use by large scale operations)

	t CO_2e	t CO_2e/ha	t CO_2e/t FFB
Land clearing	0.00	0.00	0.00
Crop sequestration	-45,666.54	-9.36	-0.39
Fertilisers	1,005.88	0.21	0.01
N2O	1,122.22	0.23	0.01
Field fuel	2,435.10	0.50	0.02
Peat	0.00	0.00	0.00
Conservation credit	-17,065.50	-3.50	-0.15
Total	**-58,168.83**	**-11.92**	**-0.50**

Mill emissions & credit	tCO_2e	t CO_2e/ha	tCO_2e/tFFB
POME	22,948.09	4.70	0.20
Mill fuel	0.00	0.00	0.00
Purchased electricity	0.00	0.00	0.00
Credit (excess electricity exported)	0.00	0.00	0.00
Credit (sale of biomass for power)	0.00	0.00	0.00
Total	**22,948.09**	**4.70**	**0.20**

Total emissions, tCO_2e (field and mill)	**-35,221**

Allocation:

t CO_2e/t CPO	-1.11
t CO_2e/t PK	-1.11

12
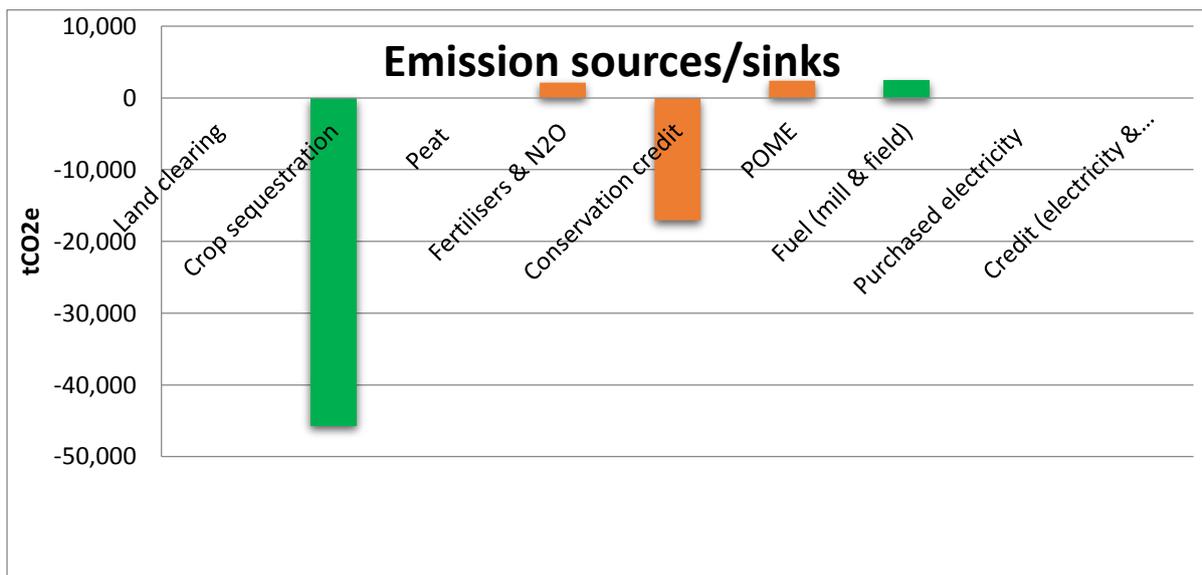
4.2 Projection of GHG Emission for Scenario 2

Field emissions & sinks (Assumes vigorous growth for oil palm - for use by large scale operations)

	t CO$_2$e	t CO$_2$e/ha	t CO$_2$e/t FFB
Land clearing	0.00	0.00	0.00
Crop sequestration	-45,666.54	-9.36	-0.39
Fertilisers	1,005.88	0.21	0.01
N2O	1,122.22	0.23	0.01
Field fuel	2,435.10	0.50	0.02
Peat	0.00	0.00	0.00
Conservation credit	-17,065.50	-3.50	-0.15
Total	**-58,168.83**	**-11.92**	**-0.50**

