



VCS JOINT PROJECT DESCRIPTION & MONITORING REPORT TEMPLATE

CUMARE CARBON PROJECT

Document Prepared by CAIA Ingeniería SAS and Climit

Agustin Inthamoussu (agustin.inthamoussu@climit.net)

+59894527788

Project Title	<i>CUMARE Carbon Project</i>
Version	<i>8</i>
Date of Issue	<i>04 July 2022</i>
Prepared By	<i>Climit (www.climit.net)</i>
Contact	<i>Agustin Inthamoussu, Av. De las Americas 8200, Canelones, Uruguay, +598 94 527 788, agustin.inthamoussu@climit.net</i>

1 PROJECT DETAILS

1.1	Summary Description of the Project	6
1.2	Sectoral Scope and Project Type	7
1.3	Project Eligibility	8
1.4	Project Design	17
	Eligibility Criteria	17
1.5	Project Proponent	18
1.6	Other Entities Involved in the Project	18
1.7	Ownership.....	20
1.8	Project Start Date	20
1.9	Project Crediting Period	21
1.10	Project Scale and Estimated GHG Emission Reductions or Removals	21
1.11	Description of the Project Activity	23
1.12	Project Location	31
1.13	Conditions Prior to Project Initiation	34
1.14	Compliance with Laws, Statutes and Other Regulatory Frameworks.....	41
1.15	Participation under Other GHG Programs	43
1.16	Other Forms of Credit.....	44
1.17	Additional Information Relevant to the Project	44

2 SAFEGUARDS

2.1	No net harm	50
2.2	Local Stakeholder Consultation	51
2.3	Environmental Impact	57
2.4	Public Comments	64
2.5	AFOLU-Specific Safeguards	64

3 APPLICATION OF THE METHODOLOGY

3.1	Title and Reference of Methodology	68
3.2	Applicability of Methodology	68
3.3	Project Boundary	73
3.4	Baseline Scenario	76
3.5	Additionality	78
3.6	Methodology Deviations	86

4 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1	Baseline Emissions	86
-----	--------------------------	----

4.2	Project Emissions	87
4.3	Leakage.....	93
4.4	Estimated Net GHG Emission Reductions and Removals.....	94

5 MONITORING

5.1	Data and Parameters Available at Validation	97
5.2	Data and Parameters Monitored.....	104
5.3	Monitoring Plan.....	112

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1	Data and Parameters Monitored.....	117
6.2	Baseline Emissions	119
6.3	Project Emissions	120
6.4	Leakage.....	125
6.5	Net GHG Emission Reductions and Removals.....	126

FIGURES

Figure 1. Project activity general view	28
Figure 2 . Planting frame overview in recently planted forest	29
Figure 3 . Current project landscape view.....	30
Figure 4. Project location in Colombia	32
Figure 5. More detailed view of the project area (green polygons)	33
Figure 6. More detailed view of the project area (green polygons) and permanent sample plots (red dots)	33
Figure 7. Project boundaries showing different species and permanent sample plots	34
Figure 8 . Landscape on REFORESTADORA CUMARE SAS farm	35
Figure 9. Map of the different types of soil in the El Porvenir farm (Source IGAC)	40
Figure 10. Land use in El Porvenir area in the period 2000-2002 (SIPRA) ...	¡Error! Marcador no definido.
Figure 11. Land use in El Porvenir area in the period 2005-2009 (SIPRA)	¡Error! Marcador no definido.
Figure 12. Land use in El Porvenir area in the period 2010-2012 (SIPRA).....	¡Error! Marcador no definido.
Figure 13. Legend applicable to all land-use maps (SIPRA), for a clearer understanding of the legend follow the link: https://sipra.upra.gov.co/	¡Error! Marcador no definido.
Figure 14. Area of interest for spectral analysis	¡Error! Marcador no definido.
Figure 15. January 2016 - Area of interest	¡Error! Marcador no definido.
Figure 16. January 2017 - Area of interest	¡Error! Marcador no definido.
Figure 17. January 2018 - Area of interest.....	¡Error! Marcador no definido.
Figure 18. Land use in 1969.....	¡Error! Marcador no definido.
Figure 19. Land use in 2021.....	¡Error! Marcador no definido.
Figure 20. Project location map	46
Figure 21. Communications and claims - Period 2014-2020	52
Figure 22. Community local projects.....	53
Figure 23. Micro-entrepreneurship	54
Figure 24. Environmental Education Program in Schools	55
Figure 25. Compost in local schools	55
Figure 26. Environmental Education Program in Schools	56
Figure 27. Environmental Education Program in Schools.....	56
Figure 28. Fire crew in REFORESTADORA CUMARE SAS.....	57
Figure 29. Erosion control program in REFORESTADORA CUMARE SAS	59
Figure 30. Savannah in REFORESTADORA CUMARE SAS	59
Figure 31. Riparo forest and a morichal	59
Figure 32. Permanent Plots in Native Forest	61
Figure 33. REFORESTADORA CUMARE SAS´s wildlife	62
Figure 34. Water birth.....	63
Figure 35. Offset plantations	63
Figure 36. Wetlands in the municipality of San Martin	69
Figure 37. Wetlands near the El Porvenir property	70

Figure 38. Project boundaries in “El Porvenir” farm in green (carbon accounting area). The red contour is the property limit.....	75
Figure 39. Forest aptitude (low (baja) and no-aptitude (no apta)	83
Figure 40. Forest aptitude for El Porvenir farm	¡Error! Marcador no definido.
Figure 41. Permanent plots	115

TABLES

Table 1. Hectares planted per year and per farm	7
Table 2. Hectares planted per year and per farm	31
Table 3. Annual precipitations.....	39
Table 4. Average temperature	39
Table 5. Land use in El Porvenir 2021	¡Error! Marcador no definido.
Table 6. Legal requirements	41
Table 7. Land tenure	43
Table 8. Social plan 2020	49
Table 9. Occurrence of fires	58
Table 10. Native species in REFORESTADORA CUMARE SAS farm	60
Table 11. Project boundaries.....	73
Table 12. Assumed parameters used for estimation of tree biomass carbon stocks	90
Table 13 Parameters used for estimation of SOC.....	91
Table 14. Net GHG emission reduction or removals	94
Table 15. Number of sample plots per stratum	113
Table 16 Parameters used for estimation of SOC.....	124
Table 17. VCUs requested by Campo Forestal by vintage	125

1 PROJECT DETAILS

1.1 Summary Description of the Project

The CUMARE Carbon Project in Colombia aims to promote investments in afforestation activity in the department of Meta and Vichada. This project is based on the transition from extensive livestock production system to sustainable forest plantations, based on good forestry practices to obtain timber products and to capture large amounts of carbon dioxide from the atmosphere.

The project area for the first instance corresponds to the property of “El Porvenir” that comprises a total of 5,526.6 ha of land previously under extensive grazing by beef cattle, on which afforestation for obtaining timber products and for sequestering large amounts of carbon dioxide from the atmosphere are established. The project area is located in the center-east of Meta department, in San Martin municipality. The project is conceived as a grouped project because the project developer REFORESTADORA CUMARE SAS has another farm “Caricare” that will be soon eligible to become part of the project area. Caricare farm has a total area of 8,069.0 ha.

The grouped project area is the department of Meta and Vichada. These areas is homogeneous in terms of soil types, climate, land use history and socio-economic conditions. The project developer has the intention to expand its forestry project in any of these departments, depending on land availability and suitability for the forestry species.

Grouped forests is based on 10-year to 20-year rotation of *Eucalyptus pellita*, *Eucalyptus Urograndis* or *Eucalyptus urophylla*, and 15 to 16 years rotation *Pinus caribea* plantations. For “El Porvenir” farm, the first plantations are based on 10-year rotation of *Eucalyptus pellita*, *Eucalyptus Urograndis* or *Eucalyptus urophylla*, and 15 to 16 years rotation *Pinus caribea* plantations. *Pinus spp.* plantation have been established and will continue being established as a complement to the short-fibre production (*Eucalyptus spp.*), since the species is best suitable for very low productive soils.

Forest project activity in “El Porvenir” is currently in its sixth year after project start-date, and plantation will be completed by year ten of project. Forests will be replanted after clear-cut harvest when the seedling genetic material compensates the cost of soil preparation and plantation. Clone plantations could be managed with regrowth, avoiding the soil preparation costs and its carbon stock reduction. Planted forests will remove carbon dioxide from the atmosphere and store it in different carbon pools (living above-ground and below-ground biomass, soil, litter, non-tree vegetation, dead wood, and harvested wood products).

Monitoring will cover carbon stock changes for living above-ground pool. Below ground biomass will be estimated indirectly based on above-ground biomass measurements. Litter, dead wood, and soil organic carbon pools will be estimated based on conservative default factors from the methodological tool. Non-tree vegetation and harvested wood products will not be accounted as per the methodology applied. The potential non-permanence of stored carbon will be considered by the non-permanence risk analysis and buffer determination.

The baseline study determined that continuation of extensive grazing is the most likely use of the land in the department. Additionality is demonstrated through barriers analysis and common practice analysis. The analysis showed that afforestation in the area of the proposed grouped project activity is not likely to occur without carbon financing.

Forest practices and all practices applied in the project area on the farm El Provenir, follow the Forest Stewardship Council standard certification as a minimum practical condition, ensuring sustainable forest management, positive net impact in social, environmental, and economic aspects. Detailed information about the certification can be found at <https://info.fsc.org/project.php>

The grouped project is expected to capture a maximum of 2,918,000 tCO₂e (long-term average) during a period of 100 years from 1 November 2016 to the 1 November of 2116, considering “El Porvenir” and “Caricare” farm. This means an average of 29,180 tCO₂e per year. With a project crediting period of 100 years and a harvest cycle of 10-12 years, the long-term average GHG benefit will be determined for a period of 105 years.

In the year 2020, the amount of carbon dioxide captured or “total net removals” by the forest in El Porvenir -in its different carbon pools- is 503,404 tCO₂e, as per the monitoring period 01 November 2016 to 25 November 2020.

As mentioned, in first instance, from 2016 to 2020 the grouped project begins with the El Porvenir farm, with a total of 5,526.6 hectares. in a second instance starting in 2021 to 2025, some areas of El Porvenir (30-ha plantation in 2021) and Caricare farm (both from REFORESTADORA CUMARE SAS company), will be part of the group project, so the captured tCO₂e will increase. The second instance are areas that by 2020 were not in conditions to be planted, but which by 2021 would already begin to be suitable for forest plantations. The number of hectares per year and per farm is detailed below:

Table 1. Hectares planted per year and per farm

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	TOTAL
El Porvenir	1,746.7	1,886.8	1,074.2	692.1	126.8		-	-	-	-	5,526.6
El Porvenir / Caricare	-	-	-	-	-	0	530.0	1,000.0	1,740.0	1,740.0	5,010.0

The Non-Permanence Risk assessment resulted in a 4,5% risk, however as it is established in the VCS Standard, the minimum percentage is 10%, so as the marketable VCU in this monitoring period is: 453,064 tCO₂e and the VCUs withhold in the buffer account are 50,340 tCO₂e.

1.2 Sectoral Scope and Project Type

The activity implemented by the project is the establishment of forests on land that had previously been under grassland, therefore corresponds to the VCS scope 14: “Agriculture, Forestry and Other Land Use” as an Afforestation, Reforestation and Revegetation (ARR). This is a grouped project that seeks to obtain timber products for commercialization and to capture large amounts of carbon dioxide from the atmosphere in Meta and Vichada department.

1.3 Project Eligibility

The project is eligible under the scope of the VCS Program as the project includes AFOLU activities (grouped project category ARR) which are supported by a methodology approved under the VCS Program.

The project area included in the project is not and was not cleared of native ecosystems within the 10-year period prior to the project start date, as demonstrated in the following paragraphs. The project activity will increase carbon sequestration by establishing forest cover by planting species such as Eucalyptus and Pinus the project activity will include timber harvesting in their management plan. However, the harvest management plan has not been defined yet as the trees have not reached their final rotation length. Notwithstanding, the management plan mentions what the harvesting technique is likely to be (Chapter 9 "Harvesting Techniques"¹).

As it can be seen in section 1.13, the project area has not been cleared of native ecosystems within the 10-year period prior to the project start date, as set out in VCS Section 3.2.4 and according to ARR definition in VCS standard. In this chapter there are different images of the El Porvenir farm where it can be seen that native forest is part of the project area (figure 10) in 2000-2002 but that it continues existing in 2010-2012. The same native ecosystems are maintained since the beginning of the plantations in 2016 (figure 14 to figure 17). Native forests are associated with the margins of water courses since one of the management measures of Campo Forestal is to maintain a buffer of 100 meters of any water course within the farm to maintain biodiversity and natural ecosystems². Both in the images of 2016, 2017 and 2018 (Figures 15,16 and 17) it can be seen that these native forests related to water courses remain.

SIPRA³ (Sistema para la Planificación Rural Agropecuaria) is the first official geographic viewer of the agricultural sector in Colombia; it has open, easily accessible information and its data is freely available to consult, navigate and download. The system presents a layer with information about the land use from the year 2000 until 2012, where it can be seen that the land use in the project area is grass which is the basis for cattle production. See this in the following figures.

¹ Plan de Manejo FSC Campo Forestal – Chapter 9.

² A 100-meter buffer has been delimited in which any type of intervention is limited, and whose objective is the conservation and protection of water and the associated natural forest

³ <https://sipra.upra.gov.co/>

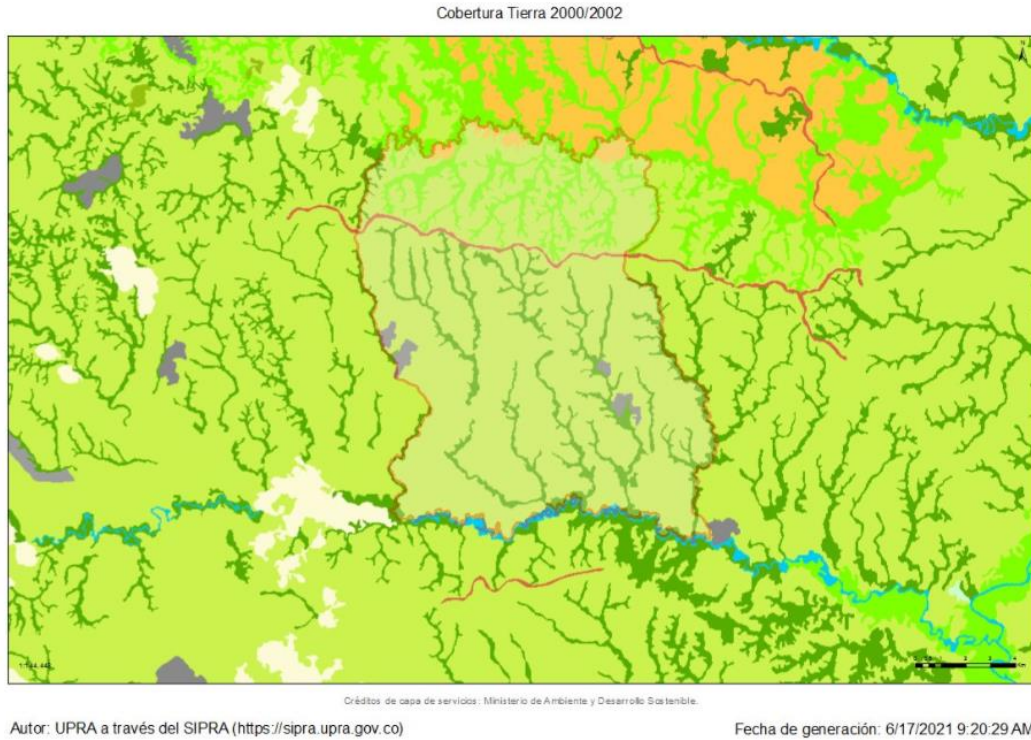


Figure 1. Land use in El Porvenir area in the period 2000-2002 (SIPRA)

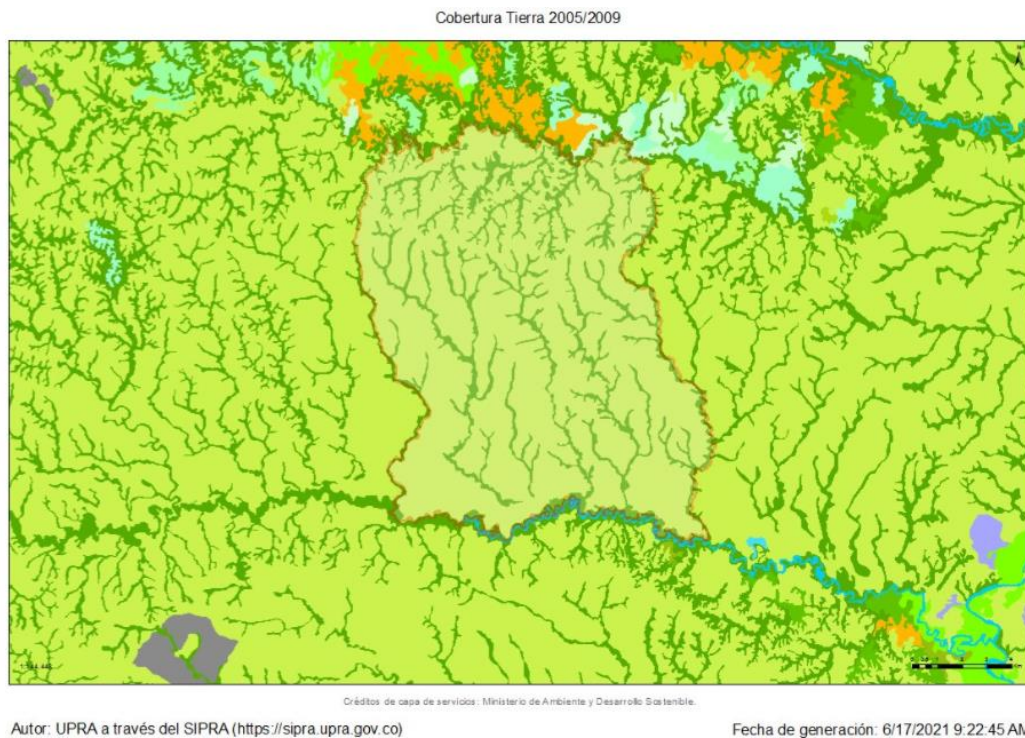


Figure 2. Land use in El Porvenir area in the period 2005-2009 (SIPRA)

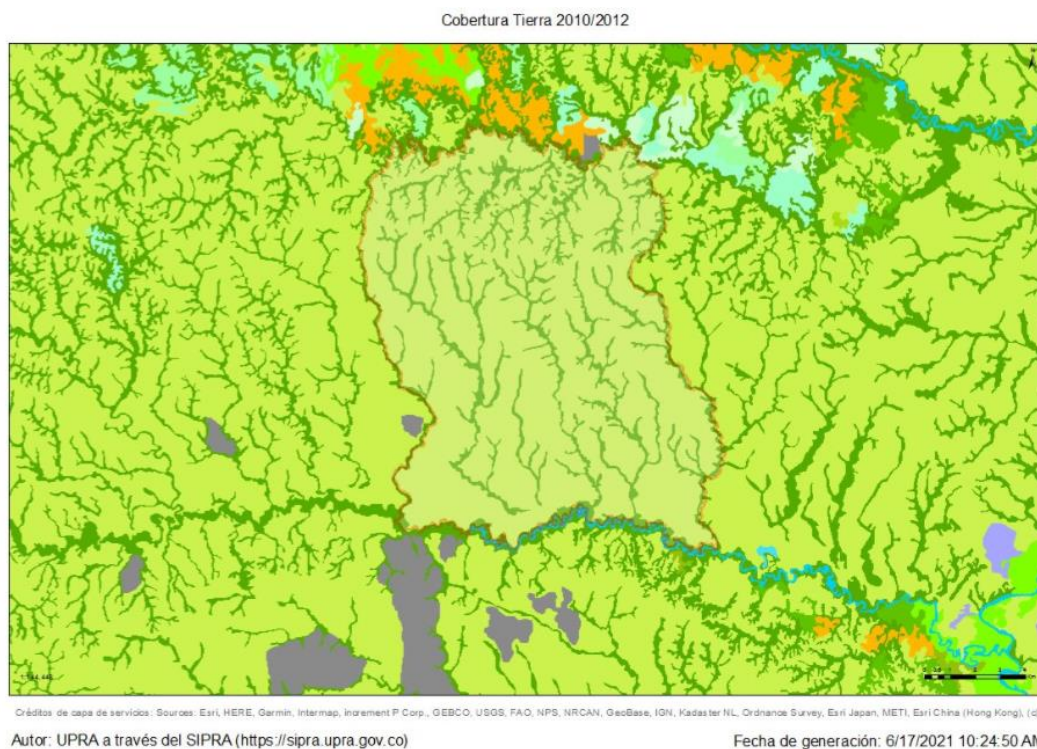


Figure 3. Land use in El Porvenir area in the period 2010-2012 (SIPRA



Créditos de capa de servicios: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Autor: UPRA a través del SIPRA (<https://sipra.upra.gov.co>)

Figure 4. Legend applicable to all land-use maps (SIPRA), for a clearer understanding of the legend follow the link: <https://sipra.upra.gov.co/>

As it can be seen in the figures above, and in the SIPRA UPRA webpage, El Porvenir project area has historically been under grasslands (“herbazales”).

This is also supported with additional analysis made by the project developer. A satelital image analysis was performed to analyse the actual and historical land use in El Povernir. Beginning in January 2016, the images with cloud concentration lower than 10%, from the selected images a composition is made to consolidate the scene. The analysis was carried out with the following spectral analyzes:

True color: The natural color band combination uses the red (B4), green (B3) and blue (B2) channels. Its objective is to show images in the same way that the human eye sees the world. In this combination, the vegetation is colored in the range of green, the bare or bare ground of vegetation is represented in the brown fallow deer.

Short wave infrared: The shortwave infrared band combination uses SWIR (B12), NIR (B8A) and red (B4). This composition shows the vegetation in various shades of green. In general, darker shades of green indicate denser vegetation. Brown is indicative of bare soil.

For the analysis, a part of the farm was randomly chosen where there were plantations in 2016. What the analysis shows is that in 2016, there was no type of forest plantation, however in 2017 the presence of arboreal vegetation. The true color spectral analysis is the one that allows us to differentiate more clearly the difference in plantations between years.