Mill emissions & credit	tCO$_2$e	t CO$_2$e/ha	tCO$_2$e/tFFB
POME	2,386.61	0.49	0.02
Mill fuel	0.00	0.00	0.00
Purchased electricity	0.00	0.00	0.00
Credit (excess electricity exported)	0.00	0.00	0.00
Credit (sale of biomass for power)	0.00	0.00	0.00
Total	**2,386.61**	**0.49**	**0.02**

Total emissions, tCO$_2$e (field and mill)   **-55,782**

Allocation:

t CO$_2$e/t CPO   **-1.76**

t CO$_2$e/t PK   **-1.76**

Emission sources/sinks
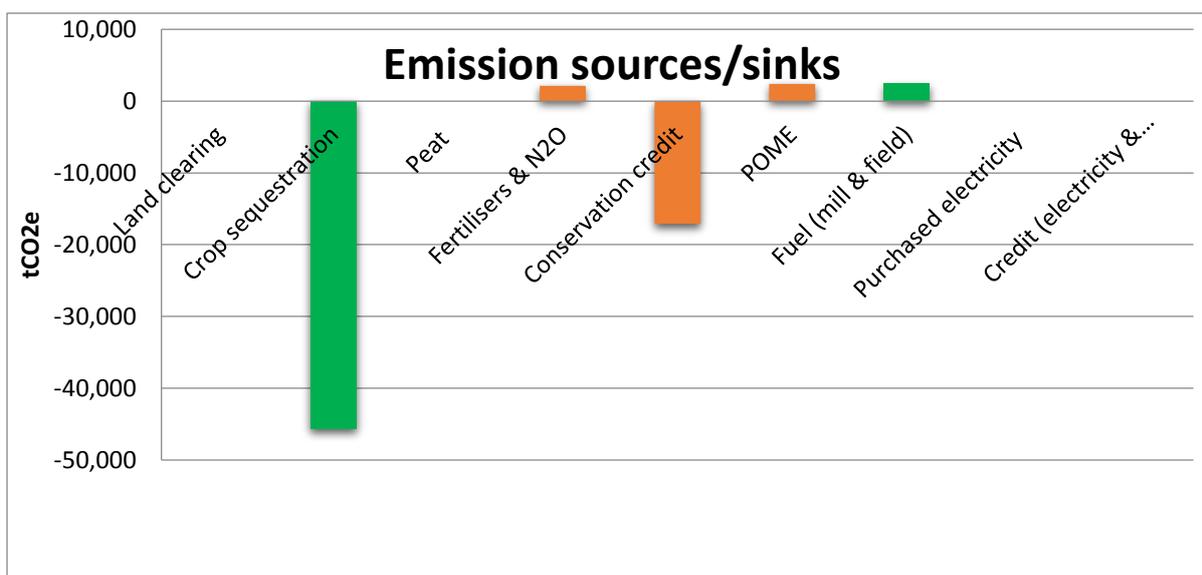
4.3 Conclusion

Both scenarios will draw down CO_2 from atmosphere. Scenario 1 is selected, all riparian, gallery forest and HCS identified will be conserved and only savannah will be planted or developed for infrastructure. -1.11 t CO_2e/t CPO is estimated as the potential emission (sequestration) from the proposed development.

5. Management and Mitigation Plans

Due to site selection, Mouila Lot 3 extension will be a net sequestration project. In general, Olam has committed **NOT to develop on peatlands and high carbon stock forest** determined through a multi stakeholder process in key origins.