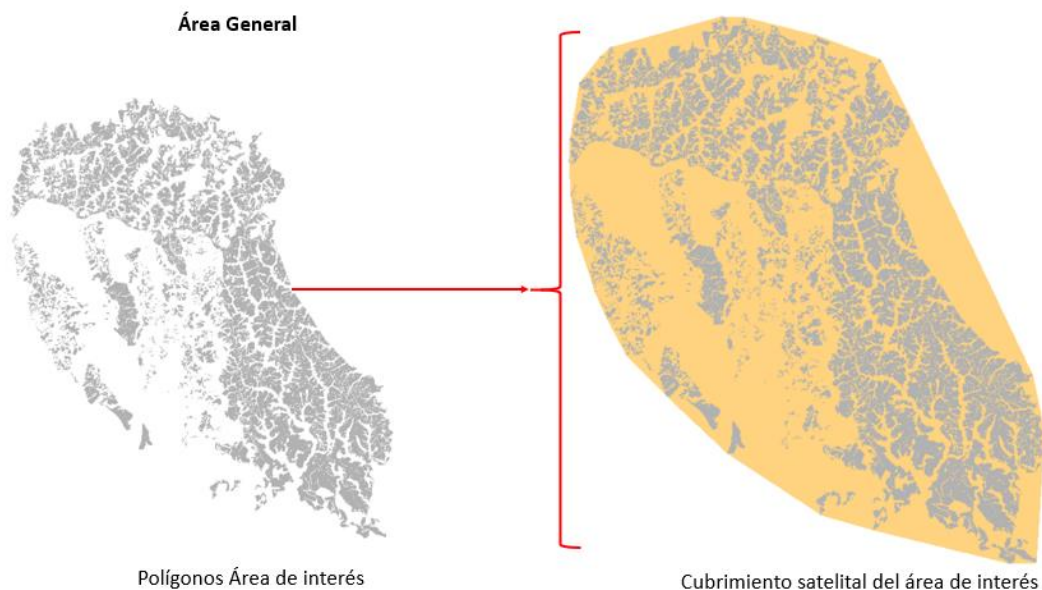
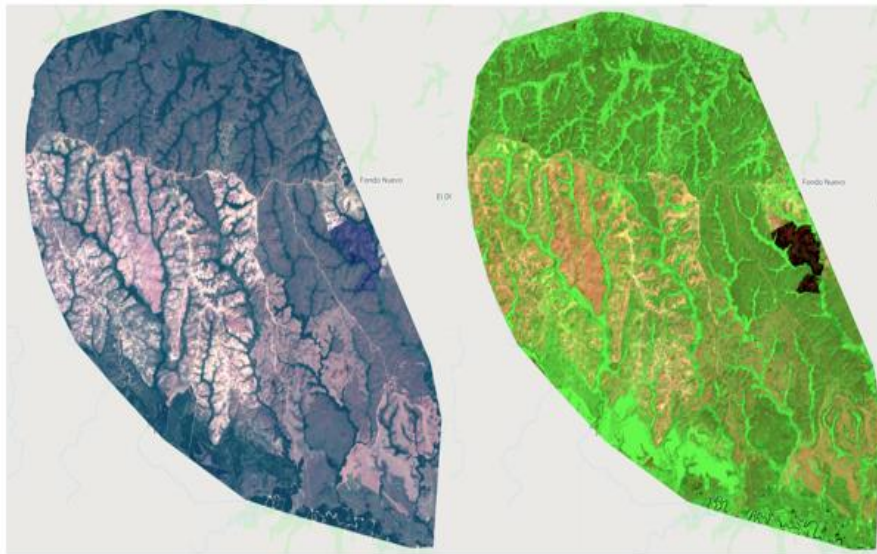


Figure 5. Area of interest for spectral analysis

ENERO 2016 Área General de Interés



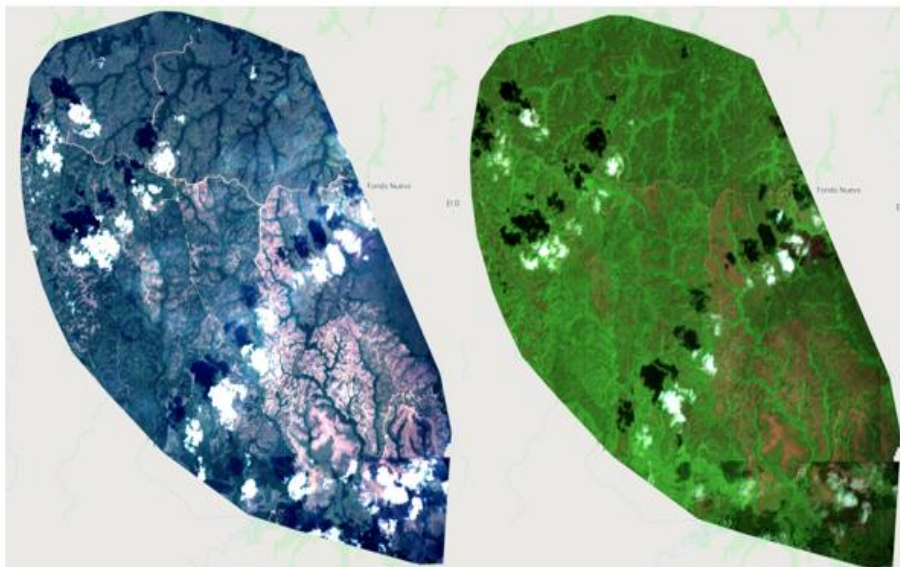
Óptico color verdadero

Óptico color infrarrojo cercano

Numero escenas	2
Fechas-hora escenas	20160117T152122 20160117T152122
Id escenas	20160117T152117_T18NYJ 20160117T152117_T18NYK

Figure 6. January 2016 - Area of interest

ENERO 2017 Área General de Interés



Óptico color verdadero

Óptico color infrarrojo cercano

Numero escenas	2
Fechas-hora escenas	20170111T151641 20170101T151702
Id escenas	20170111T152024_T18NYK 20170111T152024_T18NYK

Figure 7. January 2017 - Area of interest

febrero 2018 Área General de Interés

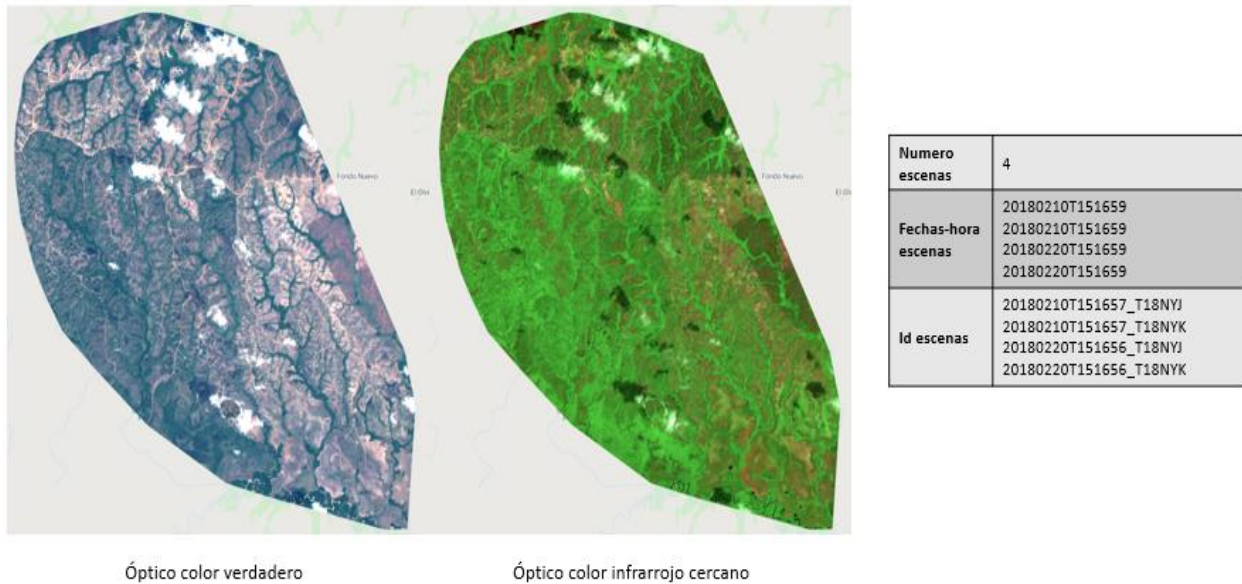


Figure 8. January 2018 - Area of interest

As can be seen, in the area of the selected farm, in the year 2016 in the true color spectral analysis, the presence of brown is observed. As mentioned earlier in the true color spectral analysis, the brown color present in the 2016 image refers to the bare or bare ground of the vegetation. However, in 2017, in the same area where there was a brown color, the green color is now present, which refers to the presence of vegetation, in this case, the growth of the REFORESTADORA CUMARE SAS plantations.

In addition, we have the images of the same area selected with the short-wave infrared spectral analysis and we can observe the same results as with the true color spectral analysis. With short wave infrared images, the presence of vegetation can be demonstrated with greater accuracy, observing in 2016 a brown color, related to bare soils and in 2017 - 2018 a green color related to arboreal vegetation.

We can also observe that the forests associated with the hydrographic network are maintained in the images of 2016 - 2017 -2018. To corroborate what was said before, the same analysis was carried out but with another area of the property. The results were the same, the area of the farm that was taken into account and the spectral analysis of true color and short-wave infrared are available to VVB ("Análisis fecha de inicio proyecto.pdf").

In addition to the study by SIPRA - UPRA of the El Porvenir farm and the spectral analysis carried out by the company, a long-term study of the use of the land was carried out to demonstrate that the plantations in the El Porvenir farm were carried out on grasslands and not on native forests. To demonstrate this, images that correspond to the El Porvenir property in 1969 and in 2021 are presented below. With these images we can see how in 1969 there was no presence of native forests, in addition to the forests related to the network hydrographic, this shows that REFORESTADORA CUMARE SAS deforested no forest for the implementation of the forestry project but carried out the project on grassland areas

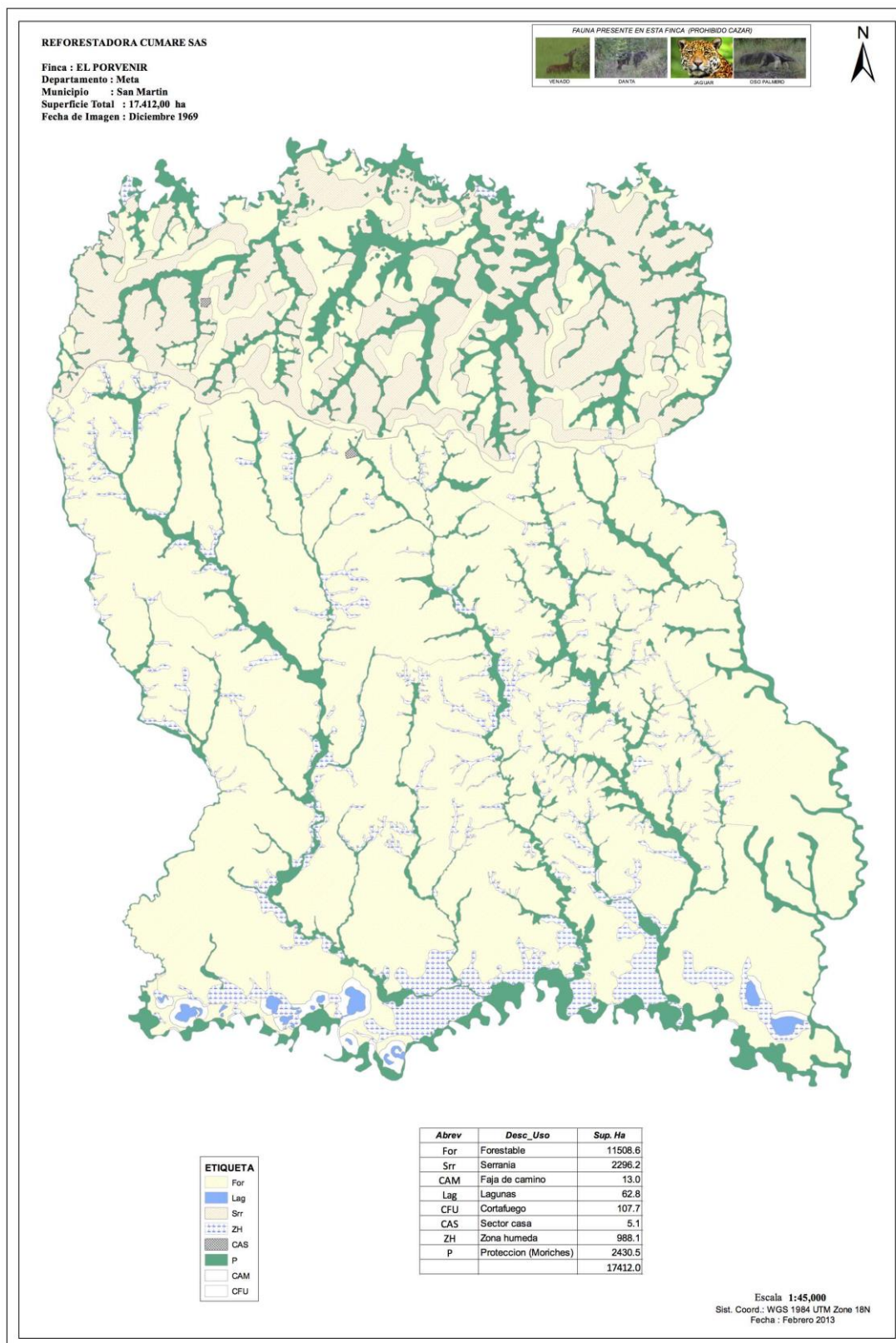


Figure 9. Land use in 1969

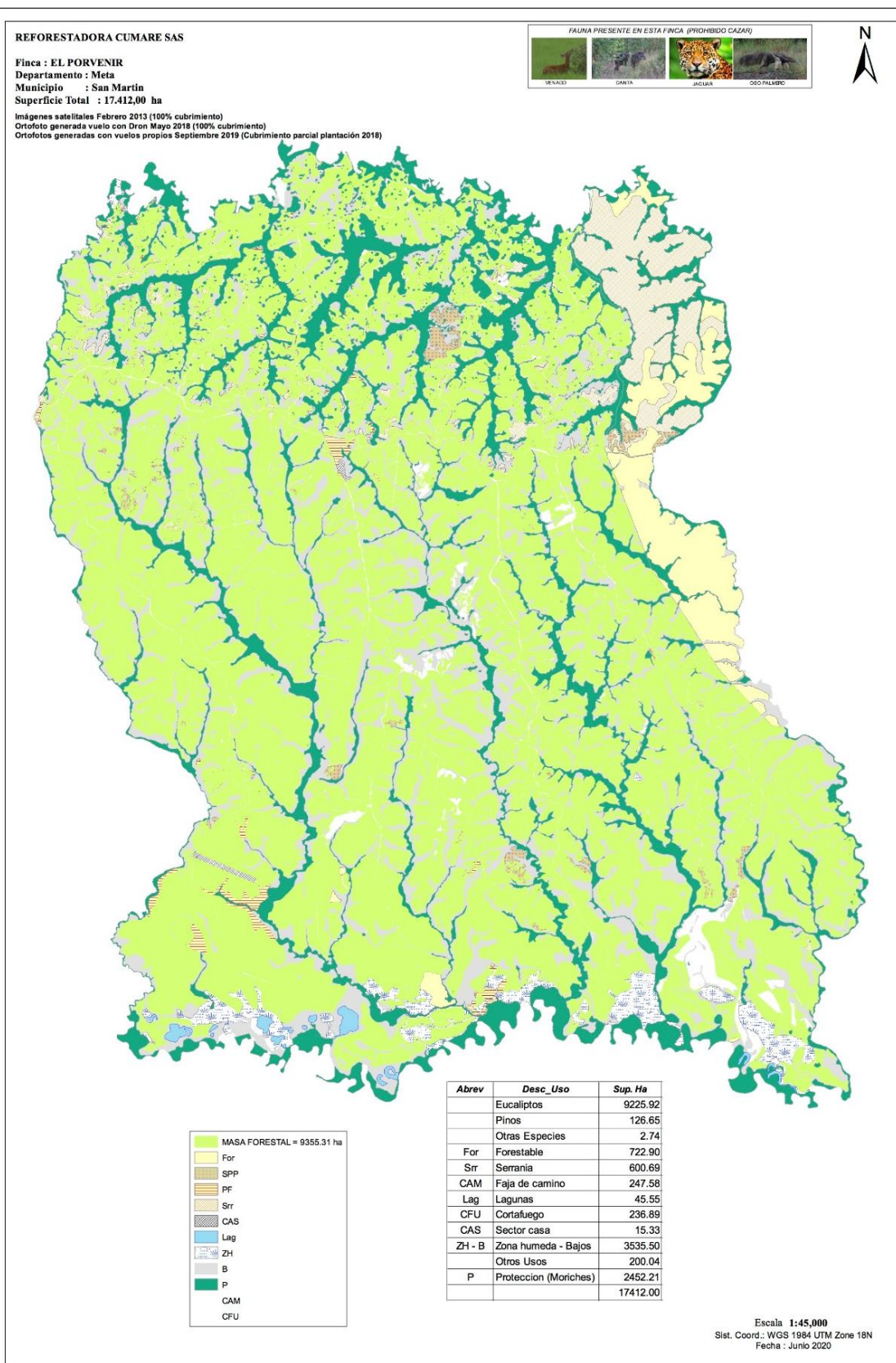


Figure 10. Land use in 2021

The hectares corresponding to current land uses on the property are detailed below:

Table 2. Land use in El Porvenir 2021

Use	Area (ha)	
	Evaluation 2013	2021
Forestry	11,508.6	553.7
Mountainous area	2,296.2	602.3
Road girdle	13.0	248.7
Lagoons	62.8	45.6
Firewall	107.7	241.0
Home sector	5.1	15.3
Low area	988.1	3,542.5
Protection (Moriches)	2,430.5	2,455.2
Plantations		9,427.8
Other uses		279.9
TOTAL	17,412.0	17,412.0

In this comparative table, it can be concluded:

- Protections - Moriches: correspond to conservation areas with the presence of native broadleaf forest and morichales (moriche palm). There is an increase of 24.7 ha.

That is, there is an increase in surface area. Therefore, there was no conversion in this use. Comparing both plans, it can be seen in the northern part many "islands" of native forest that remained standing after the establishment of the plantations, which had not been identified in the evaluation. In other words, during silvicultural activities, care was taken not to cut down native forest and convert it to a plantation.

- Area of humid and lowlands increased from 988.1 ha to 3,542.5 ha. That is, the plantations were established in areas where they were technically and economically viable. A large part of these humid and lowlands is located between the plantation and the native forest.
- Lagoons: there is a decrease in surface area due to the better quality of the aerial images and better precision in the area measurement.
- The Forestable area originally evaluated with 11,508.6 ha, it turned out that a total of 9,427.8 ha was finally planted, less than what had been evaluated.

By these mean, it is demonstrated that there has not been any forest neither conversion of native ecosystem in the last 10 years since the beginning of the afforestation activity.

1.4 Project Design

In first instance the grouped project started with one project site ("El Porvenir") and multiple implementation events differed in time. The first phase is already accomplished, and the second phase will be implemented in future stages.

Eligibility Criteria

All new projects that want to join the grouped project must comply the eligibility, additionality and baseline conditions.

In addition, all areas to be incorporated into the grouped project must meet the technical land eligibility criteria for carbon forest projects. Therefore, any project that wants to be part of the group project must meet the following conditions.

1. The project must comply with the conditions of eligibility, additionality and baseline scenario of the grouped project
2. Must apply for AFLOU activity as an Afforestation, Reforestation and Revegetation (ARR) The methodology used is AR-ACM 0003 "Afforestation and reforestation of lands except wetlands
3. Demonstrate that there has not been any forest neither conversion of native ecosystem in the last 10 years since the beginning of the reforestation activities.
4. Systems implemented comply with the national definition of planted forest have a commercial purpose, a short rotation length and the timber produced is delivered to the market. The project must comply with the definition of commercial plantations according to the Ministry of Agriculture and Rural Development of Colombia, that says: *"Crops or forest plantations for commercial purposes. Sowing or planting of forest tree species carried out by human hands, to obtain and commercialization of timber products, with uniform planting density and contemporary individuals. They are synonymous with forest plantations for commercial purposes."*(Article 2.3.3.2)⁴
5. The areas eligible for forest plantations must be planted in the departments of Meta and Vichada but not fall into the category of wetlands

1.5 Project Proponent

Organization name	REFORESTADORA CUMARE S.A.S
Contact person	Paula Sanchez
Title	Legal representative
Address	Cra. 7 N° 113-16 of 504, Bogotá, Colombia
Telephone	(+571) 8052020
Email	paula.sanchez@campocapital.com

1.6 Other Entities Involved in the Project

Organization name	Campo Forestal S.A.S.
-------------------	-----------------------

⁴ <https://www.minagricultura.gov.co/Normatividad/Paginas/Decreto-1071-2015/Cultivos-Forestales-con-fines-comerciales.aspx>

Role in the project	Campo Forestal S.A.S. is a Colombian company that acts as an independent forest operator, managing forest assets belonging to institutional investors and/or individuals. Its objective is to maximize the return on investment made by its owners. Currently this company is the representative and administrator of REFORESTADORA CUMARE S.A.S.
Contact person	Manuel Amigo
Title	Operations Director
Address	Carrera 7 N° 113-16 oficina 504, Bogotá, Colombia
Telephone	(569) 9449 4030
Email	www.campoforestal.com , mamigo@cambium.cl

Organization name	CAIA Ingeniería SAS
Role in the project	CAIA is a consultancy firm from Colombia, specialized in climate change mitigation projects. The company is responsible for the national aspects of the project documentation preparation, acting as the consultant to REFORESTADORA CUMARE SAS in relation to the carbon credit generation project in Colombia.
Contact person	Alexander Valencia
Title	CEO
Address	Dg 67 ## 7-94, Bogotá, Colombia
Telephone	+57 1 7033701
Email	avalencia@caiaingenieria.com

Organization name	CLIMIT
--------------------------	--------

Role in the project	Climit is a consultancy firm in Uruguay, specialized in climate change mitigation projects. Together with CAI, is responsible for the carbon estimation, project documentation preparation and acting as the consultant to REFORESTADORA CUMARE SAS in relation to the carbon credit generation project.
Contact person	Agustin Inthamoussu
Title	CEO
Address	Av. de las Americas 8200
Telephone	+598 94527788
Email	agustin.inthamoussu@climit.net

1.7 Ownership

At first instance the company to be part of this group project is REFORESTADORA CUMARE SAS, a Colombian company identified with NIT No. 900,614,469-0 with address at Cra. 7 No. 113-16 office 504 in Bogotá, Colombia, with commercial registration No. 02318894 according to the certificate of existence and legal representation issued by the Chamber of Commerce of Bogotá “El Porvenir” is a property of REFORESTADORA CUMARE S.A.S.

REFORESTADORA CUMARE SAS has a current contract with the Campo Forestal company, which is in charge of forest management in the fields. Campo Forestal is a Colombian company dedicated to the management of investments and projects in the agricultural and forestry sector of Colombia.

In the annexes is include the deed of sale of the El Porvenir farm (annexes 1), the certificate of existence and legal representation of the (annexes 2), REFORESTADORA CUMARE SAS the ICA registry of forest plantations (annexes 3) and the real estate registration of the farm (annexes 4).

1.8 Project Start Date

The grouped project start date of an AFOLU project is the date on which activities that led to the generation of GHG emission reductions or removals are implemented.

The project start date is 1 November 2016, when the first plantations in the farm of El Provenir were established leading to the generation of GHG emission removals.

As it is described in the silvicultural report that presents the values of the establishment, maintenance and property administration prepared by Campo Forestal to REFORESTADORA CUMARE SAS, the plantation activities were completed in October 2016. As a way to demonstration, REFORESTADORA CUMARE SAS presents supporting evidence in annex 10. Campo Forestal makes payments to the companies contracted for the purchase of Eucalyptus and Pinus seedlings, as well as for advice an plantation services. These companies were Reforiente, Refocosta (<https://www.refocosta.com/servicios/>) and Grupo Valt (<https://volveralatierra.com/>). The Annex 10 an image of the GESFOR server (Campo

Forestal's forest information activities registration and payment system) is attached detailing the purchases of products and services of these companies. In this way it is shown that the plantations in REFORESTADORA CUMARE SAS were completed in October 2016 and the project start date is 1 November 2016 (the first day of the following month as a way to apply conservatism)⁵.

1.9 Project Crediting Period

The grouped project's crediting period will be of 100 years, from 1 November 2016 to 1 November 2116.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

REFORESTADORA CUMARE SAS afforestation of lands except wetlands is classified as a "project", according to its scale. It will remove a total amount of 2,918,000 tCO₂e during a period of 100 years (ex ante LTA estimation). This means an average of 29,180 tCO₂e per year.

Project Scale	
Project	X
Large project	

Year	Estimated GHG emission reductions or removals (tCO ₂ e)	Year	Estimated GHG emission reductions or removals (tCO ₂ e)	Year	Estimated GHG emission reductions or removals (tCO ₂ e)
2016	0	2051	381,046	2086	-293,133
2017	109,921	2052	315,110	2087	-194,517
2018	248,749	2053	67,144	2088	-174,897
2019	340,267	2054	-148,000	2089	150,019
2020	364,694	2055	-370,117	2090	258,218
2021	319,063	2056	-293,229	2091	381,557
2022	250,023	2057	-194,615	2092	314,948
2023	211,737	2058	-174,996	2093	66,979

⁵ First plantations started in 2013, but these are not part of the project activity given the retroactive period allowed by VCS.

2024	223,826	2059	149,919	2094	-137,391
2025	297,107	2060	268,893	2095	-370,661
2026	393,764	2061	381,080	2096	-293,100
2027	-193,785	2062	315,143	2097	-194,483
2028	-163,013	2063	56,402	2098	-174,863
2029	161,230	2064	-136,814	2099	139,277
2030	280,202	2065	-370,757	2100	269,404
2031	392,387	2066	-293,198	2101	380,918
2032	326,450	2067	-194,583	2102	314,978
2033	78,484	2068	-174,963	2103	67,011
2034	-125,885	2069	149,952	2104	-137,358
2035	-359,154	2070	268,927	2105	-370,628
2036	-292,369	2071	381,113	2106	-293,067
2037	-184,477	2072	304,401	2107	-194,450
2038	-167,544	2073	67,588	2108	-185,606
2039	156,194	2074	-137,454	2109	150,463
2040	274,448	2075	-370,726	2110	268,764
2041	386,495	2076	-293,166	2111	380,948
2042	320,525	2077	-194,550	2112	315,010
2043	72,012	2078	-174,930	2113	67,044
2044	-133,451	2079	149,986	2114	-137,325
2045	-379,400	2080	268,960	2115	-370,595
2046	-292,589	2081	370,371	2116	-293,033

2047	-194,645	2082	315,587	2117	-205,192
2048	-175,028	2083	66,949	2118	-174,420
2049	149,886	2084	-137,423	2119	149,823
2050	268,860	2085	-370,694	2120	268,795
Total estimated ERs				2,918,000 (ex ante LTA estimation)	
Total number of crediting years				100	
Average annual ERs				29,180	

1.11 Description of the Project Activity

At first instance the project will comprise a total area of 5,526.6 ha with a long history of grazing by beef cattle, activity that have caused soil erosion and vegetation degradation. Forest plantation for obtaining timber and removing carbon dioxide from the atmosphere are being established since 2016.

El Porvenir is in Colombia in the center-east of Meta department, in the municipality of San Martín. The area is homogeneous in terms of soil types, climate, land use history and socio-economic conditions.

Forests consist of mostly *Eucalyptus pellita* and *Eucalyptus urograndis* plantations and in a lesser extent area they have *Eucalyptus urophylla*. The species of Eucalyptus is managed with a rotation length of 10 years. Also, they have plantations of *Pinus caribea* that is managed with a rotation length of 15-16 years. Forest project activity is currently in its sixth year after project start-date, and plantation will be completed by year ten of project, after the introduction of a new instance to the project. Forests will be replanted after clear-cut harvest but sprout management from stumps is also considered, depending on the genetic improvement obtained in the species at the moment of a new plantation event.

The main objectives of the grouped project activity are wood production, land restoration and carbon sequestration through afforestation. The project's crediting period is 100 years from 1 November 2016 to the 1 November of 2116. The farm El Porvenir follow the FSC standard certification as a minimum practical condition, ensuring sustainable forest management, positive net impact in social, environmental, and economic aspects.

It must be said that the current project area represents a minor part of the farms owned by REFORESTADORA CUMARE SAS. There are around 7,600 ha considered for conservation. This area of conservation is composed of native forest, "morichales", lagoons, water courses, humid areas, etc., in which a rich biodiversity of flora and fauna is protected and monitored. There is a strict prohibition to cut native vegetation within the conservation areas, as well as the hunting of wild fauna. For more information regarding environmental and social benefits, please see section 2 "Safeguards".

Planted forests removes carbon dioxide from the atmosphere and store it in different carbon pools (living above-ground and below-ground biomass, soil organic carbon, litter, and dead wood). All these carbon pools will be accounted towards issuance of carbon credits.

REFORESTADORA CUMARE SAS has a contract with the company Campo Forestal for the management of the forest plantations on their properties. Campo Forestal is in charge of the management of the farm, including all forestry, legal, and administrative activities, among others. The hiring of other external companies to carry out the activities in REFORESTADORA CUMARE SAS farms is done by Campo Forestal. Detailed description of the main activities implemented on the field and supervised by Campo Forestal are in the Manual of Operational Procedures⁶.

1. Establishment Planning
2. Firewall
3. Chemical Control of Ants - Termites
4. Site Preparation - Tractor
5. Site Preparation - Excavator
6. Pesticide Transport and Management
7. Terrestrial Application of Pesticides
8. Aerial Application of Pesticides
9. Pesticide Management
10. Triple Washing of Containers
11. Chainsaw Use
12. Use of Motoguadaña
13. Using Cutting Tools
14. Plantation
15. Fertilization

Planning

The goal is to plan and design the new plantations, minimizing environmental impact.

Environmental measures: maintain the protected areas (according to decree 1449, of 1977). The following protected areas are considered unchanging and permanent:

- water births and water sources in a buffer area of at least 100 meters around, measured from its periphery.
- a belt not less than 30 meters wide, parallel to the maximum tidal lines. Also, on each side of the channels of the rivers, ravines, and streams (whether permanent or not) and around lakes or water tanks.
- land with slopes greater than 100% (45°).
- protected wild flora species

Boundary of the productive area is marked on the ground before starting site preparation activities. Contractors and workers are instructed in compliance with these limits. Properties of more than 50

⁶ The "Manual de Procedimientos Operaciones" will be available for consultation during the validation and verification

hectares must maintain forest cover for at least 10% of its extension. Implementation of activities will be in accordance with soil management techniques in order to protect the soils, avoiding; salinization, compaction, erosion, contamination or slumping and the loss or degradation of the soils. It is mandatory and plantations are registered in the Colombian Agricultural Institute.

Site preparation

Description of site preparation and planting activities:

Weed control

Procedure for manual application of pesticides:

- (1) The foreman must have and know the Safety Data Sheets of the products being applied.
- (2) Check the good condition of the personal protective equipment.
- (3) Verify that application equipment is clean, free of loss or damage to hoses, fittings, or back pump.
- (4) Clean the equipment with a cloth (not with gloves).
- (5) The backpack must have its straps and protections in good condition.
- (6) Back pump refueling areas should be filled without causing spills. Verify that the hoses and keys do not leak. Otherwise, notify the foreman or the person in charge of preparing the mixture.
- (7) Without moving the pump back from the filling site, close it tightly.
- (8) Once filled with the pesticide, it should be carried on the back, completely dry on the outside.
- (9) Seals or gaskets must prevent the liquid from leaking to the outside, wetting any part of the applicator body.
- (10) When adjusting the respirator, perform pressure and vacuum tests to ensure proper position. Always wear the respirator in the work area (when applying and when transiting this area), as well as when carrying your back pump. Outside of these areas, the worker may temporarily remove the respirator.
- (11) Recognize areas in which you should not apply agrochemicals (protection zone, water courses, native forest, etc.).
- (12) Maintain a distance between applicators of at least 5 meters.
- (13) The application will be stopped if the wind speed exceeds 15 Km / hr., And there is a risk of toxicity to the plantation.
- (14) At the end of the day, change your work suit and store it in a bag separate from other clothes, food, etc. Wash your face and hands well before eating food or water.

Procedure for mechanized application of pesticides:

- (1) Verify that the pond, hoses, and equipment in general do not show leaks.
- (2) The operator must use a respirator in case the tractor does not have a cabin.
- (3) Applications with a wind over 15 km / hr can be done if the equipment has a cover to prevent drift.

- (4) Application restrictions will depend on the type of product to be applied and the development of the plantation. The considerations indicated below are for general cases. Specific restrictions may be taken by Campo Forestal personnel, if necessary.

Environmental measures:

- (1) Identify areas in which you should not apply pesticides (protection zone, water courses, native forest, etc.).
- (1) It is forbidden to wash back pumps, work clothes, nozzles, empty containers, ponds, etc., in water courses.
- (2) Applications will be made within the effective areas of the stands, avoiding affecting protection zones, native forests, courses, and water sources.
- (3) Handling of containers: the containers will be triple washed at the place where the mixture is prepared. Empty containers will be perforated and deposited in designated stores.
- (4) Remnants of mix: eliminate remnants of mix by treating border areas as if it were being applied (firebreaks, roads, fences, etc.), in places far from water sources.
- (5) Equipment washing: the equipment washing water will also be applied on firewalls, roads, fences, etc. Washing equipment in water courses is prohibited.
- (6) In the event of a pesticide spill, it must be contained and controlled immediately. Then remove the contaminated soil and put it in a bag, which will be taken to the cellar. This will be handled as hazardous waste.
- (7) Reforestadora Cumare applies agrochemicals only when needed. Fertilizers are applied in years 0-3 due to the quality of the soils in this region of the country. These are acidic soils with low organic matter and poor in nutrients. The company performs an analysis of the soil to define fertilizers needs. This is demonstrated with documents "Backgorund fertilizaciones" and the analysis of each component of the soil such us "Análisis calcio" (submitted to VVB) and on the "fertilization trials":
- (8) In relation to the use of pesticides, Reforestadora Cumare creates a Pest Manual "Protocolo monitoreo de sanidad" (to (i) detect the presence of pests and diseases in plantations, (ii) quantify the population and damage levels, (iii) determine and implement control measures.
- (9) Reforestadora Cumare will always choose biological controls using pesticides only in certain situations, such as ant control that can only be performed with pesticides, otherwise, would not allow the establishment of forest plantations in the Eastern Plains of Colombia.
- (10) Every time a pesticide application program is required, Reforestadora Cumare previously verified that the products to be used are not prohibited by the ICA (Colombian Agricultural Institute), nor by FSC.
- (11) Any pesticide used must have its Environmental and Social Risk Assessment, in accordance with the FSC Pesticides Politics.
- (12) The company is committed to gradually reduce the amount of agrochemicals used per unit area, and whenever other mechanical, silvicultural or biologics measures are technically and economically viable.

- (13) The commitments in the use of fertilizers and pesticides are set in the Forest Management Plan developed by Campo Forestal as the operator of the project (submitted to VVB).

Ant control

The goal of ant control is to prevent damage to young plantations. A worker with knowledge in the use and application of ant or termite control insecticides walk the stand on foot or motorcycle or on horseback, applying the product directly to the ground or in a bait holder.

In order to carry out their work daily, the worker will apply the following work procedure:

- (1) Must be trained in Risk Prevention issues, in the use and application of pesticides.
- (2) Knowledge of the characteristics of the products to be applied, dosage and method of application.
- (3) Check the good condition of your personal protective equipment.
- (4) Wash your face and hands well before eating food.

The ant control activity is carried out with direct applications of insecticide (Fipronil) on the entrance of the nests with spraying with a fumigator (knapsack pump). The low dose recommendation is being applied with good results, which corresponds to a maximum of 0.2 L of product dissolved in 200 L of water per hectare. With a dosage of 200 cc per nest. The ants that are entering the nest are sprayed and the objective is through this to contaminate their food. The date of replacement of filters and gloves must be indicated on the PPE delivery certificate. In addition, a shovel is used to cover the exit of the ant nests.

Termite control is very sporadic. If present, a systematic granular insecticide is applied, which is buried in the base or foot of the tree.

Soil preparation

Tillage is conducted on planting stripes only, in a width of 1.5 m and 15 to 20 cm depth, and every 3,5 meters. Stripes carefully follow a perpendicular pattern across the main slope. Sub-soiling is carried out with a tractor and a single point subsoiler, with the aim of breaking the compaction of the soil. The subsoiler must pass a minimum depth of 50 cm. Operation is stopped with excess moisture in the soil, when the subsoiler cuts and the soil does not break upwards on the surface. Secondary tillage using a disc harrow in order to loosen the thick clouds. Final tillage with discs, only in the sectors that are necessary.



Figure 11. Project activity general view

Planting

The site is manually planted, and it consists of planting plants at 1,350 – 1,430 stems/ha (3.5 x 2.2 or 3.5 x 2.0 meters on the subsoil line) in flat areas. When planted on slopes with soil preparation in boxes, a plant will be placed in the center of each box at 1,100 stems/ha (3 x 3 meters); if the soil is subsoiled in line, the stocking will be 1,350 stems/ha as well as the flat areas. Both in the subsoil and in the box, it is sought that the plant be in the part with the maximum cultivation depth. The allowed tolerance will be +/- 5% of the final planting density.

To carry out his work daily, the worker will apply the following safe work method:

- (1) Wear your personal protective equipment that is in good condition.
- (2) Carry your tools (shovel or skewer and box) in hand. It is not allowed to carry them over the shoulder.
- (3) Only work within the assigned area. Do not plant outside of that area.
- (4) When cultivating, carefully observe the existing material remains, clean or scrape the area before burying the shovel since foreign objects can hit your face.
- (5) Correctly apply planting techniques, avoid overexertion.
- (6) Always keep a distance of at least 5 meters from other people.



Figure 12 . Planting frame overview in recently planted forest

It can be done mechanically (flat areas) or manually (sloping areas). This activity consists of adding fertilizer to each plant, in order to supply the nutritional needs. In the fertilization operation there must be a scale to weigh the measure of fertilizer to be applied. The application of fertilizer will be located in one or two points or ditches on each side of the plant.

To carry out his work daily, the worker will apply the following work method:

- (1) Wear personal protective equipment that is in good condition.
- (2) Carry tools (shovel or hoe) in hand. It is not allowed to carry them over the shoulder.
- (3) Keep a distance of at least 5 meters from other people.
- (4) When loading the packages with fertilizer, do it for two people to avoid over efforts and spills.
- (5) Do not carry more than 25 Kg. If the weight is greater than this, load between two people.
- (6) When preparing the hole to put the fertilizer, carefully observe the remaining material, clean, or scrape the area before burying the shovel since foreign objects can jump on your face.
- (7) Apply fertilization techniques correctly, avoid overexertion.
- (8) Wash your hands and face well before eating food or water.

- (9) When fertilizing with volatile solids, use a particulate trap filter respirator, such as the 3M 8210 Respirator, for toxic dusts. Once breathing becomes difficult, it needs to be changed.



Figure 13 . Current project landscape view

Cumare has a strong commitment to avoid negative impacts of project implementation and mitigate impacts when unavoidable. The project is FSC certified, which means that the management of forest is sustainable. Principle number 6 "Environmental impact" certifies that the use of fertilizers, pesticides and agrochemicals are used in an environmentally friendly way. Campo Forestal has a manual for the use of chemical products, fertilization and other sensitive products which includes mitigation actions in case of possible adverse effects. Therefore, the agrochemicals used in Cumare do not present adverse effects since, according to the FSC standard, it certifies that they do not present an impact on the environment. The company claims in its FSC manual, that: "The company undertakes to gradually reduce the amount of agrochemicals used per surface unit, to the extent that other mechanical, silvicultural or biological controls are technically and economically feasible".

It should be added that Colombia actively participates in the REDD + negotiations (Reduction of Greenhouse Gas Emissions from Deforestation and Forest Degradation: Conservation, Sustainable Management of Forests and Increase of Carbon Reserves) of the UNFCCC (United Nations Framework Convention on Climate Change). The objective of this project is to reduce carbon dioxide emissions produced by deforestation and forest degradation. Based on this, Colombia begins the formulation of a National Strategy for the Reduction of Emissions from Deforestation and Forest Degradation - REDD + (EN REDD +). Colombia is also part of the Forest Carbon Partnership Fund (FCPF). Having consulted the FCPF webpage and the Colombian Readiness Preparation Proposal (R-PP) it cannot be concluded that the project area belongs to the area where the program will be implemented. REFORESTADORA CUMARE SAS is not located within a jurisdiction covered by a jurisdictional REDD+ Program.

Colombia also belongs to Amazon Vision, and the Joint Statement of Intent. The Amazon Vision and the Joint Declaration of Intent are Colombian initiatives with the financial help of European countries that seek to reduce emissions from deforestation in the Colombian Amazon, through a sustainable development model, which promotes strategies for the protection of forests and sustainable use of forests. natural resources.

As mentioned, in first instance, from 2016 to 2020 the grouped project begins with the El Porvenir farm, with a total of 5,526 hectares. in a second instance starting in 2021 to 2025, some areas of El Porvenir (30-ha plantation in 2021) and Caricare farm (both from REFORESTADORA CUMARE SAS company), will be part of the group project, so the captured tCO₂e will increase. The second instance areas are areas that by 2020 were not in conditions to be planted, but which by 2021 would already begin to be suitable for forest plantations. The number of hectares per year and per farm is detailed below:

Table 3. Hectares planted per year and per farm

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	TOTAL
El Porvenir	1,746.7	1,886.8	1,074.2	692.1	126.8		-	-	-	-	5,526.6
El Porvenir / Caricare	-	-	-	-	-	0	530.0	1,000.0	1,740.0	1,740.0	5,010.0

1.12 Project Location

The grouped project area is located in Colombia, Meta and Vichada department. In the first instance the project area started in the farm of “El Porvenir” is in the center-east of Meta department. The map in Figures 4 shows the exact location of the project. The area is homogeneous in terms of soil types, climate, land use history and socio-economic conditions.

Project area was stratified to homogenize the population and achieve more accurate results in the variables measured. The preliminary stratification was done prior to the implementation of the measurements and was established in the Monitoring Plan of the Project Design. The strata were defined with two main variables: tree species and plantation date.

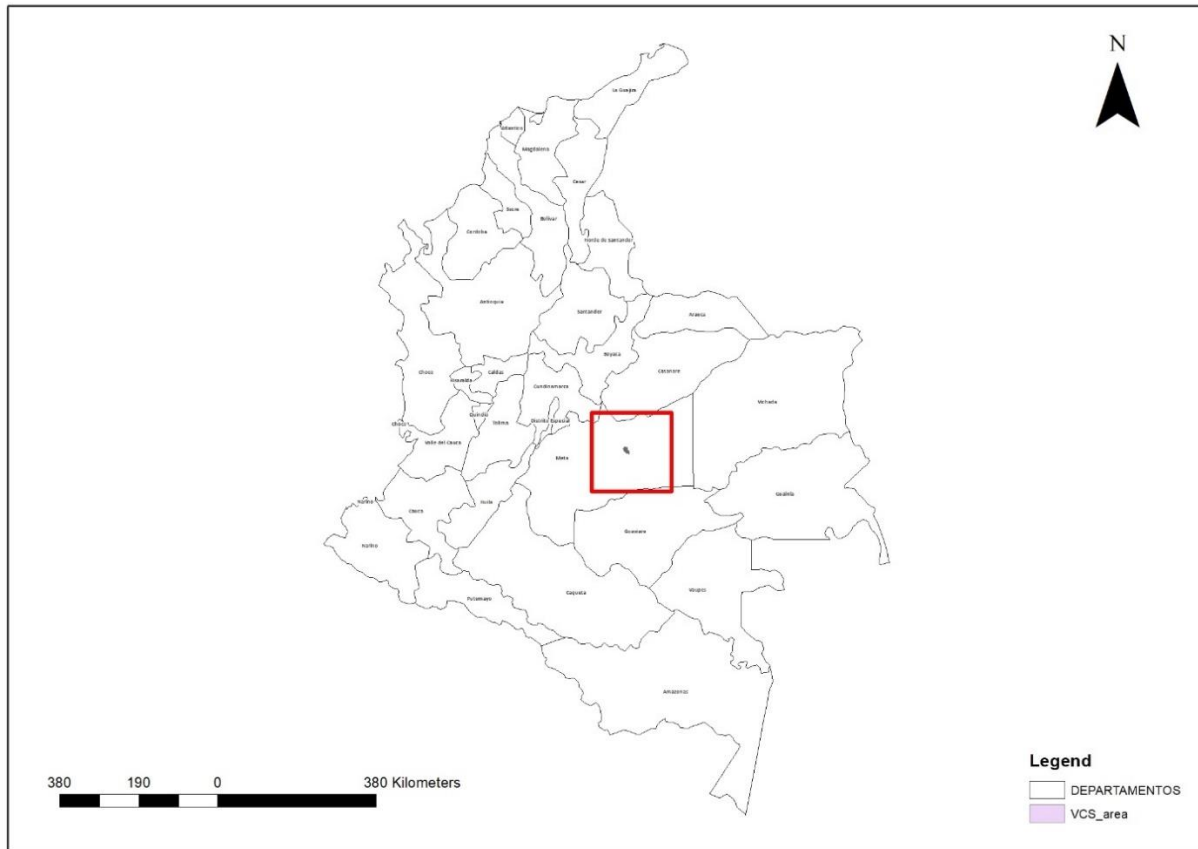


Figure 14. Project location in Colombia

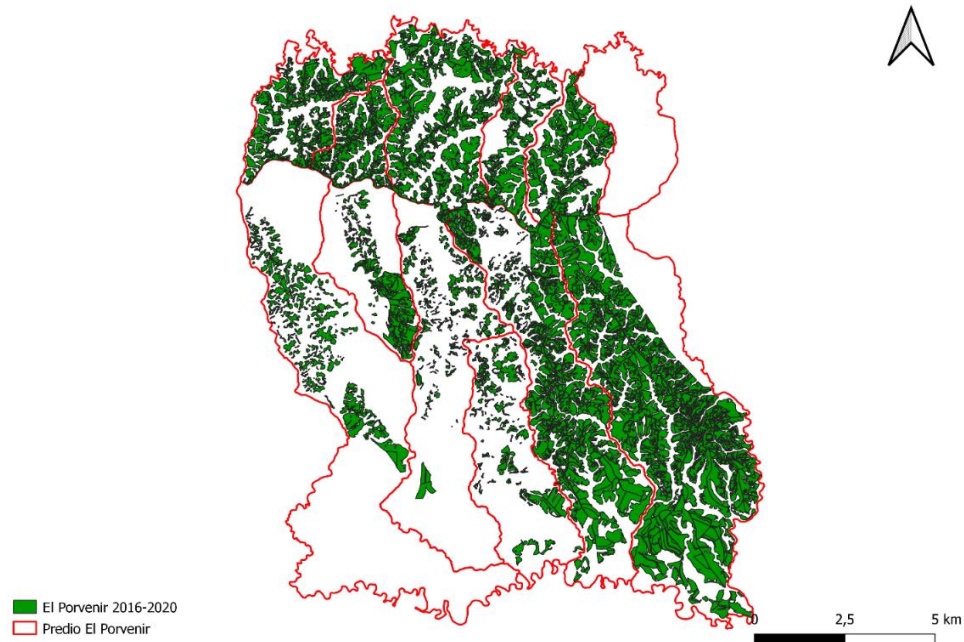


Figure 15. More detailed view of the project area (green polygons)

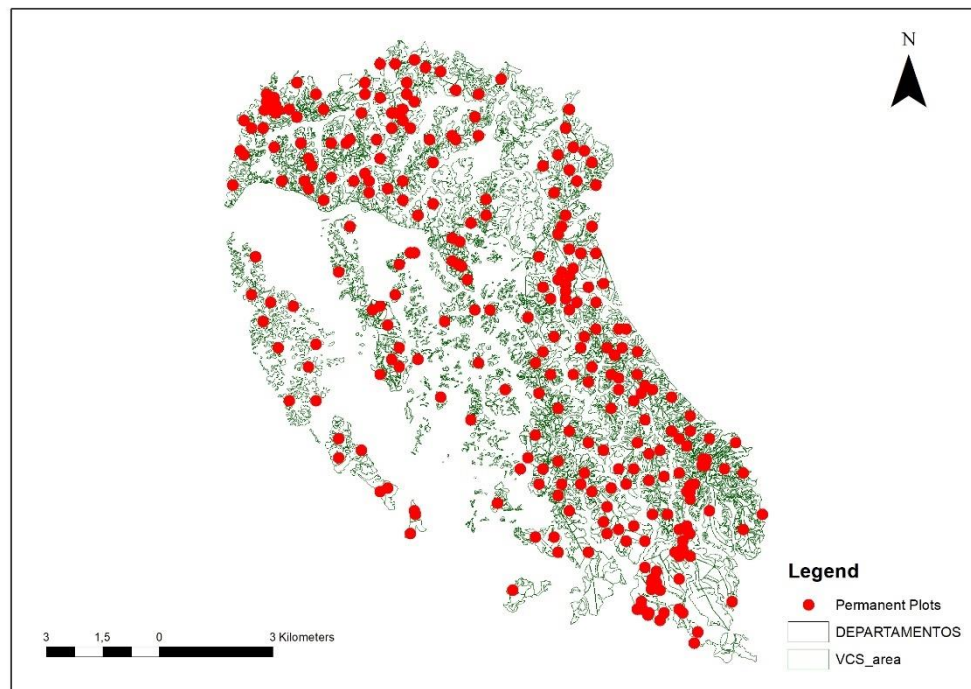


Figure 16. More detailed view of the project area (green polygons) and permanent sample plots (red dots)

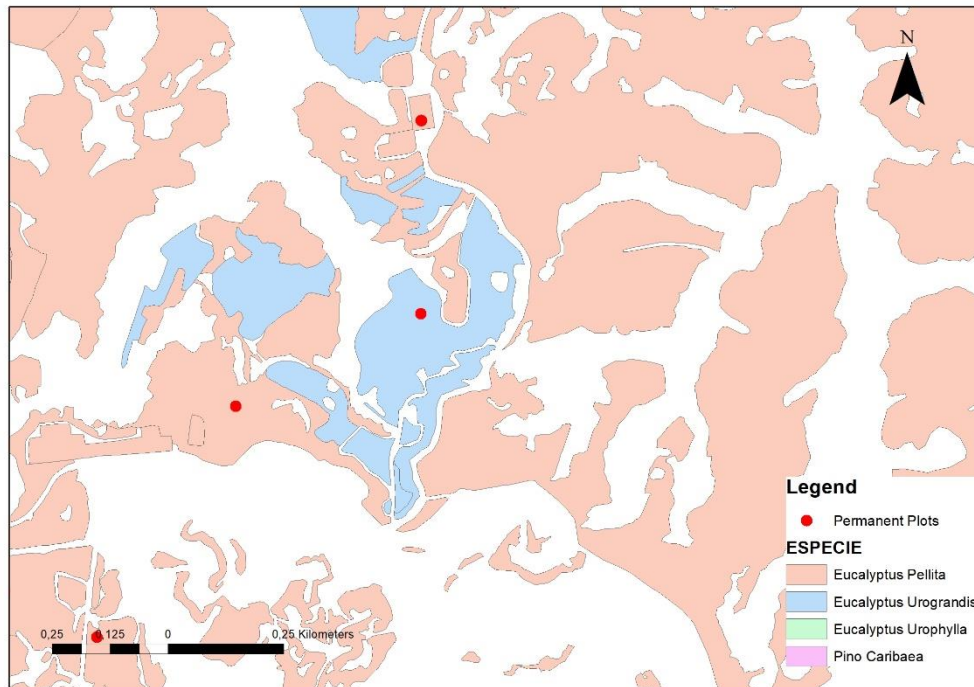


Figure 17. Project boundaries showing different species and permanent sample plots

According to Google Earth information, the center of property El Porvenir coordinates are 3°40'04.49" N / 72°30'30.67".

The El Porvenir farm is in the department of Meta (capital Villavicencio), municipality of San Martín, 93 km SE of Puerto López and 80 km E of San Carlos de Guaroa.

1.13 Conditions Prior to Project Initiation

The conditions existing prior to the project initiation are the same as in the baseline scenario, please refer to Section 2.4 (Baseline Scenario).

However, in this section it is presented the actual and prior environmental conditions of the project area, including information on the climate, hydrology, topography, relevant historic conditions, soils, vegetation, and ecosystems, among other variables.

General overview

The department of Meta and Vichada are part of the Orinoquia region. Orinoquia is part of the hydrographic basin of the Orinoco River that flows into the coasts of Venezuela.



Figure 18 . Landscape on REFORESTADORA CUMARE SAS farm

A hydrographic basin is a surface of land whose surface runoff flows in its entirety through a series of streams, rivers and eventually lakes towards the sea through a single mouth. This region is part of this land that its runoff flows towards the mouth of the Orinoco River.

Orinoquia has an area of approximately 310,000km², from the eastern mountain range, known as the piedmont, to the border with Venezuela, passing through the departments of Meta, Vichada, Casanare, Arauca, Guainia and Guaviare. The region has large expanses of savannas, making livestock and forestry production possible.

The Orinoquia region is divided into 3 zones

- Floodplains (Arauca and Casanare)
- Non-flood plains (Meta and Vichada)
- Pericratonic structural plains (Arauca, Guainia and Guaviare)

This differentiation is made based on the conditions of height above sea level, the possibility of flooding (being in a low area, they will be more flooded areas such as the departments of Aruca and Casanare), among others.

The main rivers of the Orinoquia region that supply the hydrographic basin of the Orinoco River are:

- Meta
- Guayabero
- Ariari
- Tomo
- Orinoco
- Lagoons
 - Cayman
 - Sesema
- Inírida
- Bitá
- Vichada

- Ajota
- Among others

Many of these rivers have their source near the eastern mountain range and by gravity, the water flows in different rivers that later flow into the Orinoco river.