Other measures will be implemented to limit emissions of certain factors (complementing the compensation made by plantations):

   i.   To limit site preparation to an absolute minimum, promote site preparation in highly degraded areas and to avoid swampy areas as far as possible;

   ii. To quickly re-use the biomass residues to offset emissions (energy biomass, timber, etc.);

   iii. Limit consumption of generators operating the site. An alternative being studied by Olam Palm Gabon to limit such emissions is to connect to the electricity distribution network;

   iv. Avoid losses and unnecessary consumption by ensuring regular maintenance of equipment and optimizing travel;

   v.   To rehabilitate the infrastructure areas to allow for restoration of the natural environment at the end of the project.

   vi. Continue to measure, disclose, and manage greenhouse gas emissions reductions through Carbon Disclosure Project (CDP).

6. Internal Responsibility

Summary of planning and management of Mouila Lot 3 extension, including mitigation of emission impacts has been signed off by respective person in-charge and it is submitted as part of the NPP notification.

Organizational information and personnel involved in planning and implementation are presented below:
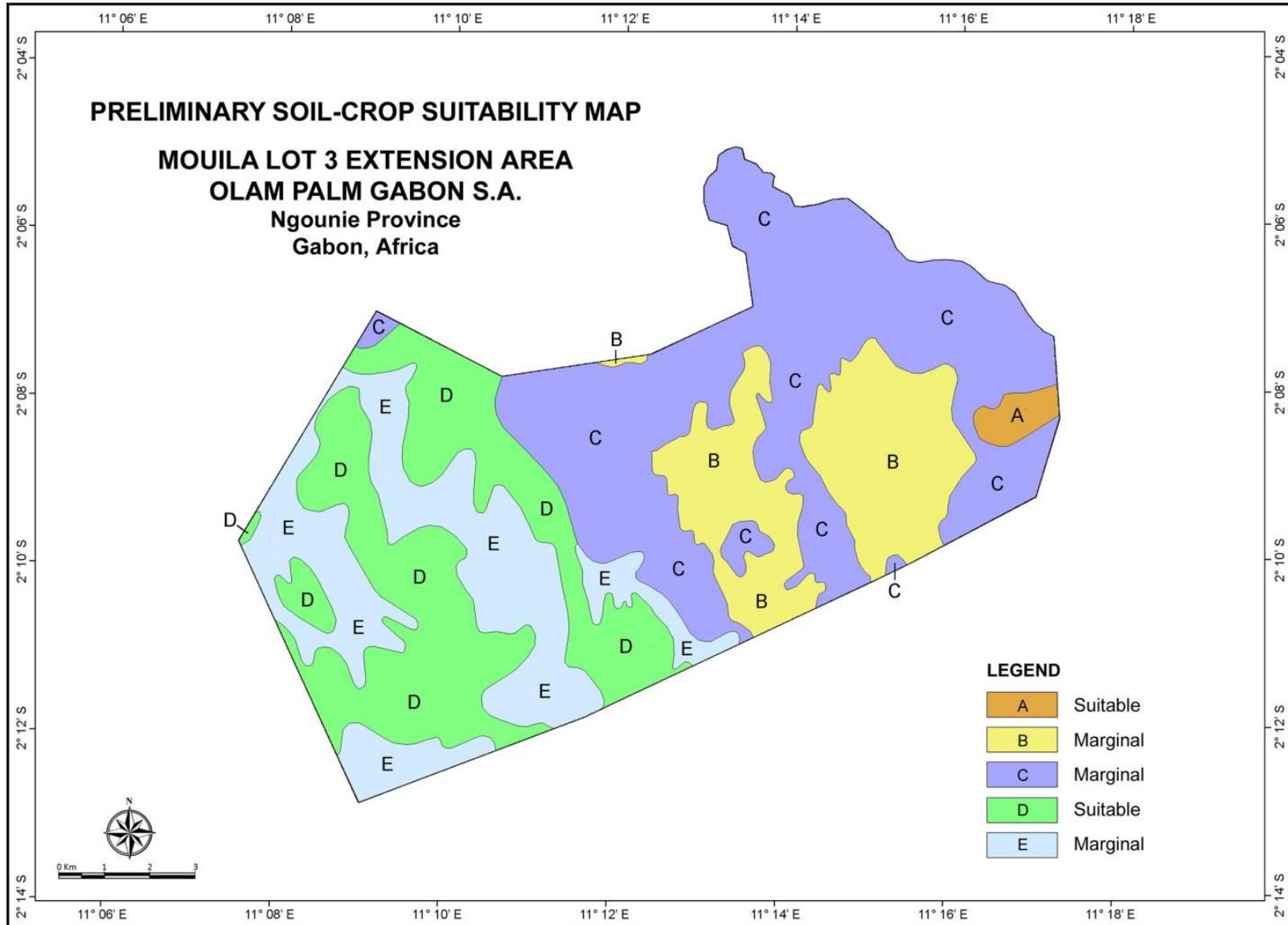
Contact Persons	Position	Entity
Supramaniam Ramasamy	President, Global Head of Plantation	Olam International Ltd
Gagan Gupta	Country Head	Olam Gabon
Faizal Mohd	Head of Sotrader	Sotrader
Quentin Meunier	Head of Environment and Sustainable Development	Olam Gabon
Olivier Desmet	CRS Manager	Olam Gabon
Audrey Lee	Sustainability Manager	Outspan Malaysia Sdn. Bhd.