On the other side, the REFORESTADORA CUMARE SAS farm, in the department of Meta, is limited to the north and south by different rivers. To the south is the Caño Cumaral river and to the north the Melua river. Also within the farm are the rivers Caño El Encierro, Caño Lagunazo, Caño La Ilusion and Caño Matanegra. The rivers Caño Lagunazo and Caño La Ilusion limit in part with the REFORESTADORA CUMARE SAS farm, with Caño Lagunazo limiting to the East and Caño La Ilusion to the West.

The rivers within El Provenir are born within the farm limits and flow into the Caño Cumaral river or the Melua river, which will flow into the great rivers of the Orinoquia region and then flow into the Orinoco River. These are the most important rivers on the farm, however, there are more water sources and small rivers that were not detailed since they have a lower flow so, they are not of great importance for the company Campo Forestal.

This shows that El Porvenir has a vast hydrographic network, important for the forest plantations of REFORESTADORA CUMARE SAS.

To comply with Law 299 of 1996, Campo Forestal promotes the conservation and propagation of natural ecosystems for the native flora and fauna of the farm. Because of this, Campo Forestal creates buffer areas around these water sources and water courses. This buffer areas, allows that the zone it is not possible to make forest plantations and that there is no human intervention, so that biodiversity can be maintained and enacting natural ecosystems

These buffer areas are protected in this way:

- The sources of water sources in an area of at least 100 meters around, measured from its periphery.
- A strip not less than 30 meters wide, parallel to the maximum tidal lines, on each side of the riverbeds, streams and streams, whether permanent or not, and around lakes or water reservoirs;
- Land with slopes greater than 100% (45°).
- Protect the specimens of forbidden wild flora species that exist within the property.

Previous activities

The terrain is a flat to undulating savannah with sectors of broken mountains, equivalent to approximately 30% of the total capacity. The previous use of the land is extensive cattle ranching, with "flat grass" of the genus *Brachiaria spp.* The project area has a long history of cattle grazing, an activity that has caused soil erosion and vegetation degradation due to overgrazing on degraded pastures, the burning of grasslands for the regeneration of grasses and the subsequent introduction of exotic grasses for production, such as *Brachiaria spp.*, resulting in a modification in the ecosystem, ending the savannahs of natural grasslands and shrubby savannahs. Livestock at the project site prior to project implementation, was 98% Zebu - Brahman, mostly breeding stock (less than 12 months) including culled females and pregnant females. The reference scenario is the same as the conditions existing before the start of the project, see Section 2.4 (Reference Scenario)

The previous activities held in El Porvenir, before Cumare started the project, was livestock production. The previous owner managed the farm for livestock production as it is managed in the region. For

example, mature and dry grassland areas were burnt every year to promote the regeneration of green shoots, see image below.



Figure 19 . Landscape on REFORESTADORA CUMARE SAS farm before the acquisition of the land, fire management of grasslands (left hand side) and livestock present in the area before the project start (right hand side),

It is worth to mention that fire is a normal practice in livestock production in Meta department, but it is not a practice followed by Cumare as part of the land preparation or forest management. These practices have been implemented for centuries are not done for the establishment of the project. The fire practice and overgrazing of grassland area has deteriorated the soils, turning them in degraded areas.

The VCS requires to demonstrate the conditions existing prior to project initiation. The conditions prior to project initiation are extensive livestock production with overgrazing periods and deterioration of grasslands. The following pictures show the situation prior to project initiation.



Figure 20 . Landscape on REFORESTADORA CUMARE SAS farm before the acquisition of the land

The project area before the initiation of the project was used for livestock production which was managed with fences. These fences are now abandoned since the project activity is not including livestock production, see images below.



Figure 21 . Livestock management infrastructure that is now abandoned

The VCS also requires demonstrating that the project has not been implemented to generate GHG emissions for the purpose of their subsequent reduction, removal or destruction. As it can be seen in the description of the activities prior to project initiation and the activities implemented, that there has not been implemented any activity for it subsequent reduction, removal or destruction.

Climate

The department of Meta is in the Intertropical Confluence Zone (ITCZ), therefore, rainfall varies from 2,000 mm, in the upper parts of the mountain range, to 6,000 mm or more per year, in the vicinity of the municipalities of “El Castillo” y “Lejanias”. In the municipality of San Martin (where it is the farm of El Porvenir) the average rainfall varies between 2,400 and 2,700 mm per year. The driest period occurs between December and March, due to the prevailing northeast trade winds at this time of year, moving the ITCZ to the south.

The rainy season lasts from April to November, due to the fact that at this time the winds from the southeast begin to dominate, moving the ITCZ to the north. The prolonged period of rains is due to the double passage of the ITCZ due to the alternation of the prevailing winds.

The following table shows the precipitation data of the 4 most representative meteorological stations on the Meta department, whose source is IDEAM (2001-2012 series).

Table 4. Annual precipitations

Station	Location	Annual precipitation (mm)
Puerto López	4°06'N; 72°56'W	2,512
Nare	3°47'N; 73°08'W	2,500
Bajo Nare	3°59'N; 72°58'W	2,712
Barbasal	3°37'N; 73°20'W	2,556
Average		2,570

Mean annual temperature in the municipality of San Martín is around 25 °C, while the average annual maximum reaches 33.9 °C (see table below), whose source is IDEAM (2001-2012 series).

Table 5. Average temperature

Station	Location	Average temperature (°C)	
		Max	Average
Barbasal	3°37'N; 73°20'W	33.9	25.4

According to the 2006 IPCC Guidelines, Vol. 4, Chapter 3, figure 3A.5.2 and taking in consideration the data on precipitation and mean temperature, added to the elevation information of the project proponents, it can be concluded that the climate at the project site it is "tropical wet" (or tropical very humid).

Topography and Soils

Prior to the purchase of the El Porvenir farm, a study of the physical conditions of the property was carried out to identify if it was suitable to carry out the afforestation project. In this study, a soil study was carried out where it was possible to identify 4 types of very different soil orders, these are: Entisol, Inceptisol, Oxisol and Ultisol (annexes 5).

The differences between the types of soil are due to the fact that the soil formation factors that have acted on the different parent materials that make up the property, the present topographies and the formation processes (additions, losses, transformations and translocations) which They have given a different dynamic to the different areas of the farm.

As we named, the difference in soils is also given by the topography of the property. The farm's terrain is relatively homogeneous, with flat to undulating savannah landscapes and mountainous areas.

However, it can be observed that in the northern sector (north of the main access road) the% of mountainous area is much higher, which explains, in part, this difference in soils.

The variation of topography in the terrain of El Porvenir, leads to define that the farm is dominated by a topography of hills. Due to the variation in the terrain the IGAC ("Instituto Geografico Agustín Codazzi") assigned different symbols to describe the different topography of the farm. The symbols identified on the farm are

- LVJ c1
- LVH dc2
- LVK bc.
- Valley soils
- VVB axy
- VVC axy

Description of symbols is found in annexes 6.

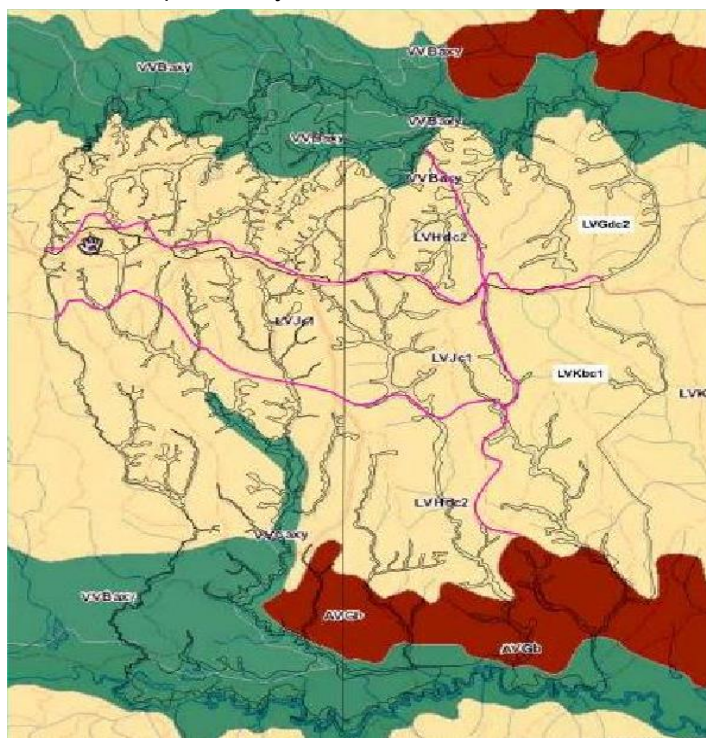


Figure 22. Map of the different types of soil in the El Porvenir farm (Source IGAC)

LVJ c1	Soil described in annex 6
LVH dc2	Soil described in annex 6
LVK bc	Soil described in annex 6
VVB axy - VVC axy	Soils related to water courses (green color). Soil describe in annex 6
Valley soils	Soils related with valley (red color). Soil describe in annex 6

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

Legal Requirements

REFORESTADORA CUMARE SAS project complies with all the legal requirements. Evidence is included in the supporting material, provided as part of this document to the validators and verifiers. The FSC certification does also requires and audits the complete and correct compliance with legislation (environmental, labor, among others). In the Legal Requirement file, it can be found:

- Register of forest crops and agroforestry systems for commercial purposes (ICA registry until 2018).
- Deed of sale of the property where the project is developed (El Porvenir).
- Certificate of existence and legal representation issued by the Chamber of Commerce of Bogotá Colombia.
- Land Use Certificate issued by the planning advisory office of the municipality of Meta, Colombia.
- Water concession of the El Porvenir property issued by the Cormacarena Regional Environmental Corporation.
- Forest Management Plan describing the environmental management of the project, including the protection and monitoring of natural environments and protected species and the strategy of relationship with the community that is described in detail in the co-benefits chapter.

In coherence with the foregoing, the project complies with each of the identified regulations and presents a summary of how it complies with the provisions of current regulations.

Table 6. Legal requirements

Norm	Description	Compliance of the Project
Decree 1076 of 2015	Through which the Sole Regulatory Decree of the Environment and Sustainable Development Sector is issued	Technical use of forest products, in accordance with current legal regulations. Optimal use and higher degree of transformation of said products Workforce training. Protection of renewable natural resources and the environment, in accordance with current legal regulations. Promote the technological development of the transformation processes of forest products.

Norm	Description	Compliance of the Project
Law 299 of 1996	The conservation, protection, propagation, investigation, knowledge, and sustainable use of the resources of the Colombian flora are strategic for the country and constitute a priority within the environmental policy.	Adequate compliance with the CITES Convention. In accordance with this Agreement, the organization executes the plans described in Prospecting for Flora and Prospecting for Fauna. The wooded areas that surround the plantations are conserved considering the importance that this represents for the country.
Law 1333 of 2009	By which the environmental sanctioning procedure is established	The project complies with all environmental regulations and has not entered into processes penalties.
Law 1377 of 2010	Through which the commercial reforestation activity is regulated, the object of this law being to define and regulate forest plantations and agroforestry systems for commercial purposes.	The plantation areas have complied with everything stipulated in this law.
Decree 2803 of 2010	Regulated Law 1377 of 2010, in relation to the registration of forest crops and agroforestry systems for commercial purposes, protective-producing plantations and the mobilization of primary transformation forest products.	All areas of the project are registered, which is why the project complies with the provisions of this decree.
Policy to stimulate commercial reforestation in Colombia (Conpes Document 3237)	Policy framed in the National Development Plan 2003 - 2006 and contributes to the fulfillment of the goals of the National Forest Development Plan	The project activities are in line with what is stipulated in this document.

Norm	Description	Compliance of the Project
National Forest Development Plan	Which is established in order to improve the management of forest resources and in turn improve the quality of life of the communities that occupy natural forests, in addition to seeking to offer productive alternatives that are more sustainable	The management of forest plantations complies with the requirements of Colombian regulations, in addition to being a source of work for the inhabitants of the region, making these an alternative productive friendly with the environment and society.
Decree 926 of 2017	By which, among other things, the procedure to make effective the non-causation of the national carbon tax is regulated.	The project is developed under the guidelines established by the regulatory entities, for the benefit of those natural or legal persons who want to be exempt from the causation of the national carbon tax.
Resolution 1447 of 2018	By which the system of monitoring, reporting and verification of mitigation actions at the national level referred to in article 175 of Law 1753 of 2015 is regulated, and other provisions are dictated.	The project meets the requirements established in this resolution.

Land Tenure

The property that is part of the project boundaries and that is the object of the afforestation activity of the REFORESTADORA CUMARE SAS Project is described in the following table. To support the land tenure the deed of sale of the El Porvenir, where the project is developed will be provided to auditors.

Table 7. Land tenure

Property	Real estate license plates	Total area (ha)
El Porvenir	236-20543	17,990

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

This project is not registered or seeking registration under other GHG Programs. “CUMARE Carbon Project” is not even considering the presentation of the project to non- The Project Proponent presents, for the revision of validator/verifier, a letter from EcoRegistry⁷ stating that REFORESTADORA CUMARE

⁷ <https://www.ecoregistry.io/>

SAS project has never been presented and/or registered in their platform. ProClima is another carbon standard in Colombia. The project developer has never used these or any other GHG Program. An extract of all the carbon projects registered in ProClima, where it will be seen that REFORESTADORA CUMARE SAS project is not on the list.

1.15.2 Projects Rejected by Other GHG Programs

The project has not been rejected by any other GHG programs as it has never been presented to any GHG Program, as demonstrated above.

As mentioned in the previous section, this is the first carbon calculation project carried out by the REFORESTADORA CUMARE SAS company, so it has not been rejected in any other GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

GHG removals generated by the project had not been used and will not be used for compliance in emission trading programs and the project activities in the proposed area are not subject to any required binding limit on GHG emissions.

Carbon credits (VCUs) that REFORESTADORA CUMARE SAS will generate will not be used in any Emissions Trading Program. The project will only be registered in VCS and the uses that these VCUs will receive are linked to an internal market or, depending on the market price, they could be used in the international voluntary carbon market. The project developer has made an attestation saying that the project will not be registered in other programs.

Using cartographic information, it is verified on the RENARE platform El Porvenir does not overlap with other carbon projects. **This is also justified through the platform of RENARE and COLCX.**

RENARE is the National Registry for the Reduction of Greenhouse Gas Emissions, while COLCX is an initiative created for greenhouse gas (GHG) mitigation projects focused on reducing emissions or increasing removals of greenhouse gases for the voluntary emissions market or projects that are eligible to request the non-accrual of the Colombian carbon tax.

It is the first time that CUMARE has presented under a GHG quantification program (VCS). As it is also stated in the Monitoring Plan, the GHG removals generated by the project will be revised that have not been used for compliance under other programs and mechanisms in every monitoring period.

1.16.2 Other Forms of Environmental Credit

GHG removals generated by the project had not been used for compliance with other forms of environmental credits.

1.17 Additional Information Relevant to the Project

1.17.1 Leakage Management

As per VCS Standard 3.14.5 the projects are encouraged to include leakage management zones as part of the overall project design. Leakage management zones are part of a leakage management plan, they can minimize the displacement of land use activities to areas outside the project area by maintaining the production of goods and services, such as agricultural products, within areas under the control of the project proponent or by addressing the socio-economic factors that drive land use change. CUMARE

carbon project has no need to include a leakage management plan or zone, since the pre-existing activity “livestock production” is a common activity in the departments of Meta and Vichada, and the cattle present in the project site does not generate leakage emissions when the project starts, as described in chapter 4.3.

1.17.2 Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

1.17.3 Sustainable Development

Sustainable Development Goal N° 8: Decent work and economic growth

The project has generated and will continue generating decent employment through formal recruiting. The project developer has created full-time direct and indirect positions for local people. The project is promoting economic growth in the region for the jobs created but also for the investment done and the timber market that is generating.

Sustainable Development Goal N° 12: Ensure sustainable consumption and production patterns

The project strengthens the scientific, technological and innovation capacity of a developing country in order to move towards more sustainable patterns of production. The project is certified with FSC which demonstrates that is producing timber in a sustainable way.

Sustainable Development Goal N° 13: Climate Action

The actual and future project activities are actions that will combat climate change through the removals of CO₂ in photosynthesis in five carbon pools (aboveground and belowground biomass, litter, deadwood and soil organic carbon). The project has contributed to the reduction of GHG emissions by acting as sinks and sequestering 503.404 tCO₂e corresponding to the current verification period and will sequester 2.918.000 tCO₂e in the long-term (ex ante LTA estimation).

Sustainable Development Goal N° 15: Life on Land

The main project goal is the production of biomass while regenerating degraded land (overgrazed by cattle raising) through afforestation activities. The project also protects native ecosystems and riparian forest. Both activities promote the connectivity and improve the habitat for the wild flora and fauna.

Other aspects related to sustainable development: Community relations strategy (social)

In the area of influence of the property managed by Campo Forestal S.A.S.(El Porvenir), located in the municipality of San Martín de los Llanos- Meta and identified with real estate registration No. 236-20543, there is no presence of reservations and / or indigenous communities. This was verified through consultation with the Ministry of the Interior in 2013 and consultations made by Reforestadora REFORESTADORA CUMARE SAS during 2014. Based on the social diagnosis carried out in 2014 and the consultation with the Ministry of the Interior, a Social Strategy program was prepared by Campo Forestal SAS. (see document "SOCIAL STRATEGY CF-.docx").

During September 2014, the NSG company carried out a social diagnosis related to the geographical area in which the farm managed by Campo Forestal is located. This diagnosis included the following topics:

- Political and administrative context of Colombia
- Regional context of the Department of Meta

- Local context of the municipality of San Martín
- Generalities of the community relationship in the environment of the farm

The details of this diagnosis can be found in the document "SOCIAL STRATEGY CF.docx". Based on this diagnosis, the strategy of relationship with the interested parties (authorities, communities, neighbors) is defined. The Campo Forestal Social Strategy consists of strategic guidelines to work in the long term, and annual action plans, beginning with the period 2015 - 2016.

The area where the social strategy will be developed has to do with the geographical area where the impacts derived from forest management occur. In this sense, two large geographical areas are clearly distinguished:

1. Farms neighboring the farm managed by Campo Forestal: due to the direct impacts that forest management could generate.
2. Communities and neighbors in the access routes to the farm: due to the use of the roads for access to the farm and supply of inputs.

Ruta Los Avestruces – El Tropezón – El Porvenir (vía “el derechazo” y vía Extremadura)

- Route Puente Amarillo – El Porvenir
- Route Extremadura a El Calandrio – San Carlos de Guaroa
- Route El Porvenir – La Cristalina – Río Manacacías (vía norte, y vía La Morena)

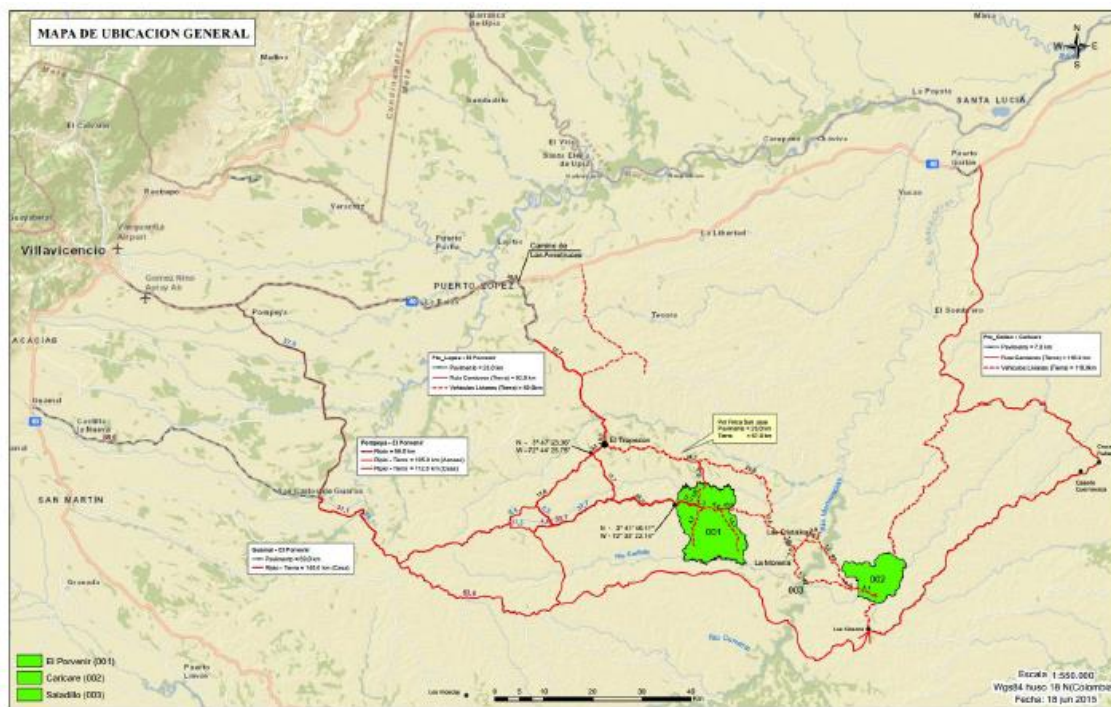


Figure 23. Project location map

Note that the project site is the green parcel marked with a “001” code. There are other areas marked in green which are not part of the project site.

Good neighbourhood relations:

It is probably the most important management to develop. It consists of knowing the neighbours and participating within the "neighbourhood" as one more neighbour. The objective is to make yourself known, have good communications with neighbours and develop trust with them. This is a job that consists of "day to day", through conversations, help in everyday life, and so on. These aids materialize, for example, in:

- Transfers of neighbours to and from their farms or residences.
- Specific repairs of public roads near the farm, and to the extent that appropriate machinery is available.
- Auxiliary vehicles that are damaged in sectors near the farm.
- Helps neighbours in savanna burns, by knowing how to carry out safe burns and providing support with the fire brigade and equipment available.

This line of work is not specific and is constant in all annual plans.

Hiring local labour:

A component of great influence in neighboring communities is the legacy of the oil companies in terms of hiring labour. Traditionally, these contracts have had the following characteristics:

- Hiring for short periods, based on drilling.
- High salaries, much higher than the forest average.
- Low physical demand, in contrast to forestry activities.

Therefore, when faced with hiring requests, the first thing to do is manage the expectations of the type of work and salary, explaining that it is a private forestry company that does not manage the profitability of an oil company and most of the activities are associated with the performance of each worker, so that the more he performs, the better his remuneration is. Requests for hiring local labour traditionally come from two sources:

- (1) Requests made by a Community Action Board, where a list of people (and their resumes) to be hired is delivered. It has been seen in the past that these lists are full of vices: the person is charged to appear in a favorable position on the list, those who are friends or related to the person making the list are put on the list, etc. Therefore, these lists will not be accepted, and the response that must be given is for the Community Action Board to send the list to the National Apprenticeship Service (SENA), as the official and formal conduit for job application.
- (2) The person on their own initiative contacts someone from Campo Forestal or contractor. If it is someone from Campo Forestal: the important thing is to indicate that the hiring of labour is autonomous by the contractors, and that the corresponding resume will be sent to them. It is also important to give a timely response to the person. If he is a contractor, he must give a timely response (favorable or unfavorable). If the answer is unfavorable for the applicant, the contractor must disseminate the resume among the other contractors, to see if there are job options.

It is in the interest of Campo Forestal to promote the hiring of local labour that meets the necessary skills for the forestry activities that are being developed.

Support in local development:

Support for local development should be understood as actions carried out by the organization on issues that meet the following characteristics:

- Are of interest to the community or are directly required by them.
- The community in general is benefited, and not individual people.
- The actions to be carried out are in support of the actions that the community is developing. In other words, like just another neighbor, support is given to community initiatives, so that it achieves its objectives. The car is “pushed; it is not pulled”.

Three strategic lines of support have been defined in local development:

1. Schools:
 - a. to. Infrastructure improvement
 - b. Education regarding the dissemination of a new productive forestry activity in this region.
2. Health:
 - a. to. Improvement in infrastructure, equipment, supplies
 - b. b. Support in improving the health care service
3. Infrastructure:
 - a. to. Maintenance and improvement of public roads
 - b. b. Improvement of works of art on public roads
4. Support for productive projects: This line seeks to support the community and / or neighbours in projects that generate economic income.
 - a. Projects with the community, where a project led by the JAC is supported.

Individual micro-entrepreneurship projects with contribution of seed capital:

Communications with interested parties or affected parties are carried out according to the following procedure:

- a) Only Colombian partners may deliver information to the general public or the press. Campo Forestal personnel who are consulted by the public and especially by the press, must indicate that they are the representatives of the owners, those authorized to give answers, and, therefore, must refrain from giving further comments.
- b) Requests from neighbours or communities: They must be channeled through the Security Company or the Operations Supervisor, to the Operations Manager. The Operations Manager will define the action plan according to the request or will deliver the corresponding information. Those requests that imply an expense not considered in the annual plan or outside the normal aid that is delivered to the neighbours, must be analysed together with the Director of Operations.
- c) Job applications: The person interested in working with a contractor in forestry operations must submit his CV to the Operations Supervisor or the Security Company. They will deliver the CV to the contractors, who will evaluate the need and opportunity for contracting.

It is part of the role of the Operations Manager and Supervisors to have good relations with the community. This is achieved in part with good "day-to-day" communication with neighbours. In these meetings, it is important to inquire about:

- Eventual impacts that are being generated by the tasks that are carried out within the assets managed by the company.

Eventual requirements that the community may have. These requirements may include requests for firewood extraction, beekeeping, training in various subjects, visits to forestry operations, etc.

It is important to manage the impacts caused by the operations, as well as respond to the requests of the community. However, community requests will not always be accessible. This will depend on the nature of the request and the feasibility of the company in being able to grant it. However, a response must always be given within reasonable time. The most relevant communications and the requests indicated above will be recorded in a Communications Worksheet. It is the responsibility of the Security and Operations Company to promptly inform the Operations Base, who must keep said registry updated.

Donations on special days:

To reinforce the strategic line of good relations with the community, contributions will be made to the Community Action Board and / or schools, on important days during the year. The gift to be contributed will be defined on a case-by-case basis. The following is the summary of the social plan for 2020.

Table 8. Social plan 2020

PROGR.	COM.	ACTION	TERM	RESP
Public roads arrangement	El Tropezón	Improvement via El Tropezón - El Porvenir (via Extremadura) • Improvement of the El Tropezón - El Porvenir - Garibay Bridge • Improvement via El Porvenir - Via point and catchment Improvements include attention to critical points, gap filling and road leveling.	March	Operations
Environmental education. Previously agreed on dates and agenda.	School Navajas / El Tropezón / La Cristalina	• One day / month, according to the schedule to work with the schools	Monthly	Environmental Management Advisor
Projects Productive	El Tropezón	Micro-entrepreneurship project: • Permanent monitoring of the status of productive projects, visits, and telephone contact.	Bimonthly	Environmental Management Advisor

		Review of progress in undertakings with support with basic accounting checks. • Coordination of training with technical entities agricultural (National Learning Service-SENA) through the JAC. • Search for technical support by the municipal mayor of Puerto López.		
Dissemination Strategy	Finqueros El Tropezón y La Cristalina	It is planned to receive 1 visit from owners, administrators, and workers of farm of both villages for the year 2020 to the El Porvenir project.	Annual	Operations and Social Management Advisor
	Social Action Communal Boards	2 meetings with the community called by means of the JAC to socialize the project and answer questions from the interested parties.	Annual	Operations and Social Management Advisor
	Schools El tropezón, Alto Navajas y La Cristalina	An annual visit of the students to the project to bring the students closer to the culture of reforestation		
Assisted burns	Fincas vecinas a El Porvenir	Assistance to the community to carry out controlled burns in accompaniment with the fire control brigade. Communications with neighbours: Nov 2019-Apr2020 Attendance: Dec 2019- Apr 2020	Nov 2019 -April 2020	Central Operations

1.17.4 Further Information

No additional relevant information.

2 SAFEGUARDS

2.1 No net harm

The present project in all its components and phases guarantees that there are not or will not be net harm to the environment neither to socio-economic aspects.

The project proponent has established measures against any type of environmental negative impact.

In addition, REFORESTADORA CUMARE SAS is FSC certified. As mentioned above, FSC certifies the forests that are being managed to preserve biological diversity, benefiting the lives of natural populations and stakeholders. In this way it is shown that REFORESTADORA CUMARE SAS does not generate a risk to the environment where it is present.

2.2 Local Stakeholder Consultation

CUMARE carbon project has an open and permanent consultation process with local stakeholders. As it is described in section 1.17.3 of this project description process, there is a community relation strategy elaborated and conducted by Campo Forestal. It is also a key element for the FSC certification process.

One of the important elements and first step to engage local stakeholders is to have a living database with contact information of them. Campo Forestal has created and is permanently updating an Excel file with information such as: name of the person, institution they belong, location (department and city), telephone number, among other data. The process to identify and include a stakeholder in the list has been done by Campo Forestal before and during the project development. Key stakeholders to the project has been defined as equal to FSC process.

Campo Forestal is actively and passively consulting stakeholders about the development of the project in relation to project design and implementation, whenever corresponds. This project is privately owned and as it is shown in section 2.1 and 2.3, there are no net harm or negative environmental impacts to stakeholders.

These consultations are properly document in another dataset “Communications register”, where the following information is registered: Campo Forestal representative, institution and name of the person contacted by Campo Forestal, type of communication (communication, complaint, gratitude, donation, informative, reunion&meeting, visit, among others), topic of discussion, response action, response date and response time. Campo Forestal has been recording this consultation process since 2014.

The main procedure or method that Campo Forestal has for the relationship with the communities near the farm is the day-to-day relationship. To achieve this, the security company hired by Campo Forestal oversees relations with the neighbours. The security company is the representative of Campo Forestal for the neighbours.

Campo Forestal seeks to be one more neighbour in the community. The objective is that the neighbours get to know the company and its plantations, have good communications with them and develop trust.

Some of the methods to achieve these goals are:

- Transfers of neighbours to and from their farms or residences.
- Specific repairs of public roads near the farm, and to the extent that appropriate machinery is available.
- Auxiliary vehicles that are damaged in sectors near the farm.
- Helps neighbours in savanna burns, by knowing how to carry out safe burns and providing support with the fire brigade and equipment available.

In this way, it is possible to talk with the neighbours and communicate about the different operations that are taking place within the farm. In turn with this, Campo Forestal shows that:

- Campo Forestal is present.
- Campo Forestal cares about people.

- Campo Forestal as an austere but generous and friendly company.
- Campo Forestal is present when there are problems.
- Campo Forestal brings interesting development alternatives.

The Campo Forestal project brings benefits to the communities near the farm, such as: work for the region, support for micro-entrepreneurs with the "Seed Capital" project, and environmental education for schools in the region. As we mentioned before, Campo Forestal wants to show that it is present, therefore it is always supporting the neighbours, fixing the streets, helping the neighbours, improving the infrastructure of the health centres, providing supplies for the health centres.

The following sections inform about the relation with the communities, obtained from the "Public Summary of the Social and Environmental Monitoring".

Communication management and neighbors complaints

With the aim of maintaining and reinforcing communications to and from the project with neighbours, neighborhood organizations, etc., all of them (requests, collaborations, complaints, claims, acknowledgments, questions, and donations) are recorded in a comp that allows to verify the level of communication and response from Campo Forestal. These interventions are reviewed and monitored to strengthen the relationship with neighbours and the community in general. Likewise, a response period was established according to the type of communication that enters.

In the last 2 years (2019-2020) a similar record of communications between 70-80 records is observed, in the same way the claims which are at a low level. This is due, in part, to the reinforcement of the social management program, in addition to the improvement in the registration system for these communications.

Complaints from neighbours are channeled through supervisors, who, together with the Operations Manager, manage responses or solutions as soon as possible.

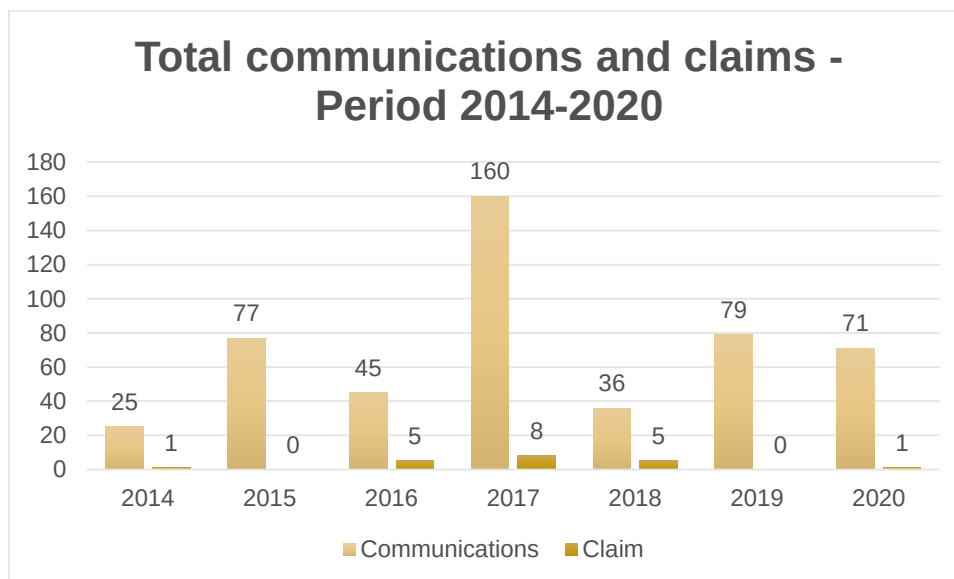


Figure 24. Communications and claims - Period 2014-2020

It should be noted that the response time to complaints from neighbours has been reduced, with one month being the time limit to solve the request.

Community social project

In addition to the Environmental Education program, the social management approach remains constant with the Community Action Boards (JAC) of the Alto Melúa village of El Tropezón and La Cristalina since 2016. In the same way, steps have been taken and small Articulations with the Community Action Boards of the Medio Melúa and Alto Navajas villages

Alto Melúa Community Action Board:

- During 2020, a Market donation was made to the El Tropezón community in support of the difficulties caused by the COVID-19 situation.

Donation of a market (22 different types of food) for each of the 40 families reported by the Tropezón Community Action Board. This support as a social work in the face of employment and income difficulties during the quarantine measures and their negative effects on the dynamics of the national economy.

- WAYS

During 2019, maintenance was carried out on 30 km of external roads, mainly aimed at repairing critical points on the Extremadura Road. This sector benefits transportation for all economic and social activities in the community, given the frequent traffic of vehicles and cargo trucks.

- LOAN MACHINERY

- From October 8 to 10, the clamped excavator (bow tie) was provided to the community of Tropezón to cover holes in the completed fish farming project and for various activities at the El Tropezón school.

- 11 days of a clamped excavator (bow tie) was provided to repair external roads with 85 machine hours, given the presence of a critical traffic sector.

El Tropezón and Alto Navajas Schools:

In cultural week, in November, snacks, native trees and distinctive divers were provided for the children for the environmental education activity and cultural week. Additionally, transportation was arranged for inputs and wages for the native plantation activity.

La Cristalina School:

- In June 2019, supplies were donated for the repair of the school's laundry pool, including cement, sand, and glue.

- The school closing activity included lunch (hamburgers) and snacks for all members of the educational community, in addition, native trees and a diver were donated for the children for the cultural week activity.



Figure 25. Community local projects

Micro-entrepreneurship

Part of the social management carried out derives from the company's commitment to supporting local economic development. In this sense, the Alto Melúa community was encouraged.

- El Tropezón to present a series of productive initiatives that were supported with seed capital and began in July 2018. In 2019, 5 of the 6 selected proposals continue to be active. The monitoring of productive projects is carried out constantly, with monthly visits to maintain communication with the entrepreneurs and monitor the evolution of the projects, as well as offer the required support, for example in accounting. Below are the active initiatives in El Tropezón.



Figure 26. Micro-entrepreneurship

Additionally, external support is sought from government or educational institutions that can contribute to local development. The Mayor's Office of Puerto López - Secretariat for the Environment and Rural Development, for example, has participated in community projects in El Tropezón.

Environmental Education Program in Schools

Environmental education (EE) is a determining component in the relationship between people and the natural environment in which they live. In this sense, the environmental education program of Campo Forestal aims to share the experience of Campo Forestal and forest plantations, in addition to training students who know and can analyse their own context or reality, where they recognize the influence of their daily actions on the natural environment. The program, aimed at the schools of La Cristalina, El Tropezón and Alto Navajas, exposes alternative practices that contemplate regional development aimed at the conservation of strategic local ecosystems and the generation of social well-being, as is the case of forest plantations. In addition to promoting the care of natural elements, the socialization of the forestry work of Campo Forestal is carried out. The extension allows the rapprochement between the company and the inhabitants of the region.



Figure 27. Environmental Education Program in Schools

The year 2016 began the environmental education program in the Alto Melúa educational centres, El Tropezón headquarters and Alto Navajas headquarters in the municipality of Puerto López, and Camoita, La Cristalina headquarters in the municipality of San Martín.

This stage becomes an exploration of the knowledge of students and teachers with their natural environment. Workshops are held on flora and fauna of the region, the water cycle, trophic chains, among others.

For the year 2017, and collecting the concerns of teachers, students and parents, environmental education focuses on the issue of food safety, based on key concepts such as: cleaner production, organic fertilizers, agroecology. In this way, it is possible to implement, with the students of the two educational centres, production proposals such as vermiculture, school garden, fish farming, composting and native tree species.



Figure 28. Compost in local schools

In 2018 and 2019, the focus of the program is directed to forest plantations, their functions, ecosystem, and social benefits, derived from reforestation. The content of the program includes a contextualization of forest plantations, highlighting the protection of areas with ecosystem importance at the regional level (courses and bodies of water, morichales and native forest) and fauna, taking El Porvenir as a specific case, where the regulations apply. current environment for the protection and conservation of natural elements.

It also exposes the multiple objectives of forest plantations in which the obtaining of timber and non-timber forest products, carbon reservoirs, protection of the soil devoid of vegetation and allow the development of native fauna are framed. Added to the above are forest fire protection and erosion control programs that include the establishment of conservation works on the property. The members of the Campo Forestal team actively participate by sharing their knowledge from their experience that exemplifies what was seen in the environmental education sessions. A total of 164 students are included in the environmental education program.



Figure 29. Environmental Education Program in Schools



Figure 30. Environmental Education Program in Schools

Worker's rights

As it has been demonstrated before, the worker's rights are secured by Cumare at all times. This is a key element in the project development as it is also part of the FSC principles. The workers are permanently trained in several aspects and labour rights is one of the topics. Every year, a consultant firm is hired to qualify Cumare's contractors in this regard. Information on the annual reports are delivered to the VVB.

Reforestadora Cumare, committed to generate positive social impact on contractors and its employees (stakeholders), since the beginning of the project and specifically during the years 2016 - 2020, contracted the law firm Godoy Córdoba to carry out monthly labor audits of its contractors in order to verify if its contractor complies with labor legislation. The scope of the labor audit and its analysis by Reforestadora Cumare includes: (i) monthly audit (ii) compliance report to Reforestadora Cumare (iii) labor/legal assistance from the law firm to contractors to comply with their obligations (iv) holding payments to contractors until they comply with their legal/labor obligations (v) termination of business

relationships with contractors that breaches labor obligations. Godoy Cordoba certifies performed audits executed between 2016- 2020. Auditing assessments for Cumare for the period 2017 to 2021 are submitted to VVB as part of the validation/verification process.

In relation to workers training and compliance with security, Reforestadora Cumare, through its operator Campo Forestal, deploys internal audits on field to promote continuous improvement of the (i) processes related to forestry activities, and (ii) the Occupational Health and Safety Management System. Campo Forestal executes an annual analysis to all the contratists to identify any potential risks arising from the way workers develop forestry activities and the way they use necessary equipment to stay safe. The audit reports performed from 2016 – 2020 are available for any consultancy.

2.3 Environmental Impact

Forest Protection - Forest Fire Protection Brigade.

The preventive fire protection activities, related to the dry season, begin with the planning and execution of firebreak lines in the perimeter of plantation areas and are executed in their entirety and interconnected to existing roads and natural barriers, they are considered protected areas or barracks.

They do not obey exact areas of division since natural barriers, roads, type of soil and state of the vegetation must be considered. In the sectors where this work could not be carried out mechanically, the firebreaks were anchored to natural barriers (moriches) that remained wet throughout the season.

The fire protection system operates in the driest months of the year, from December to March or April. It is led by the Operations Centre that fulfils the function of maintaining communication with the fire brigade, neighbours and work teams. The Operations Centre plans and directs the activities of the fire control brigade, which is made up of the brigade chief, crew chief, motorized security guard and brigade members.

For the 2019-2020 season, two observation points were implemented that allowed to see the entire perimeter of the property:

- A 45-meter-high structure with a camera that allows a constant 360° observation.
- A 20-meter-high structure that functions as an observation tower



Figure 31. Fire crew in REFORESTADORA CUMARE SAS

The work of the fire brigade and the Operations Centre is complemented by the prevention actions carried out by Campo Forestal personnel through constant communication with the neighbours, whose objective, in addition to maintaining good relations, is to be informed about of the burning execution plans or other risk activities that could lead to fire outbreaks. If necessary, the action of a reinforcement squad that will assist the fire protection squad is considered.

The level of occurrence of forest fires during the last 6 seasons is:

Table 9. Occurrence of fires

OCCURRENCE OF FIRES							
TYPE	2015 - 2016	2016 - 2017	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	TOTAL
SMOKE	252	154	177	122	150	291	1,146
THREATS	3	12	12	6	1	8	42
OWN WITHOUT DAMAGE	3	1	5	6			15
OWN WITH DAMAGE	1			1	1		3

Erosion control program

The erosion control program includes the identification, geo-referencing, categorization, monitoring, and maintenance of active points. Each of the stages consists of:

- Identification and geo-referencing: a tour of the total area of the El Porvenir property is made, including the main roads, slopes, quarries, etc., each point identified is georeferenced and included in a digital database that allows monitoring of evolution.
- Categorization and cartography: erosion points were classified according to their origin; there are then the following categories: Sewers, landslides, roads, and quarries. Culverts and roads are associated with built roads, while landslides are associated with steep slopes and quarries. Erosion points already categorized are included in the general mapping.
- Monitoring and maintenance: conservation works are proposed according to the type of erosion that occurs, mechanical and manual controls are used and / or the installation of a work that allows erosion control. This is complemented with the establishment of some type of vegetation, as a definitive solution.
- For cases of landslides on slopes with high slopes, wooden carvings are used. If there are bare slopes, grass is sown so that a permanent vegetation layer is established.
- The culverts are located on the roads at points of constant water passage that affect the condition of the road they are reinforced with bags filled with soil to protect the pipeline.
- Energy dissipators are installed in cases where the passage of water can form grooves.
- Tree planting is carried out in areas without vegetation; the gullies include plantation of native species.



Figure 32. Erosion control program in REFORESTADORA CUMARE SAS

Natural Environment

In 2015, a characterization of the natural environments and a study of the flora present in the El Porvenir property was carried out;



Figure 33. Savannah in REFORESTADORA CUMARE SAS



Figure 34. Riparo forest and a morichal

Protected flora

In 2015, a flora survey was carried out in El Porvenir with the aim of determining the status of the natural patches and identifying species under some category of threat at the national and international level, which are now classified as protected species within the project. The species of interest identified in El Porvenir are listed below:

Table 10. Native species in REFORESTADORA CUMARE SAS farm

Species	Common name	Category
<i>Aniba perutilis</i>	Comino cresco	Citric
<i>Clitoria hermannii</i>	Generalá	Endémic
<i>Guatteria cestrifolia</i>	Palancabueno	Endemic
<i>Cyathea sp.</i>	Helecho macho	Veda
<i>Ananas ananasoides</i>	Piña de Danta	Veda

As part of the Endangered Species Protection Strategy, field personnel were trained to identify protected species, which was complemented with an identification card that they use in the execution of operations. If the presence of any of these species is determined in new sectors, the cartographic base will be included and updated.

The endangered species protection strategy, where the identification card is the tool used to achieve their monitoring, contributes to the organization participating actively in the conservation of the protected native flora.

Permanent Plots in Native Forest

The El Porvenir property has patches of natural forest that fulfil important ecological functions. It is very important to remark that they are not part of the project area. In addition to containing typical ecosystems of the Orinocense region, the Morichales. Based on the characterization of the natural environments, permanent monitoring plots –PPM- were installed in 2016 in areas with gallery forest cover, with the following objectives:

- (1) PPM Comino Crespo: Monitor the status and evolution of the *Aniba perutilis* species: Cumin Crespo under the category of critical danger.
- (2) PPM Natural Forest: Evaluate the influence of the establishment of a eucalyptus plantation in the vicinity of a mature natural forest.
- (3) PPM Morichal: Monitor regeneration and recovery of morichal after a fire disturbance in summer 2015.

The establishment of PPM and line were carried out at the end of 2016. An annual visual monitoring was proposed to observe the most evident changes in the coverage, the measurement of the dasometric variables will be carried out every four years since the plots are in forest areas mature, so its growth is low and does not show significant changes in a year.

PPM Comino Crespo: The forest cover is maintained, it has a normal development without any type of natural or anthropic disturbance, the individual of *Aniba perutilis* is in good phytosanitary condition (Image 1.)

PPM Natural Forest: The plot does not present changes due to interventions, so its original coverage is preserved in a good state of conservation. Mature individuals, although inclined, are in good phytosanitary condition

PPM Morichal: the ecosystem presents a state of secondary succession, the burned moriches have new leaves, in the understory appear shoots of *Mauritia flexuosa* (moriche), of heliophilic and grass species that show the recovery after the disturbance

In 2018, three PPMs were installed whose objectives follow the line of observation and conservation. Specific areas were chosen, where there is a specific interest in the morichal and the identification of species in a special state of conservation such as *Aniba perutilis*, in critical condition.

1. **PPM in Morichal Quemado:** observe the recovery of the ecosystem that suffered disturbance by fire in February 2018. Due to the disturbance by fire, there was a loss of coverage of shoots of primary species and had a significant impact on the individuals of *Mauritia flexuosa* that presented a mortality of 35% with 19 individuals.

2. **PPM in Morichal No Quemado:** area whose floristic composition, without disturbances, will allow to compare the degree of recovery of the previous plot. This plot was characterized by presenting a good state of conservation, it did not show any interventions or disturbances.

3. **PPM of Comino crespo:** plot that includes the second location on the El Porvenir property of the individual of the crespo cumin (*Aniba perutilis*) in a critical state of threat, it aims to observe the individual and, therefore, its conservation in this area. It corresponds to a gallery forest that presents species of the ecological union of partial sciophytes that are indicators of the degree of maturity of the forest.

Visual monitoring 2019: according to the established monitoring frequency, in 2019 a visual monitoring was carried out that included the review of PPM areas. There were no obvious changes in the curly cumin plots and the unburned morichal plot, while in the burned morichal plot the recovery of the area is partial: there are no longer areas of soil without vegetation and there is a presence of regeneration of *Mauritia flexuosa*. Due to the high mortality of mature moriche palms in the fire, several fallen trunks were found that formed clearings of considerable size.



Figure 35. Permanent Plots in Native Forest

Wildlife monitoring

Since 2015, a wildlife sighting registry has been implemented that includes the frequency and location of the sighting, these reports are updated by the Operations Centre.

By the end of 2020, a record is kept of 431 sightings and 35 species of fauna, which include mammals, reptiles (14 identified species) and birds in the project area. In addition, species such as puma, jaguar, palm bear and tapir have been reported on few occasions.

In the sightings of the 2015-2020 period, the Saino with 34.4% and the Cajuche with 20.5% correspond to the most identified species, influenced mainly by the habit of living and moving in numerous communities. In second place comes the deer with 17.6% who, thanks to the union between plantation covers and the natural forest, go out to look for food. However, for the last year 2020, the deer occupies the first place with 30% and the Cajuche with 25% of the sightings.

46% of the reports received correspond to fauna associated with areas covered by Savannah, followed by plantations with 34% and then camping with 12% where deer are frequently sighted.



Figure 36. REFORESTADORA CUMARE SAS ´s wildlife

Water births

Given the extension of the heritage, an annual inspection of the area that will be planted the following year is carried out for the identification and georeferencing of new springs. To date, in the El Porvenir property, 11 water sources have been identified, duly mapped, where a 100-meter buffer has been

delimited in which any type of intervention is limited, and whose objective is the conservation and protection of water and the associated natural forest.

The points are distributed in 7 sectors of the property, predominating the springs where the water emerges horizontally at various points - hillside and diffuse springs. Associated with the springs, there is a large amount of vegetation that ensures a flow of water is maintained until reaching larger courses; morichales, for example, are indicators of water sources



Figure 37. Water birth

Offset plantations

The protective forest area comprised within a radius of 100 meters in a radius from the periphery of two (2) water sources was selected. The area was reforested with the native Yopo species (*Anadenanthera peregrina* (L.) Speg.). A total of 2,500 individuals from Yopo, covering a total area of 2.3 hectares.



Figure 38. Offset plantations

2.4 Public Comments

During the period from June 4 of 2021 to July 4 of 2021, a public consultation was carried out in Verra (<https://verra.org/>) where the following comments were received:

1. Does this project have all of the needed funding to be completed? Would this project be interested in an investor?
2. Summary expected capture maximum is different from estimated net GHG Emission Reductions and Removals. Table 10 has an error after year 2024 in Net GHG emission reductions or removals. VCUs eligible for issuance are not conservatively rounded down.

According with the public comments, for the first question related to the financial support, currently REFORESTADORA CUMARE SAS has the totality of financial resources to develop the project until the final step. However, REFORESTADORA CUMARE SAS doesn't discard the possibility to expand the project with investment of different stakeholders.

There is a financial analysis file for the document which was submitted to VVB as part of the validation and verification process. It accurately represents the project activities, and it clarifies different things. E.g. the total cash out is covered is a different thing than having an interesting project from the financial point of view. As it can be seen in that document, the project has already disbursed in 2021 93% of total cash out (land purchase and plantation cost) which is a demonstration that almost 100% of the project cash out has been covered with financial resources. Another thing is that the project has an IRR of circa 2%, which means that the project is not profitable at the moment of doing the investment. However, the project developer could be seeing the project as the starting point of a forestry sector development, where the timber could have a different value in a mid-term scenario.

In relation to the second comment received, the Monitoring Report and carbon calculations (Excel sheet) has been amended to maintain consistency.

2.5 AFOLU-Specific Safeguards

Social and environmental monitoring is performed every year and the results is made public to any stakeholder willing to comment it. This document includes information such as "natural negative effects", "erosion control program", "flora and fauna modifications", "forest operations monitoring" and "relationship with communities", among other topics. The public summary of the social and environmental monitoring is delivered to the VVB in the process of the validation and verification process.

Campo Forestal has identified local stakeholders with a diagnosis of the sociopolitical conditions in the project region in 2014 ("Diagnóstico del entorno sociopolítico y estrategia de relacionamiento para el proyecto Campo Forestal", delivered to VVB).