The plantations management is structured according to various roles and functions to ensure implementation of best agronomic, environmental, social practices and monitoring of ESMP, HCV management, social contract etc. Each of these divisions/ unit is managed by a manager, and assisted by assistant managers or executives.

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- TEREA, 2016. Projet d'extension de palmeraie dit Olam Palm Mouila lot 3. Etude socioeconomique.*Submitted as part of the ESIA and HCV assessment.*
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Annex 1 Soil Map

PRELIMINARY SOIL-CROP SUITABILITY MAP

MOUILA LOT 3 EXTENSION AREA
OLAM PALM GABON S.A.
Ngounie Province
Gabon, Africa

LEGEND

A	Suitable
B	Marginal
C	Marginal
D	Suitable
E	Marginal

PRELIMINARY SOIL MAP LEGEND
PROPOSED Mouila Lot 3 Extension

Parent Material	Map Symbol	Slope Class (%)	Soil Description	Suitability for Oil Palm (Limitations)	Management Practices Needed	Extent	
						Ha	%
Sedimentary Rocks	A	Rolling (12-24)	Deep (>100 cm) fine sandy clay; Moderate base saturation; Moderate to low fertility soils over calcareous sedimentary rocks.	SUITABLE (Fertilization)	Correct fertilizer applications using soil/leaf analyses data.	174.1	1.2
Pediments	B	Undulating (4-12)	Moderately deep (50-100 cm) sandy soils with lateritic gravels in the 50-100 cm depth overlaying limestone rock. Moderate base saturation.	MARGINAL (Moderate depth, Possible Ca/Mg:K imbalance)	Monitor the appearance if any of Ca/Mg/K imbalance symptoms.	2,448.4	16.9
	C	Undulating to Rolling (4-24)	Shallow (<50 cm) to moderately deep (50-100 cm) soils with lateritic layer within shallow (50 cm) or moderately deep (50-100 cm). Low base saturation. Pediments over sedimentary rocks.	MARGINAL (Shallow to moderate depth)	Use deep planting holes and addition phosphate fertilizers.	5,449.4	37.5
	D	Level to Undulating (0-12)	Moderately deep (50-100 cm) sandy loams overlying lateritic gravel layers at5 60-80 cm depth. Low base saturation. Pediments.	SUITABLE (Fertilizer application)	Correct fertilizer applications using soil/leaf analysis data.	3,534.9	24.3
Alluvial Soil	E	Level to Depressional (0-4)	Deep (100+ cm) poorly drained sandy loams to sandy clay loams. Depressions, waterlogged in rainy season.	MARGINAL (Flooding, Poor drainage, Fertilizer application)	Ensure drainage and flood mitigation practices are implemented.	2,923.2	20.1
					Total:	14,530.0	100.0