As a result, a list of stakeholders has been created, to maintain permanent communication with them. Afterwards, a social strategy was developed every year since 2015 in which it is established the responsibilities, strategic plan, communication plan, conflict resolution procedure, etc (see section 1.17.3 for more information). The following table is a list of key stakeholders to the project.

Table 11. List of stakeholders (institutions).

Institution	Departament	Relation to the project

Gobernación del Meta	Gobernador del Meta	Recognition of the project
	Secretaria de Planeación	Recognition of the project
	Secretaria de medio ambiente y recursos minero energéticos	Recognition of the project
Alcaldía (Puerto López - Meta)	Alcalde	Recognition of the project
	Secretaria de Despacho	Recognition of the project
	Secretaria de Gobierno	Recognition of the project
	Secretaría de Ambiente y Desarrollo Rural	Recognition of the project
Ejército Nacional	Comandante de la Séptima Brigada	Recognition of the project and monitoring security conditions
	Comandante de la IV División	Recognition of the project and monitoring security conditions
Bomberos de Puerto López	Jefe de Bomberos	Attend fires per request and issuances of certificates
Policia Nacional	Comandante de Distrito	Recognition of the project and monitoring security conditions
	Comandante de Estación	Recognition of the project and monitoring security conditions
Hospital Puerto López	Gerente Hospital	Use per request
Cormacarena	Grupo de Suelos - Coordinación de ocupación de Cauce	Permits
	Directora General	Recognition of the project
	Asesor de la dirección	Recognition of the project
	Subdirector de Gestión Ambiental	Recognition of the project
Puerto Gaitán, Meta	Alcalde	Recognition of the project
	Secretario de Planeación	Recognition of the project and issuance of cer
Universidad Distrital	Coordinadora Proyecto Curricular	Technical studies and analysis
	Docente	Technical studies and analysis
San Martín, Meta	Alcalde	Recognition of the project
	Secretaria de despacho	Recognition of the project
	Secretario de Planeación	Recognition of the project

Ministerio de Ambiente y Desarrollo Sostenible	Director Técnico de Ordenamiento Territorial y Coordinación del Sistema Ambiental – SINA	Recognition of the project
Parques Naturales	Directora	Recognition of the project
	Oficina Asesora Planeación	Recognition of the project
	Subdirectora de Gestión y Manejo de Áreas Protegidas	Recognition of the project and technical studies
Asorinoquia		
	Directora Ejecutiva	Recognition of the project and work on common affairs to the region
ONG Yoluka	Fundador	Technical studies
WWF Colombia		Recognition of the project
REFORESTADORA DEL ORIENTE SAS	Ingeniero Forestal	Silviculture contractor
REFORESTADORA DE LA COSTA SA	Director estructuracion de Negocios	Silviculture contractor
	Gerente Zona Villanueva	Silviculture contractor
SERVIFORESTALES LAVERDE	Ingeniera Forestal	Silviculture contractor
YARA ABOCOL COLOMBIA	Comercial	Fertilizers and pesticides commercialization
LLANOGRAL SAS	Comercial	Fertilizers and pesticides commercialization
CALES RIO CLARO NARANJO Sen C	Comercial	Fertilizers and pesticides commercialization
SEGURIDAD SELECTA	Socio Gerente	Security services
INVERSIONES MFP	Socio Operador	Roads contractor
LOS KIOSKOS	Socia Operadora	Catering contractor
		Catering contractor
SERPENTARIO NACIONAL	Socio	Contractor serpent management

Table 12. List of stakeholders (neighbours)

Institución	Departamento	Relation to the project
Finca Chiguagua	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca La Isabela	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca La Isabela	Encargado	Neighbour, community relation to improve roads and to prevent and control fires
Finca Las Vegas	Encargado	Neighbour, community relation to improve roads and to prevent and control fires
Finca Las Vegas	Dueño	Neighbour, community relation to improve roads and to prevent and control fires

Finca La Morena	Encargado	Neighbour, community relation to improve roads and to prevent and control fires
Finca La Morena	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca La Giralda	Encargado	Neighbour, community relation to improve roads and to prevent and control fires
Finca La Giralda	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca Las Divisas	Encargado	Neighbour, community relation to improve roads and to prevent and control fires
Finca Las Divisas	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca El Capricho	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca La Ponderosa	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca El Caribe	Encargado	Neighbour, community relation to improve roads and to prevent and control fires
Finca El Caribe	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca Cuerno de toro	Encargado	Neighbour, community relation to improve roads and to prevent and control fires
Finca Cuerno de toro	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca San Javier	Encargado	Neighbour, community relation to improve roads and to prevent and control fires
Finca San Javier	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca Tamanaco	Encargado	Neighbour, community relation to improve roads and to prevent and control fires
Finca Tamanaco	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca Juan de a pie	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca Juan de a pie	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca Los Alpes	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca Loma linda	Encargado	Neighbour, community relation to improve roads and to prevent and control fires
Finca Loma linda	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca Extremadura	Dueño	Neighbour, community relation to improve roads and to prevent and control fires
Finca Extremadura	Encargado	Neighbour, community relation to improve roads and to prevent and control fires

The stakeholder identification process does also help to understand that this AFOLU project has no impact on local stakeholders, given that the project areas are located apart from local stakeholders (Figure 23. Project location map). Local stakeholders (communities living close to the project site), as seen in the Non-Permanence Risk Report, are not reliant on the project area, neither depend on nor derive livelihoods from the forestry project.

As it was shown in Figure 23. Project location map, there are neighbours identified as part of the communication and consultation program with stakeholders. Despite there is not an exact grievance redress procedure, any concern or conflicts arising between the communities and REFORESTADORA CUMARE SAS is very well managed.

However, despite the nature of the project (private property, absence of third parties with land rights), limited stakeholders, a local stakeholder identification process has been elaborated (Stakeholder_List_Campo Forestal_2021.xlsx). In the previous sections of the “Safeguard” chapter, it has been shown the communication process to ensure ongoing dialogue with communities and stakeholders. There is a track record of all the complaints in a matrix called “Registro Comunicaciones - Campo Forestal.xlsx”. Communication management and neighbors complaints procedure is explained in section 2.2 and 1.17.3 of the PD.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The consolidated CDM methodology AR-ACM0003 “Afforestation and reforestation of lands except wetlands” (version 02.0) was applied. This methodology is applicable to large scale afforestation and reforestation projects, as per the CDM scale definition.

The following methodological tools, to which the selected methodology refers to, are used:

- Version 01 of “Combined tool to identify the baseline scenario and demonstrate the additionality in A/R CDM project activities”.
- Version 04.0.0 of “Estimation of non-CO2 GHG emissions from burning of biomass attributable to a CDM A/R project activity”.
- Version 02.0 of “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”.
- Version 01.1.0 of “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities”.
- Version 02.1.0 of “Calculation of the number of sample plots for measurements within A/R CDM project activities”.
- Version 04.2 of “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activity”
- Version 03.1 of “Estimation of carbon stocks and change in carbon stocks in deadwood and litter in A/R CDM project activity”
- Version 01. 1 “Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities”

3.2 Applicability of Methodology

Applicability of methodology

(a) The land subject to the project activity does not fall in wetland category

According to the information found at national level, in the Colombian Environmental Information System (SIAC), there is no presence of large-scale wetlands in the current project area. The officially registered ecosystem maps can be consulted in its website: <http://sig.anla.gov.co:8083/>. In addition, a review of the local study “Identification and preliminary characterization of wetland-type slow ecosystems located in the municipality of Puerto López, Meta” was done. The ecosystems identified can be seen in the Environmental Information Viewer for the department of Meta (VIAM, <https://cormacarena.maps.arcgis.com>). According to this study, there are no wetlands within the project boundaries.

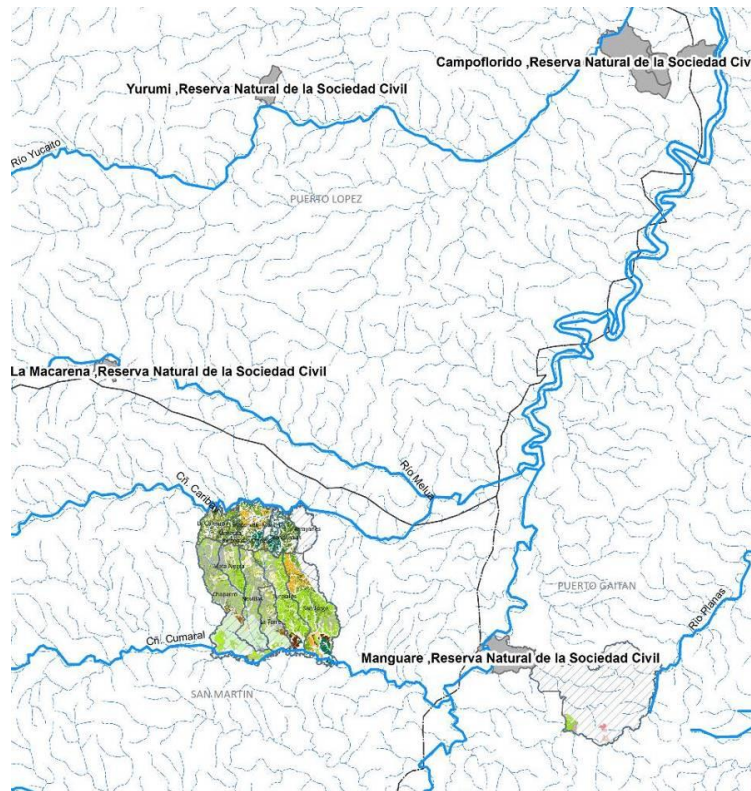


Figure 39. Wetlands in the municipality of San Martín

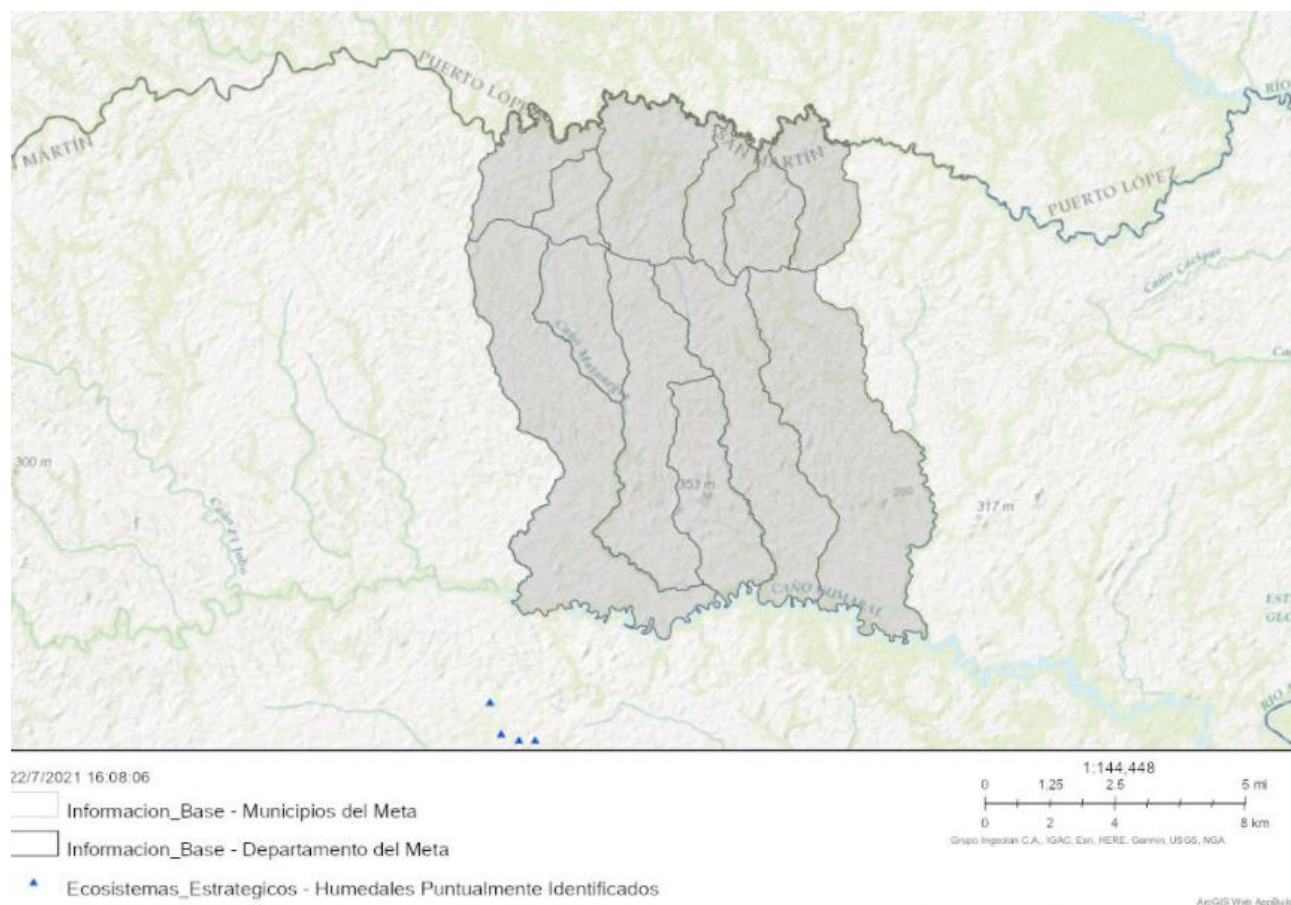


Figure 40. Wetlands near the El Porvenir property

(b) Soil disturbance attributable to the project activity does not cover more than 10 per cent of area in each of the following types of land, when these lands are included within the project boundary:

(i) Land containing organic soils.

According to IPCC definition, soils are organic if they satisfy the requirements 1 and 2, or 1 and 3 below (FAO, 1998):

1. Thickness of 10 cm or more. A horizon less than 20 cm thick must have 12 percent or more organic carbon when mixed to a depth of 20 cm.
2. If the soil is never saturated with water for more than a few days and contains more than 20 percent (by weight) organic carbon (about 35 percent organic matter).
3. If the soil is subject to water saturation episodes and has either:
 - (i) At least 12 percent (by weight) organic carbon (about 20 percent organic matter) if it has no clay; or (ii) At least 18 percent (by weight) organic carbon (about 30 percent organic matter) if it has 60 percent or more clay; or (iii) An intermediate, proportional amount of organic carbon for intermediate amounts of clay.

The areas of land to which the tool is applied do not contain organic soils

Most of the soils identified in the soil study at the El Porvenir correspond to the order of Oxisol soils. These are soils rich in iron and aluminum sesquioxides with a predominance of 1: 1 type clays. They are weathered and low fertility soils. They have an acidic pH and low moisture retention. None of the soils in the different Soil Cartographic Units correspond to the characteristics of organic soil:

Requirement 1: none of the soils present in each soil unit has 12% or more organic carbon. Forest plantations in the El Porvenir are on high areas, and the soils present in them do not have a high percentage of organic matter (2.5% general average).

For more information see the report “Informe Técnico Suelo El Porvenir”.

(ii) Land which, in the baseline, is subjected to land-use and management practices and receives inputs listed in appendices 1 and 2 to this methodology.

According to the baseline scenario the project previous land use was grassland (management practices listed in appendix 2 apply). The project will be implemented on degraded lands which are expected to remain in a degraded state in the absence of the project. Extensive grazing activity have made the soil lost the original vegetation and a fraction of the soil organic matter, an essential component determining land productivity, leading to constraints to productivity.

The change in vegetation due to grazing reduced the turnover of plant residues and, consequently the organic matter content of the soil, thus leading to a more degraded state of soils.

A project activity applying this methodology shall also comply with the applicability conditions of the tools contained within the methodology and applied by the project activity.

Applicability conditions from tool Soil Organic Carbon “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities”, EB60.

This tool is applicable when the areas of land, the baseline scenario, and the project activity meet the following conditions:

(a) The areas of land to which this tool is applied:

(i) Do not fall into wetland category.

Methodology condition (see applicability of methodology above).

(ii) Do not contain organic soils as defined in Annex A: glossary of the IPCC GPG LULUCF 2003.

Methodology condition (see applicability of methodology above).

(iii) Are not subject to any of the land management practices and application of inputs as listed in the Tables 1 and 2

The areas applied are not subject to any of the land management practices and application of inputs listed in Tables 1 and 2 of the tools. Since the land use prior to project start is grassland, only Table 2 applies. For the tropical wet climate region corresponding to the project activity, none of the three combinations included in Table 2 are applicable, as is demonstrated in 3.4 baseline scenario.

(b) The A/R CDM project activity meets the following conditions:

(i) Litter remains on site and is not removed in the A/R CDM project activity, and

Litter will not be removed from the project site. Litter removal is not part of the list of project activities established in the document “Operative Procedures Manual”.

(ii) Soil disturbance attributable to the A/R CDM project activity, if any, is:

- In accordance with appropriate soil conservation practices, e.g. follows the land contours.
- Limited to soil disturbance for site preparation before planting and such disturbance is not repeated in less than twenty years.

1. Tillage is done in accordance with applicability conditions for accounting soil organic carbon.

Description of site preparation activities:

2. Subsoiling is carried out with a tractor and a single point subsoiler, with the aim of breaking the compaction of the soil. The subsoiler must pass a minimum depth of 50 cm. Subsoiling is done every 3.50 meters looking for the level curve, up to where the slope allows safe work. Operation is stopped with excess moisture in the soil, when the subsoiler cuts and the soil does not break upwards on the surface.
3. Secondary tillage using a disc harrow in order to loosen the thick clods. The implement must loosen the ground over a width of 1.50 meters, passing the tractor just above the subsoil line.
4. Final tillage with discs, only in the sectors that are necessary, in order to break large clods. The working width will be 1.50 m.

Environmental measures:

- 1) Operator must know the area to work and not enter the machine in buffer zones, protection zones, native forest, water courses, etc. To avoid this, it will make a first subsoiling pass marking the buffer widths (30 meters to water courses and 100 meters to water springs), and then work within the planting area.
- 2) In those sectors where there is native forest and exceeds 30 meters towards the watercourse, the subsoiling will be made at least 5 meters from the native forest.
- 3) The subsoiling will be done by cutting the natural slope, on a level curve. Avoid working on a grade curve on steep slopes where there is risk of overturning. Those areas required to be enabled with an excavator.

Soil disturbance is in accordance with appropriate conservation practices, limited to site preparation and not repeated within 20 years.

Applicability conditions from tool “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities” (EB 35).

The tool is applicable under the following conditions:

- Forestation of the land within the proposed project boundary performed with or without being registered as the A/R CDM project activity shall not lead to violation of any applicable law even if the law is not enforced.

The forest activity by REFORESTADORA CUMARE SAS is permitted by the Ministry and has the approval from it to perform the activity. There is a registry from ICA (annex 3) confirming this.

- This tool is not applicable to small - scale afforestation and reforestation project activities

The project is not a small-scale project.

Applicability conditions from tool “Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity” (EB 65)

- The tool is applicable to all occurrence of fire within the project boundary.

The project will consider any occurrence of fire within the project boundary.

- Non-CO₂ GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area greater than the minimum threshold area reported by the host Party for the purpose of defining forest, provided that the accumulated area affected by such fires in a given year is ≥5% of the project area.

This will also be considered in the project.

Applicability conditions from tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity” (AR_TOOL 15).

- This tool is not applicable if the displacement of agricultural activities is expected to cause, directly or indirectly, any drainage of wetlands or peat lands.

The project activity will not cause any displacement of activities, as it is demonstrated in chapter 4.3.

On the other hand, there are no applicability conditions for the following tools included in the methodology:

- Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities
- Calculation of the number of sample plots for measurements within A/R CDM project activities.
- Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities

3.3 Project Boundary

Five carbon pools are selected in the baseline scenario and project: above-ground and below-ground biomass, dead wood, litter, and soil organic carbon. Harvested wood products were not selected because it is not eligible under the selected methodology. Above-ground and below-ground biomass must be selected according to the methodology. All other carbon pools are optional, and they are also selected because they are expected to increase by the implementation of the proposed project activity. It is very clear in the case of dead wood and litter since these pools do not exist in the pre-project situation and will appear under forest. In the case of soil organic carbon, the situation is more complex. Even though soils are degraded, there still may be a mild, transient reduction in soil organic carbon if site preparation (e.g., tillage). However, the establishment of forest is expected to cause an increase in net primary productivity and, therefore, in the turnover of plant residues into the soil. This would lead to a long-term increase in the soil organic carbon pool.

Table 13. Project boundaries

Source		Gas	Included?	Justification/Explanation
Project	Above and below	CO ₂	Yes	Carbon stocks in tree biomass is the main carbon pool affected by project activity. It is

Source	Gas	Included?	Justification/Explanation
ground biomass			considered in the baseline scenario and project activity.
Dead wood, litter and SOC	CO ₂	Yes	Carbon stocks in the other three forest carbon reservoirs are expected to increase due to project activities. It is considered in the baseline scenario and project activity.
Burning of woody biomass	CO ₂	Yes	Burning of woody biomass for site preparation is not part of forest management. Despite there were not forest fires since the beginning of the project, the occurrence of such event would be accounted indirectly as a change in the carbon stock. It is considered in the baseline scenario and project activity.
	CH ₄ N ₂ O	No	Burning of woody biomass for site preparation is not part of forest management. Forest fires are considered under applicability conditions of the tool “Estimation of non-CO ₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity” (Version 04.0.0). Neither it is considered in the baseline scenario nor in the project activity.
Harvested wood products	CO ₂	No	This carbon pool is not eligible under selected methodology.
Combustion in fossil fuel in vehicles and machinery	CO ₂ CH ₄ N ₂ O	No	Potential emissions are negligibly small and are not included as a source of GHG emissions
Nitrogen based fertilizers	N ₂ O	No	Potential emissions are negligibly small and are not included as a source of GHG emissions

Project boundaries include all the areas of ‘Campo Forestal’ that have been and will be afforested. These areas have been defined based on the criteria discussed below.

Forest area effectively planted is delineated using GPS technology and aerial photographs. Project boundaries are organized in GIS-format polygons. Polygons that contain planted areas or areas to be planted are grouped by property. The polygons of El Porvenir property comprise the total land area which constitutes the project boundaries.

Forest area effectively planted in El Porvenir is delineated according to the following criteria:

- Site aptitude for tree species to be planted: areas with a good and medium suitability for Eucalyptus/Pinus trees are included.
- Biological richness and diversity value: buffer zones and fauna corridors such as native forest alongside rivers is excluded from project project area
- Firebreaks: a network of 152-km, 5 to 10 m wide that exists and is annually maintained in order to keep it free of weeds during the wildfire season and separate forest blocks. These areas are not included in the project boundaries. Additionally, a strip 5 or more meters wide is cleaned, reducing the residues of dry vegetation under the canopy of the plantations located in priority areas.
- Infrastructure needs: areas needed for infrastructure (e.g., areas needed for roads, cattle fences, buildings, stocking of harvested wood, and other) were excluded from the project area.

No visible landmarks have been established on the field. Map with project boundaries of the property is shown in Figure 37.

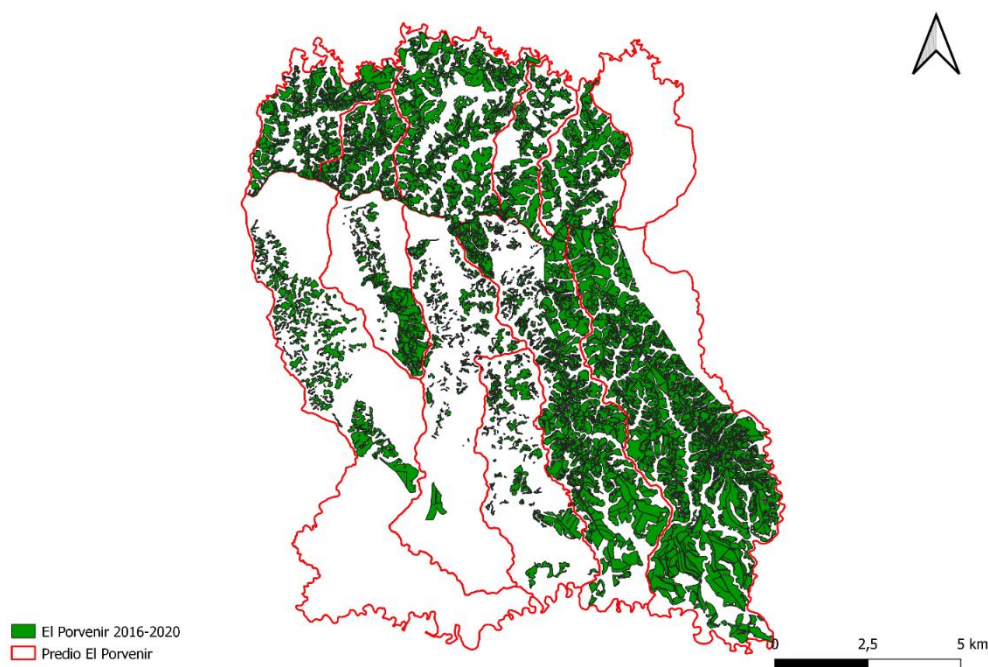


Figure 41. Project boundaries in “El Porvenir” farm in green (carbon accounting area). The red contour is the property limit.

The area included within project boundaries comply with the scope of the methodology, therefore there is no land that falls into the category of wetland. Also, complies with methodology applicability conditions: there is no land containing organic soils, neither land which is subjected to land-use and

management practices in the baseline that receives inputs as listed in appendix 2 of the methodology. For an increased transparency and better understanding of the project, the project proponent clarifies there are no other areas to report, such as leakage management areas, or reference areas.

3.4 Baseline Scenario

The baseline scenario and demonstration of additionality (see chapter 3.5) follows the “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (version 01)”. This tool is an indispensable part of the methodology applied: AR-ACM0003 (see chapter 3.1) which is applicable to large-scale projects.

This tool is applicable to the grouped project activity since afforestation of the land within the proposed project boundary do not lead to violation of any applicable law, even when laws are not enforced. REFORESTADORA CUMARE S.A.S activity is framed within the existing legislation and in a context of respect and harmony with the natural and social environment, as it is described in its FSC certification statement. Furthermore, REFORESTADORA CUMARE SAS project activity exceeds what is requested by law in benefit of social and environmental characteristics. This tool is not applicable to small-scale afforestation and reforestation project activities.

According to the tool, REFORESTADORA CUMARE S.A.S. shall apply the following five steps to identify the baseline scenario and demonstrate additionality:

- Step 0. Preliminary screening based on the starting date of the A/R project activity
- Step 1. Identification of alternative scenarios
- Step 2. Barrier analysis
- Step 3. Investment analysis (if needed) and
- Step 4. Common practice

The following section presents the description and justification of the procedure followed in relation to these steps.

Step 0. Preliminary screening based on the starting date of the A/R project activity

The grouped project start date is on 1st November 2016 when the first activities that lead to the generation of GHG removals were implemented in El Porvenir property.

This first activity began in the department of Meta, however the project is a grouped project allowing instances in the department of Meta and Vichada. Both departments are considered by the project developer as a single geographic area. Both departments have common soil characteristics, relief, climatic conditions, they share the same biological values (flora and fauna) and social indicators.

The project developer is willing to consider those departments as the area of influence of the grouped project. They have a common baseline condition and additionality analysis could be implemented for both departments indistinctly. Following, is presented the justification of the common baseline conditions and additionality.

The Orinoquia region is one of the 5 regions of Colombia which are classified by their natural characteristics: Andean region, Caribbean Region, Amazon region, Pacific region and Orinoquia Region⁸.

The main characteristics by which they are defined are relief, height above sea level, average rainfall and soil conditions. For example, the Andean region is mountainous while the Orinoquia region is flat. In the Pacific and Amazon regions there are prolonged periods of rain, while the Caribbean is drier. It is for all this that in Colombia it is not known what uniformity is and its natural regions are proof of this.

This document represents a collective project of the departments of Meta and Vichada, which belong to the Orinoquia region. The Orinoquia region is part of the Orinoco River basin, which flows into the coast of Venezuela. In this region of the Orinoquia in Colombia they begin to create rivers that will later give water to the Orinoco River.

This region has large plains, with livestock being the main agricultural production chain. 75% of the region corresponds to savannas, while the other 25% corresponds to natural forests.

The grouped project puts together the departments of Meta and Vichada since these are located in the high plains of the region, being known as non-flood plains. While the departments of Arauca and Casanare correspond to the low plains, that is, the flood plains of the Orinoquia region.

The altiplano refers to the height above sea level, in this case the departments of Meta and Vichada are at a higher altitude within the region, compared to the departments of Arauca and Casanare.

The non-flood plains bring many benefits for both livestock and forestry because, as there are no floods, it allows agricultural production chains not to have losses due to this climatic phenomenon. In addition, the planted species are sensitive to periodic flooding, so the forest plantations in the low-lying departments such as Arauca and Casanare, imply a high risk of loss of plantations.

Therefore, the departments of Meta and Vichada will be considered for the grouped project, since they are in the high areas of the Orinoquia region. They present better soil suitability for afforestation due to the fact that they present the same types of soils and do not present periodic floods. It can be said that they are similar departments in geographical, hydrographic, physiographic and ecogeographic conditions.

Therefore, the reference scenario and the additionality barriers for both Meta and Vichada are similar because the geographical conditions of both departments are similar both for type of soil, productive activities, among others.

Step 1. Identification of alternative scenarios

Sub-step 1a: Identify credible alternative land use scenarios to the proposed CDM project activity

Realistic and credible alternatives scenarios for the current land area, that would have occurred on the land within the proposed project boundary in the absence of the afforestation project activity under the VCS, are:

- Continuation of the pre-project activity: grazing' unmanaged grassland
- Forest plantation without being registered for carbon credits generation.

Livestock production with grazing of unmanaged grassland is the existing activity prior to the project implementation. This alternative is credible as it has been the historical activity performed in the project

⁸ As per "Caracterización Región de la Orinoquia". Universidad Nacional de Colombia (www.humanas.unal.edu.co/observapazyconflicto/files/4614/3144/5526/caracterizacion_de_la_orinoquia.pdf)

area. The soils in farms on this region are very poor and livestock production does not require large investments to make the cattle farmer survive precariously. Furthermore, the UPRA (Unidad de Planificación Rural Agropecuaria) from the Ministry of Agriculture has a user-friendly GIS web-based platform publicly available for any person in: <https://sipra.upra.gov.co/>. There is a set of layers that can be overlapped to the project boundaries and determine the aptitude for the land to different productive chains: cotton, banana, potato, avocado, rice, poultry, fisheries, cacao, onion, strawberry, among other many other productive chains. Despite the platform can indicate different aptitudes to different land uses, they are not credible or realistic. In conclusion, the project area is suitable to produce different grasses (*Bracharia decumbens*, *Cynodon nlemfuensis*, *Megathyrsus maximus*, *Bracharia humidicola*) which is the basis for cattle production.

Sub-step 1b. Consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations

All land use alternatives identified above comply with all mandatory regulations in the country. Livestock activity is commonly conducted in Colombia, and there is no law or regulation that prevents the realization of afforestation activities; thus, no alternatives are eliminated based on this criterion.

Outcome of step 1 is the list of plausible alternative land use scenarios to the A/R project activity that are in compliance with mandatory legislation and regulations taking into account their enforcement in the region or country (and EB decisions⁹) on national and/or sectoral policies and regulations. We can assure that all plausible alternative land use scenarios are in compliance.

The following steps (step 2 “Barrier analysis” to step 4 “Common practice”) are presented in the section additionality of this document.

3.5 Additionality

Additionality is demonstrated following the “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”, steps 2 “Barrier analysis” to step 4 “Common practice”, here described.

Step 2. Barrier analysis

This step is formed by two sub-steps: sub-step 2a. Identification of barriers that would prevent the implementation of at least one alternative land use scenarios and sub-step 2b. Elimination of land use scenarios that are prevented by the identified barriers. The correct approach is to elaborate 2a and then proceed with 2b, but for the purpose of simplifying the analysis during this pre-feasibility study, both sub-steps are conducted as one.

For the continuation of pre-project activity (grazing), no barriers are identified. This activity has been practiced for a long time and its continuation is not prevented by any barrier. The UPRA has established that the area of the grouped project has a medium to high aptitude for cattle raising activity, as it can be seen in previous figures.

Investment barriers. afforestation with fast-growing eucalyptus species for timber production is not economically proven to be feasible. Colombia has a potential to establish commercial forest plantation in circa 25 million of hectares (UPRA) - which represents 20% of the total area of the country-, however only 1.5% of that area has been planted.

⁹ Applicable only for CDM projects

The downstream timber revenues and carbon credits generation is still not economically attractive for investors and unattractive for creditors. The low level of economic activity in the commercial forestry sector is attributed to several factors, among them: low rates of return, a high number of intermediaries, long periods between cash disbursements, high concentration of costs in the first years of production, long wait for economic returns and difficulties in obtaining bank credits for these types of activities. Furthermore, there are no commercial bank lines of credit for long-term investments such as reforestation projects (Aldana, 2004), and banks perceive the investment risk for this type of project as very high due to the factors explained above (Montoya-Restrepo, Montoya-Restrepo, & Lowy-Ceron, 2015).

The competitiveness of forest sector is closely correlated with the quality of infrastructure and transport. The actual situation present constraints in terms of infrastructure, transport and logistics which constitute the bottlenecks for commercial plantations. Infrastructure is thus one of the factors that have disadvantaged the development of the country's forestry potential. On one hand, there is a tremendous lack of highways and railways in areas with forest resources, and on the other hand the nearby rivers are not, or not sufficiently navigable or they do not connect delivery points. This means that the project owner must invest also in infrastructure or in the maintenance of the existent roads to reach the plantations area and transport any equipment, materials, technology, and tools needed for the work. These adverse conditions represent an important barrier that must overcome by the project developer to guarantee the competitiveness in the national and international markets.

The Meta department lands are low aptitude for afforestation. In addition, there are very deteriorated roads to reach the farm.

This means that there are no investors for this type of project, and the only ones who dare to carry it out are speculators in the potential future timber business. Not just any investor develops projects of this type.

Market: As it has been said, the forest market in Colombia in general and in the departments of the project in particular, is not developed. The selling price of wood is not known at present, neither at the moment of harvesting. The price at which the wood will be sell is unknown. The market is at early stages, there are no delivery points in the area of influence of the plantations and the project developer do not have a selling contract of any kind. This proves to be a huge barrier for REFORESTADORA CUMARE SAS because the project output's market is not known.

Institutional barriers. This risk is associated to changes in government policies/law or lack of enforcement of land-use-related legislation.

Although UPRA has defined that around 20% of the country's soils are suitable for forestry, there is no public entity that specifically promotes activity in this sector.

Based on the report "Analysis of the legal and institutional framework and financial instruments for commercial forest plantations in Colombia" (Producto del programa "Colombia: Reforestación Comercial Potencial del Banco Mundial / PROFOR (P148233)¹⁰" there are several barriers and challenges in respect to the institutional framework in Colombia: Precariousness in the institutionality, especially at the level of development and operational competencies; lack of inter-institutional coordination; diversity of

¹⁰

<https://www.profor.info/sites/profor.info/files/An%C3%A1lisis%20del%20marco%20legal%20e%20institucional%20y%20de%20instrumentos%20financieros%20para%20plantaciones%20forestales%20con%20fines%20comerciales%20en%20Colombia.pdf>

interpretations in processes for the issuance of environmental permits related to the establishment and harvest of commercial forest plantations and lack of research on commercial forest plantations.

- Precariousness in the institutionality

Commercial foresters miss an institutional structure related to commercial forest plantations in Colombia in all its components [policy formulation, promotion, registration, sanitary control, research, import of seeds, etc.] and coordinate the articulation with the other entities. They mention as other limitations for a successful development the lack of public representation of their interests before other sectors, especially the environmental one, and the lack of positioning of the activity on the government's agenda.

The different actors in the surveys and interviews carried out by the consulting team also expressed their dissatisfaction with the lack of resources and the insufficiency in numerical terms of the ICA staff to attend to their operational skills in forestry, especially at the regional level. It is also questioned that the staff lacks continuity and, in some cases, technical knowledge. All the above translates into a weakness in the fulfillment of delegated functions and even phytosanitary control, typical of the missionary purpose of the ICA.

Likewise, other procedures necessary to strengthen the sector, such as the case of the importation of seeds, led by another ICA unit, have shown delays due to the lack of technical knowledge regarding the needs of the sector, which prevent an efficient management of forestry projects. These procedures are of special importance for companies that in their business plan have foreseen the cultivation of species that have not been sown before in Colombia.

- Lack of inter-institutional coordination

The lack of coordination between the ICA and the environmental authorities creates gaps in legal competencies that make it difficult and, in some cases, prevent the harvest or use of standing forest plantations with acquired rights. Especially regarding the cases mentioned that somehow combine environmental and agricultural elements, there are no guidelines to guide the management of the individual. All this implies wasted time and resources, as well as serious uncertainties. Similarly, for sudden changes in land use there are no alternatives.

On the other hand, the lack of coordination between the environmental authorities and the Highway Police facilitates that the theft of wood in property duly registered with commercial forest plantations continues to occur, that the complaint and immediate response by reforesters are discouraged and that losses are generated in the plantations or even effects on the natural forest that could well be avoided with an articulated management.

- Environmental permits

The diversity of interpretations in processes for the issuance of environmental permits related to the establishment and harvest of commercial forest plantations makes it impossible to clearly determine what is required to implement a large-scale cultivation or even to have the certainty of being able to commercialize plantation products, since in many cases their extraction depends on obtaining an environmental permit that may or may not be granted by the environmental authority. Depending on the region, the requirements and considerations for the environmental permitting process vary.

Planning a commercial reforestation business is difficult when there is no certainty about the duration of the environmental procedures related to the reforestation activity. The duration of this type of procedure may even mean the loss of an investment in the event that the harvest is ready for commercialization, but

there is no legal support to carry out the works that are required for the extraction of the products from the area where they were planted.

- Lack of research on commercial forest plantations

This is explained in the following paragraphs.

Technological barriers. Since commercial forest plantations have not been given great importance in the formal agricultural economy of the country, advances in technology packages and research have been developed mainly by medium and large-scale reforestation companies. This means that the adapted new technology has not been developed by public institutions and are not freely available. REFORESTADORA CUMARE SAS is an incipient small forestry company that has not yet developed its own technology.

For example, lack of access to necessary materials is a fact in Colombian forestry sector. Planting materials are scares as well as forest equipment in general terms. In the implementation of plantations are difficulties related to the access of seedlings and seeds of species of interest to the project. This difficulty lies in the very reduced use of these species due to very low afforestation area in the country, also due to the lack of knowledge on phenology (production of flowers fruits and seeds), nursery production, planting techniques and silvicultural management in general. REFORESTADORA CUMARE SAS, with the advice of Nuno Borralho, decided to import the seedlings from Brazil, since this country is more advanced in technology to produce this material.

As it is stated in “Analysis of the legal and institutional framework and financial instruments for commercial forest plantations in Colombia”, these adverse conditions represent an important barrier that must overcome the technical team to guarantee the competitiveness in the national and international markets. The lack of innovation as the axis for a sustainable growth of the sector, has not allowed to reduce costs and compete in international markets with more sophisticated products. In the same way, in the absence of research, which allows incorporating technologies with the latest state of the art, which improve production practices, it is feasible that forest production systems do not adjust to the restrictions of the environment and that they are not implemented. technologies that better support crops, considering the biophysical characteristics or agroclimatic relationships of certain areas or cultivated species and the particular phytosanitary risks. These risks are more complex in view of the possible dispersal that pests associated with poor crop management may have.

It has not been determined what type of research and technological packages the country has and which ones it needed, neither the State nor by the joint entities in charge of the investigation or by the private sector.

Local tradition. There is no sufficient local tradition to implement and manage highly productive exotic species for timber production. Initial and current technical support comes from Cambium Chile, which is Campo Forestal's partner. Support in operations was in the beginning by personnel from Cambium - Uruguay and from Cambium Chile. Additionally, external advisers from Brazil, the United States and Chile have participated. Some of the activities were:

- Cambium Uruguay staff (Martín Sosa-Dias) supported plantations operations.
- Some planting material was bought with an agreement with Smurfit Kappa (200,000 plants) of Eucalyptus.
- REFORESTADORA CUMARE SAS also signed an agreement with the laboratory SBW located at Sao Paulo, Brazil. The laboratory multiplied *Eucalyptus urograndis* and *Eucalyptus urophylla* selected clones.

- The nutrition expert Lafayette Campelo, from Brazil, prescribed the liming and fertilization schemes for 2014.
- The expert in fire protection - Jorge del Pedregal - who advises Cambium in Chile, Uruguay, and Brazil, visited REFORESTADORA CUMARE SAS farm in April 2014 to complete the diagnosis and the protection plan. The plan was implemented during the second half of 2014, including the construction of a look-out tower for fire detection and support of communications.
- A social management program that engages all employees and contractors of REFORESTADORA CUMARE SAS is established during 2014, and includes actions related to neighbours and closest towns. This plan was formulated by Germán Schaub based on the experience gained in Chile, Uruguay, and Guatemala with such kind of programs.
- An environmental management system was established taking advantage of Cambium's experience in this matter. This system and the social management program were the basis to achieve the FSC certification in 2016.
- Among many other activities that needed to be consulted, hired, or directly bought in countries with a larger forest experience.

REFORESTADORA CUMARE SAS has reduced local labor force because the inhabitants of the nearby towns are used to work for the country's oil industries. These oil industries usually offer contracts for limited time, high salaries (higher than those that REFORESTADORA CUMARE SAS can offer) and have low physical demand compared to forestry. This is a demonstration of the lack of local tradition. The workers have special working arrangements, sometimes working for several days in a row (25 days) and leaving the site for the rest of the month (5 days). This also increases the cost of hiring workers.

Among landowners there is a strong resistance to change: they are not open to integrating new methods or developing new activities. In different interviews that Campo Forestal had with project members and stakeholders, they have said that forestry projects at the scale of REFORESTADORA CUMARE SAS project, could only be carried out by private companies, because the initial investment cost is very high, and the recovery time is large.

In Meta department there is no tradition of forestry activities. The few communities nearby the project area do not have experience in afforestation. Their economic activity is based primarily subsistence farming. There is no local supply of labor with experience in forestry, so training is a needed activity for every employee, and skilled labor must be paid a higher wage to move from other regions of the country to this remote region.

Prevailing practice. The predominant practice in the area where the Cumare forestry project is located is cattle ranching. However, livestock does not present any barrier since it is the activity that has been practiced for many years. There are no cultural, technological, financial, institutional, ecological or social barriers. What has been done for a long time could continue to exist. Besides that, the afforestation with Eucalyptus species is not commonly practiced, and the proposed project activity is the first of its kind in terms of geography, technology, size, and investor, causing to exist barriers related to prevailing practice.

Local ecological barriers. Eucalyptus and Pine plantations are not known to be entirely suitable for this area. Adaptability is still being investigating. For example, there is a concrete clone type that has suffered wind damages after several years from plantation. This clone had to be cancelled from the project activity because it was discovered it's lack of adaptability. There are other ecological barriers (pests, diseases, flooding, etc.) that could affect the project yield and still must be discovered and react consequently.

Social conditions. There is a lack of skilled and/or properly trained labor force in the project surroundings. Also, there is a lack of organization of local communities that limits REFORESTADORA CUMARE SAS to count on direct stakeholders to the project, because there is a lack of interest from the community for the development of forestry.

As stated above, in Meta department there is no tradition of forestry activities. The few communities nearby the project area do not have experience in afforestation. Their economic activity is based primarily subsistence farming. There is no local supply of labor with experience in forestry, so permanent training is a needed activity for every employee. Sometimes more skilled labor must be paid a higher wage to move from other regions of the country to this remote region.

Land tenure, ownership, inheritance, and property rights. This is not a barrier for the project. Land tenure is very well regulated, the land is 100% owned by Cumare and there is no dispute over El Porvenir. The legal documentation that acts as an attestation or prove is in Annex 1, Annex 2 and Annex 3 in this document.

Market barriers. There are barriers related to markets. The timber production from the project site does not have a real market at the moment. The project developer has invested and expects that in the near future some industry will be established in the area of influence.

There are also barriers related to remoteness of land area and undeveloped road and infrastructure incur large transportation expenditures, thus eroding the competitiveness and profitability of products from the project.

Outcome of sub-step 2b is the list of land use scenarios that are not prevented by any barrier. Afforestation project presents many barriers that prevent its implementation. SIPRA (Sistema para la Planificación Rural Agropecuaria) is the first official geographic viewer of the agricultural sector in Colombia; it has open, easily accessible information and its data is freely available to consult, navigate and download. The system presents a layer with information about the forest aptitude, showing that the sites is not suitable for forest plantation, as it can be seen in the following figures.

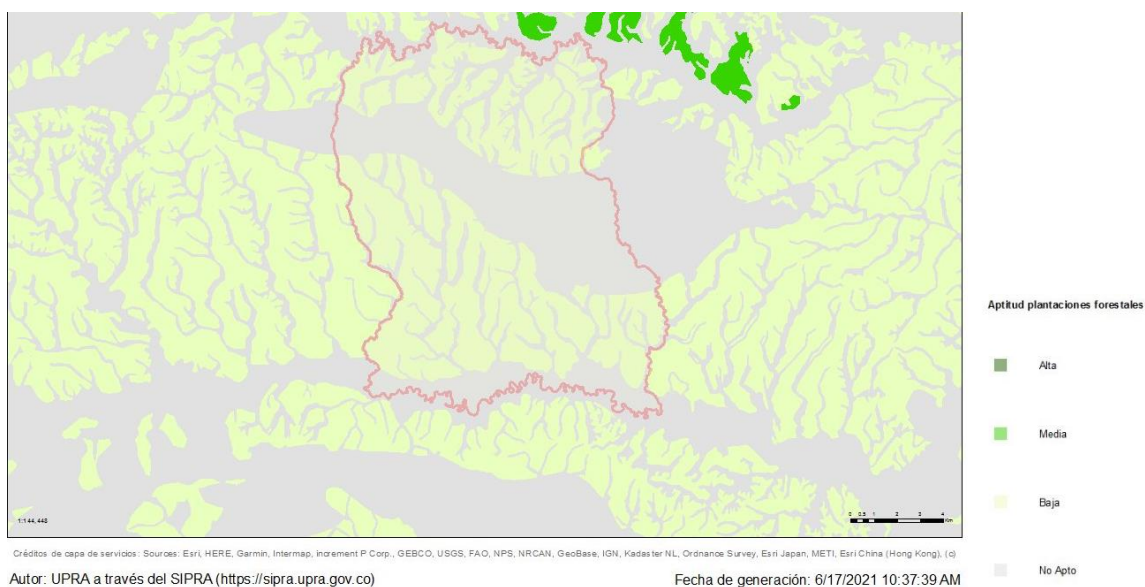


Figure 42. Forest aptitude (low (baja) and no-aptitude (no apta))

Grazing' unmanaged grassland is not prevented by any barrier. The continuation of cattle ranching

(grazing) does not present any barrier since it is the activity that has been practiced for many years. There are no cultural, technological, financial, institutional, ecological or social barriers. What has been done for a long time could continue existing. According to FEDEGAN (Foro Ganadería Regional – Meta)¹¹, Meta is the department with major cattle area, fourth in the country by population and with a long history of cattle production. According to CUMARE experts, the continuation of the previous activity does not face any major barrier. There are 3 main reasons to explain that 67% of the production of San Martín is livestock:

1. Livestock is naturally adapted to remote places due to its product's price vs. transportation cost per ton. Expensive things can only be produced in places with little infrastructure and long distances. The ton of live cattle in Colombia ranges from 1,500-2,300 USD/ton at destination depending on the category. The price of wood is between 35-45USD/ton depending on the characteristics. The freight cost of 100kms is around 15USD/ton.
2. Poor basic infrastructure determines little population and vice versa. Large rodeo and large fields can only be managed with few people. It is not like that for other activities
3. The low cost of land allows livestock production that does not compete equally with agriculture. Livestock productivity does not allow it to compete with agriculture, so fields of medium fertility with little logistics in distant places are suitable for livestock and not for agriculture or forestry¹².

The methodological tool request to apply the following decision tree to the outcome of sub-step 2b:

Is forestation without being registered as an A/R CDM project activity (in our case VCS) included in the list of land use scenarios that are not prevented by any barrier? The answer for REFORESTADORA CUMARE SAS project is no.

If no, then:

Does the list contain only one land use scenario? The answer for REFORESTADORA CUMARE SAS project is yes.

If yes, then the remaining land use is the baseline scenario. Continue with Step 4: Common practice test

Box 1. Additional information related to additionality

Despite this project does not need to go for step 3, ("investment analysis"), the project proponent has elaborated an economic analysis of the project. As it can be seen in the non-permanence risk assessment, the project Internal Rate of Return is circa 2%.

The Capital Asset Pricing Model (CAPM) is used to estimate the expected internal rate of return on unleveraged project activity that compensates the investor on risk and time value of money (k_e)

For a developing country, k_e is determined according to the following equation:

$$k_e = r_f + [E(R_m) - r_f] \beta + prs$$

Where:

¹¹ Fedegan: Federación Colombiana de Ganaderos

(<https://estadisticas.fedegan.org.co/DOC/download.jsp?pRealName=6.PlanMetaFINAL.pdf&iIdFiles=652>)

¹² <https://estadisticas.fedegan.org.co/DOC/download.jsp?pRealName=6.PlanMetaFINAL.pdf&iIdFiles=652>

k_e = project cost of capital (benchmark project IRR, %)

r_f = risk free rate (%)

$[E(R_m) - r_f]$ = premium for market risk (%)

β = systematic risk of the project activity (dimensionless)

prs = premium for sovereign risk (%)

The estimation of the benchmark IRR was done for each one of the years the investment analysis was developed. The investment analysis was done in the year 2014 and 2015.

Determination of the risk-free rate r_f

The chosen value for r_f is the yield of 30-year US Treasury bonds.

r_f equals 3.34% in 2014 and 3.2% in 2015 respectively in accordance with the US Department of the Treasury: <https://www.macrotrends.net/2521/30-year-treasury-bond-rate-yield-chart>

Determination of the premium for market risk $[E(R_m) - r_f]$

The arithmetic average annual premium for market risk with respect to US Treasury bonds is selected. It is a conservative value, from a well-documented source (Damodaran) who calculated the premium for market risk for the period from 1928 to 2020 (a period of 20 years before the project initiation was selected).

The estimated values are 4.6% and 4.54%

Determination of the systematic risk of the project activity: β

It has to be considered that systematic risk of forestry activities depends greatly on the markets where the industries are located. As an example, average unleveraged β values for paper/wood/forestry sectors for the year 2006 are estimated to be 0.82 (USA), 1.27 (emerging markets), 1.04 (Japan), 0.75 (Europe) and 1.09 (Australia/Canada) by the New York University L.N. Stern School of Business (Damodaran 2011).

The average value of β for these markets (considering Paper & Related Products and Forestry) for the period 2014-2015 is 0.5 and 0.41.

Determination of Premium for Sovereign Risk, prs

Sovereign risk reflects the amount of additional market risk for public bonds from one country as compared to the reference case (in this case, the US). The difference in yield between bonds issued by the US Treasury and those from another country constitutes the Premium for Sovereign Risk. Average premium for sovereign risk for Colombia for year 2014 was calculated at 4.25, and 4.78 in 2015. Reputable and public sources of information were used¹³.

Calculation of benchmark Internal Rate of Return for the afforestation activity

$$k_e = r_f + [E(R_m) - r_f] \beta + prs$$

¹³ Bono a 10 años de Colombia: <https://tradingeconomics.com/countries>

Bono 10 años de USA: <https://www.treasury.gov/resource-center/data-chart-center/interest-rates/pages/TextView.aspx?data=yieldYear&year=2014>

2014 Values: $k_e = 3.34 + [(4.6) \times 0.5] + 4.25 = 9.89\%$

2015 Values: $k_e = 3.2 + [(4.54) \times 0.41] + 4.78 = 9.84\%$

In conclusion, the benchmark IRR for an afforestation activity without carbon finance in the project area is estimated to be 9.89% (2014) and 9.84% (2015).

This demonstrate that the afforestation project of REFORESTADORA CUMARE SAS is under an interesting profitable project IRR for any investor.

Step 4. Common practice

Forest plantation is rarely seen in Meta department landscape. Despite that forest sector is included in the “Plan de Ordenamiento para la Producción” put in place at the beginning of year 2019 and in the “Pacto por el crecimiento y la competitividad del sector forestal”, signed in august 5th 2019¹⁴, the forest sector is still an incipient activity.

Commercial forest plantations in the department of Meta are only 62,500 (aprox) ha, which represents 0.72% of the area of the department¹⁵. Each of the properties that make up these hectares present the same limitations as El Porvenir since Colombia as a country has favorable climatic conditions for forest production, however it has not been able to expand its productive capacity, which leads to few forestry investments in the country. Furthermore, the timber industry remains underdeveloped.

On the other hand, there are no other forest carbon projects (ARR) in the Department, according to RENARE information.

3.6 Methodology Deviations

No deviations from the procedures indicated by the methodology have been made.

4 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The baseline net GHG removals by sinks shall be calculated as follows

$$\Delta C_{BSL,t} = \Delta C_{TREE_BSL,t} + \Delta C_{SHRUB_BSL,t} + \Delta C_{DW_BSL,t} + \Delta C_{LI_BSL,t}$$

Where:

$\Delta C_{BSL,t}$

Baseline net GHG removals by sinks in year t; t CO2-e

¹⁴ <http://www.minagricultura.gov.co/noticias/Paginas/Minagricultura-actualiza-informaci%C3%B3n-estad%C3%ADstica-sobre-plantaciones-forestales-en-el-pa%C3%ADs.aspx>

¹⁵ See “Boletín Estadístico Forestal” (marzo 2021) from Minagricultura, Colombia. Graph 2.3, page 18: https://fedemaderas.org.co/wp-content/uploads/2019/07/BOLETIN_FORESTAL_MARZO_WEB.pdf

$$\Delta C_{TREE_BSL,t}$$

Change in carbon stock in baseline tree biomass within the project boundary in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO₂-e

$$\Delta C_{SHRUB_BSL,t}$$

Change in carbon stock in baseline shrub biomass within the project boundary, in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO₂-e

$$\Delta C_{DW_BSL,t}$$

Change in carbon stock in baseline dead wood biomass within the project boundary, in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”; t CO₂-e

$$\Delta C_{LI_BSL,t}$$

Change in carbon stock in baseline litter biomass within the project boundary, in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”; t CO₂-e

Since continuation of an activity that has not trees, shrubs, deadwood, or litter (cattle grazing) and that it has been applied without changes for more than 20 years has been selected as the baseline scenario, it is assumed, in agreement with IPCC Good Practice Guidance for Land Use, Land Use Change and Forestry (2003) that the net GHG removals by sinks in the baseline equals zero.

4.2 Project Emissions

Change in the carbon stocks in project: general overview of the calculation process (ex-ante)

The process to calculate ex-ante carbon stocks starts with the delimitation of the forest area in a GIS. This is done by the local experts of REFORESTADORA CUMARE SAS, who measures the net forest area with GPS instruments. This information is transferred to the offices and together with another set of information, a complete Geographical Information System (GIS) is set. The data extracted from the GIS is presented in the ex-ante calculations in the Workbook of REFORESTADORA CUMARE SAS (Carbon stocks - VCS Grouped project 10122021.xlsx) in the worksheet “stata and plots”. The information is classified and presented in strata considering as main variables the species and plantation year.

In that same worksheet and based on the area of each strata, it is calculated the number of plots that are need according to the “A/R Methodological Tool: Calculation of the number of sample plots for measurements within A/R projects” and the number of plots that were actually measured (it has always been measured more plots than requested by the tool). Based on previous technical experience from the carbon consultant, it has not been considered as a variable to stratify the genetic provenance of the seedlings (clones vs seeds).

Following, the growth curves of every species is included as part of the calculation in the same workbook: “Curva E. pellita”, “Curva E. urograndis urophylla” and “Curva P. caribea”. The growth curves are obtained following the application of the Gompertz model, which has been applied by Campo Forestal. The information is in the workbook “Modelo linealizado Crecimiento.xlsx” and “Comparacion modelos - Volumen.xlsx”. All the corresponding variables and their assumed values are in the workbook “Carbon stocks - VCS Grouped project 10122021.xlsx” and presented in table 12 below.

The next section that continues with the ex ante estimation is the “ex ante” sheet. There, the information of the GIS is combined with the growth curves to estimate the ex ante total carbon removals and the long-term average.

The Change in the carbon stocks in project is presented below, step by step:

- 1) Obtain the growth curve of every species. The growth curves are obtained following the application of the Gompertz model, which has been applied by Campo Forestal to estimate the under-bark volume of trees.
- 2) Use the bark percentages of every species to estimate the aboveground volume of trees: *E. pellita* (9%), *E. urograndis* (7.3%), *E. urophylla* (10.2%), *P. caribea* (20.0%)
- 3) Using the parameters presented in table 12 (basic density, biomass expansion factor, root-to-shoot ratio and carbon fraction, estimate the carbon stock in aboveground and belowground biomass for the growth curve (which are not real values measured on the field, but a model that predicts the volume at each year during the rotation length).
- 4) With Excel, this information is combined with the plantation area by species and year. Automatically, the carbon stock in aboveground and belowground tree biomass is calculated for each year of the project, since 2016
- 5) Using the default and conservative value of 6% and 1% of carbon stock in tree biomass for dead wood and litter respectively, the total carbon in deadwood and litter is estimated, which is then summed for a total carbon stock in each year.
- 6) In the end, the soil organic carbon increase in stock is added, following the equations and parameters presented in section 4.2 and below.
- 7) After the carbon stock is calculated from 2016 to 2120, the long-term average is calculated applying the methodology described below.

It is important to clarify that the ex ante estimation considers a single instance initially (El Porvenir) and two instances (El Porvenir and Caricare) from 2022, when the Caricare farm will join the group. Note that this second instance is not yet validated, but it will be in the next –second- monitoring period. On the other hand, the ex post estimates (01-November-2016 to 25-November-2020) will only claim VCU's for the single instance -El Porvenir- within the group in this period.

Ex-ante estimation: detailed procedure

Net anthropogenic GHG removals by sinks is estimated as the actual net GHG removals by sinks minus the baseline net GHG removals, minus leakage. The following general formula described in the methodology is used to calculate the net anthropogenic GHG removals by sinks of an A/R project activity, in t CO₂-e:

$$\Delta C_{AR-CDM,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_t$$

Where:

- $\Delta C_{AR-CDM,t}$ Net anthropogenic GHG removals by sinks, in year t; t CO₂-e
- $\Delta C_{ACTUAL,t}$ Actual net GHG removals by sinks, in year t; t CO₂-e
- $\Delta C_{BSL,t}$ Baseline net GHG removals by sinks, in year t; t CO₂-e

LK, t GHG emissions due to leakage, in year t; t CO₂-e

The actual net greenhouse gas removals by sinks were estimated using the following equation described in the methodology:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t}$$

Where:

$\Delta C_{ACTUAL,t}$ Actual net greenhouse gas removals by sinks, in the year t; t CO₂-e

$\Delta C_{P,t}$ Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO₂-e

$GHG_{E,t}$ Increase in non-CO₂ GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t, as estimated in the tool “Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity”; t CO₂-e

The tool for “Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity” (Version 04.0.0) has been considered. The use of fire for site preparation and/or to clear the land of harvest residue prior to replanting is specifically excluded from the project management and therefore project emissions are estimated as zero.

Carbon stock changes

ΔC_P is the sum of the changes in above-ground and below-ground tree biomass, dead wood, litter, and soil organic carbon stocks in the project scenario. Changes in the carbon stocks in project were estimated using the following equation described in the methodology:

$$\Delta C_{P,t} = \Delta C_{TREE_PROJ,t} + \Delta C_{SHRUB_PROJ,t} + \Delta C_{DW_PROJ,t} + \Delta C_{LI_PROJ,t} + \Delta SOC_{AL,t}$$

ΔC_P , t Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO₂-e

$\Delta C_{TREE_PROJ,t}$ Change in carbon stock in tree biomass in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO₂-e

$\Delta C_{SHRUB_PROJ,t}$ Change in carbon stock in shrub biomass in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO₂-e

$\Delta C_{DW_PROJ,t}$ Change in carbon stock in dead wood in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”; t CO₂-e

$\Delta C_{LI_PROJ,t}$ Change in carbon stock in litter in project in year t, as estimated in the tool

“Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”; t CO2-e

Δ SOCAL, t Change in carbon stock in SOC in project, in year t, in areas of land meeting the applicability conditions of the tool “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities”, as estimated in the same tool; t CO2-e

For ex-ante estimation, all pools were accounted. Calculations are described below.

Biomass carbon pools

Above and below ground biomass have been estimated according to the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activity”. A summary of the main data used, and each source of data are presented in the table below. Estimations are archived as part of the project documentation. Data used for estimating tree biomass are shown in the table below.

Table 14. Assumed parameters used for estimation of tree biomass carbon stocks

Parameter	Symbol	<i>E. pellita</i> <i>E. urograndis</i> , <i>E. urophylla</i> and <i>P.caribea</i>	Source
Mean Annual Increment (m ³ .ha ⁻¹ .yr ⁻¹)	MAI _j	<i>E.pellita</i> : 24.7 <i>E. urograndis</i> <i>urophylla</i> : 27.5 <i>P. caribea</i> : 20.0	Project design assumption based on real data
Wood basic density (Mg.m ³)	D _j	0.48 to 0.53	Local source: “Proyectos sectoriales de mitigación de GEI sector AFOLU (Proclima)”2020
Biomass expansion factor (dimensionless)	BEF1 _j	1.15	Tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs" (Version 04.2)
Carbon fraction (dimensionless)	CF	0.47	Tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs" (Version 04.2)
Root-to-shoot ratio (dimensionless)	R _j	From 0.22 to 0.34	Tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs" (Version 04.2)
Bark volume	%	<i>E.pellita</i> : 9.0 <i>E. urograndis</i> :7.3 <i>E.urophylla</i> : 10.2	<i>E. pellita</i> : “Growth Responses of Eucalyptus pellita F. Muell. Plantations in South Sumatra to Macronutrient. Fertilisers Following Several Rotations of Acacia mangium

		<i>P. caribea</i> : 20 ¹⁶	Willd. Alen. M et al 2019 ¹⁷ E. urogranids: Study Quantification of forestry and carbonization waste Neves A et al ¹⁸ E.urophylla: Wood and Pulping properties.pdf", Mendes, A. et al. 2016 <i>P. caribea</i> : ¹⁹
--	--	--------------------------------------	--

Soil organic carbon

Estimations of soil organic carbon (SOC) stocks were done in accordance with the “Tool for the estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activity” (Version 01.1.0). As suggested by the tool, it is assumed that the implementation of the project activity increases the SOC content of the lands from the pre-project level to the level that is equal to the steady-state SOC content under native vegetation. The increase in SOC content in the project scenario takes place at a constant rate over a period of 20 years from the year of planting. The project meets the applicability conditions as was demonstrated in chapter 3.2 (applicability methodology).

Table 15 Parameters used for estimation of SOC

Parameter	Symbol	Value	Source (SOC estimation tool, V01.1.0)
Reference SOC (tC/ha)	SOC _{REF,i}	47	Table 3 LAC soils, tropical moist
Land use factor	f _{LU,i}	1	Table 6 All permanent grassland
Management factor	f _{MG,i}	0.97	Table 6 Moderately degraded grassland Overgrazed or moderately degraded grassland, with somewhat reduced productivity (relative to the native or nominally managed grassland) and receiving no management inputs
Input factor	f _{IN,i}	1	Table 6 Grassland without input of fertilizer

SOC at the beginning of the project (SOC_{INITIAL,i}) is estimated by multiplying the factors in Table 5 by the reference SOC. As per the tool, a loss in SOC (SOC_{LOSS,i}) is applied in the case that soil disturbance occurs on more than 10 per cent of the land area, which is the case of this project. The following methodological formula is used for calculating the annual change in SOC stock:

$$dSOC_{t,i} = \frac{SOC_{REF,i} - (SOC_{INITIAL,i} - SOC_{LOSS,i})}{20}$$

Where:

¹⁶ <http://www.fao.org/3/AC121E/ac121e05.htm>

¹⁷

https://www.researchgate.net/publication/337449278_Growth_Responses_of_Eucalyptus_pellita_F_Muell_Plantations_in_South_Sumatra_to_Macronutrient_Fertilisers_Following_Several_Rotations_of_Acacia_mangium_Willd

¹⁸ https://www.researchgate.net/publication/310812768_Quantification_of_Forestry_and_Carbonization_Waste

¹⁹ <http://www.fao.org/3/AC121E/ac121e05.htm>

dSOC _{t,i}	The rate of change in SOC stock in stratum i of the area of land, in year t; t C/ha/yr
SOC _{REF,i}	Reference SOC stock corresponding to the reference condition in native lands by climate region and soil types applicable to stratum i of the area of land; tC/ha
SOC _{INITIAL,i}	SOC stock at the beginning of the A/R CDM project activity in stratum i of the areas of land
SOC _{LOSS,i}	Loss of SOC caused by soil disturbance attributable the A/R CDM project activity, in stratum i of the areas of land; tC/ha

Application of the equation results in an estimated increase of 0.64 t C/ha/year in soil organic carbon.

Litter and Dead Wood

Estimations were done in accordance with the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities” (Version 03.1). The conservative default-factors with reference to the carbon stock in living trees were used for estimating both pools. Default values are 6% in the case of dead wood and 1% for litter.

Long-term average

As set out in the VCS Standard, ARR projects with harvesting shall include the loss of carbon due to harvesting in the quantification of project emissions, therefore the long-term average is estimated.

For REFORESTADORA CUMARE SAS project undertaking even-aged management, the time-period over which the long-term GHG benefit is calculated include the last harvest/cut in the cycle. With a project crediting period of 100 years and a harvest cycle of 10-12 years, the long-term average GHG benefit will be determined for a period of 105 years. The long-term average is estimated using the 100 years crediting period plus 5 years to consider the entire rotation length of the plantations done in 2025.

Firstly, the expected total GHG benefit of the project for each year of the established time-period: GHG removals from the project scenario minus baseline scenario. Then, the sum of the total GHG benefit of each year over the established time-period. Afterwards, the average GHG benefit of the project is calculated over the established time-period using the following equation.

$$LA = \frac{\sum_{t=0}^n PE_t - BE_t}{n}$$

Where:

LA	=	The long-term average GHG benefit
PE _t	=	The total to-date GHG emission reductions and removals generated in the project scenario (tCO ₂ e). Project scenario emission reductions and removals shall also consider project emissions of CO ₂ , N ₂ O, CH ₄ and leakage.
BE _t	=	The total to-date GHG emission reductions and removals projected for the baseline scenario (tCO ₂ e)
t	=	Year
n	=	Total number of years in the established time period

Project Emissions

Biomass burning

Estimations were done in accordance with the tool A/R Methodological Tool “Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity”. The tool is applicable to all occurrence of fire within the project boundary. Non-CO₂ GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area defined as forest, provided that the accumulated area affected by such fires in a given year is ≥5% of the project area.

Up to now there has not been any forest fires within the project boundaries.

Other project emissions

As per the methodology AR ACM 0003, section 5.5 “GHG emissions resulting from removal of herbaceous vegetation, combustion of fossil fuel, fertilizer application, use of wood, decomposition of litter and fine roots of N-fixing trees, construction of access roads within the project boundary, and transportation attributable to the project activity shall be considered insignificant and therefore accounted as zero”.

Appendix 2 of the methodology tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”, there is a procedure to apply an uncertainty discount if estimates have high uncertainty. Since uncertainty is not needed to estimate for baseline emissions, application of uncertainty discount is not done.

4.3 Leakage

According to the methodology AR-ACM003 v.2.0, section 5.6, leakage emissions shall be estimated as follows:

$$LK_t = LK_{AGRIC,t}$$

Where:

LK_t = GHG emissions due to leakage, in year t; t CO₂-e

$LK_{AGRIC,t}$ = Leakage due to the displacement of agricultural activities in year t, as estimated in the tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”; t CO₂-e.

The methodology requires the assessment of sources of leakage due to activity displacement (conversion from grazing land to forestry) with the application of the tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”. This tool is not applicable if the displacement of agricultural activities is expected to cause, directly or indirectly, any drainage of wetlands or peat lands”, which is not the case of REFORESTADORA CUMARE SAS project.

The tool estimates the increase in emissions based on changes in carbon stocks in the affected carbon pools in the land receiving the displaced activities. First of all, REFORESTADORA CUMARE SAS has started the project with no livestock in it. The previous landowner relocated the cattle in similar farms to “El Porvenir”. The cattle may have ended in slaughterhouse if common practice to these situations have been applied. Furthermore, cattle may be introduced in future stages of the project to finally have a silvipastoral activity. There is no displacement since the previous land-use activity may continue to exist in the project area ‘surroundings’.

There are no leakage emissions attributable to the displacement of agricultural activities (cattle production) due to implementation of the afforestation project activity since there is no decrease in carbon stocks in the affected carbon pools of the land receiving the displaced activity. Meta Department has a large share of grazing areas and the implementation of a circa 5.500 ha forest project will not have an impact in the carrying capacity in the department. The carbon stocks in the areas that receives the cattle which was in the project area, will not be affected.

4.4 Estimated Net GHG Emission Reductions and Removals

Equations for the quantification of net change in carbon stocks have been presented in previous sections. It is here presented the ex-ante calculation (estimate) of baseline emissions/removals, project emissions/removals, leakage emissions and net GHG removals for the project crediting period.

Table 16. Net GHG emission reduction or removals

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)	Net GHG removals accumulated (tCO ₂ e)	Number of instances
2016	0	0	0	0	0	1
2017	0	109,921	0	109,921	109,921	1
2018	0	248,749	0	248,749	358,670	1
2019	0	340,267	0	340,267	698,937	1
2020	0	364,694	0	364,694	1,063,632	1
2021	0	319,063	0	319,063	1,382,695	1
2022	0	250,023	0	250,023	1,632,719	2
2023	0	211,737	0	211,737	1,844,456	2
2024	0	223,826	0	223,826	2,068,282	2
2025	0	297,107	0	297,107	2,365,389	2
2026	0	393,764	0	393,764	2,759,154	2
2027	0	-193,785	0	-193,785	2,565,368	2
2028	0	-163,013	0	-163,013	2,402,356	2
2029	0	161,230	0	161,230	2,563,586	2
2030	0	280,202	0	280,202	2,843,788	2
2031	0	392,387	0	392,387	3,236,175	2
2032	0	326,450	0	326,450	3,562,625	2
2033	0	78,484	0	78,484	3,641,109	2
2034	0	-125,885	0	-125,885	3,515,225	2
2035	0	-359,154	0	-359,154	3,156,071	2
2036	0	-292,369	0	-292,369	2,863,702	2
2037	0	-184,477	0	-184,477	2,679,225	2
2038	0	-167,544	0	-167,544	2,511,681	2
2039	0	156,194	0	156,194	2,667,875	2
2040	0	274,448	0	274,448	2,942,323	2
2041	0	386,495	0	386,495	3,328,818	2

2042	0	320,525	0	320,525	3,649,343	2
2043	0	72,012	0	72,012	3,721,355	2
2044	0	-133,451	0	-133,451	3,587,904	2
2045	0	-379,400	0	-379,400	3,208,504	2
2046	0	-292,589	0	-292,589	2,915,915	2
2047	0	-194,645	0	-194,645	2,721,269	2
2048	0	-175,028	0	-175,028	2,546,241	2
2049	0	149,886	0	149,886	2,696,127	2
2050	0	268,860	0	268,860	2,964,987	2
2051	0	381,046	0	381,046	3,346,034	2
2052	0	315,110	0	315,110	3,661,143	2
2053	0	67,144	0	67,144	3,728,287	2
2054	0	-148,000	0	-148,000	3,580,287	2
2055	0	-370,117	0	-370,117	3,210,169	2
2056	0	-293,229	0	-293,229	2,916,941	2
2057	0	-194,615	0	-194,615	2,722,326	2
2058	0	-174,996	0	-174,996	2,547,330	2
2059	0	149,919	0	149,919	2,697,249	2
2060	0	268,893	0	268,893	2,966,142	2
2061	0	381,080	0	381,080	3,347,221	2
2062	0	315,143	0	315,143	3,662,365	2
2063	0	56,402	0	56,402	3,718,766	2
2064	0	-136,814	0	-136,814	3,581,952	2
2065	0	-370,757	0	-370,757	3,211,195	2
2066	0	-293,198	0	-293,198	2,917,997	2
2067	0	-194,583	0	-194,583	2,723,415	2
2068	0	-174,963	0	-174,963	2,548,451	2
2069	0	149,952	0	149,952	2,698,403	2
2070	0	268,927	0	268,927	2,967,330	2
2071	0	381,113	0	381,113	3,348,443	2
2072	0	304,401	0	304,401	3,652,843	2
2073	0	67,588	0	67,588	3,720,431	2
2074	0	-137,454	0	-137,454	3,582,978	2
2075	0	-370,726	0	-370,726	3,212,252	2
2076	0	-293,166	0	-293,166	2,919,086	2
2077	0	-194,550	0	-194,550	2,724,536	2
2078	0	-174,930	0	-174,930	2,549,605	2
2079	0	149,986	0	149,986	2,699,591	2
2080	0	268,960	0	268,960	2,968,551	2
2081	0	370,371	0	370,371	3,338,922	2
2082	0	315,587	0	315,587	3,654,509	2
2083	0	66,949	0	66,949	3,721,457	2
2084	0	-137,423	0	-137,423	3,584,034	2
2085	0	-370,694	0	-370,694	3,213,340	2
2086	0	-293,133	0	-293,133	2,920,207	2
2087	0	-194,517	0	-194,517	2,725,690	2

2088	0	-174,897	0	-174,897	2,550,793	2
2089	0	150,019	0	150,019	2,700,812	2
2090	0	258,218	0	258,218	2,959,030	2
2091	0	381,557	0	381,557	3,340,587	2
2092	0	314,948	0	314,948	3,655,535	2
2093	0	66,979	0	66,979	3,722,514	2
2094	0	-137,391	0	-137,391	3,585,123	2
2095	0	-370,661	0	-370,661	3,214,462	2
2096	0	-293,100	0	-293,100	2,921,361	2
2097	0	-194,483	0	-194,483	2,726,878	2
2098	0	-174,863	0	-174,863	2,552,015	2
2099	0	139,277	0	139,277	2,691,291	2
2100	0	269,404	0	269,404	2,960,695	2
2101	0	380,918	0	380,918	3,341,613	2
2102	0	314,978	0	314,978	3,656,591	2
2103	0	67,011	0	67,011	3,723,602	2
2104	0	-137,358	0	-137,358	3,586,244	2
2105	0	-370,628	0	-370,628	3,215,616	2
2106	0	-293,067	0	-293,067	2,922,549	2
2107	0	-194,450	0	-194,450	2,728,100	2
2108	0	-185,606	0	-185,606	2,542,494	2
2109	0	150,463	0	150,463	2,692,957	2
2110	0	268,764	0	268,764	2,961,721	2
2111	0	380,948	0	380,948	3,342,669	2
2112	0	315,010	0	315,010	3,657,680	2
2113	0	67,044	0	67,044	3,724,724	2
2114	0	-137,325	0	-137,325	3,587,399	2
2115	0	-370,595	0	-370,595	3,216,804	2
2116	0	-293,033	0	-293,033	2,923,771	2
2117	0	-205,192	0	-205,192	2,718,578	2
2118	0	-174,420	0	-174,420	2,544,159	2
2119	0	149,823	0	149,823	2,693,982	2
2120	0	268,795	0	268,795	2,962,778	2
Total (long-term average)	0	2.918.000	0	2.918.000	2.918.000	2

For the purpose of clarification, (+) values mean an increase in carbon stocks and (–) values represents a decrease in carbon stocks due to harvest activities.

The long-term average is the mean value of all the carbon stocks in a period of time defined by the VCS Standard. It represents the maximum amount of carbon credits (VCUs) that the project can claim. The long-term average method for determination is in section 4.2 and the ex ante result is 2,918,000 tCO₂e. As this document combines the Project Description and Monitoring Report, this value corresponds to the ex ante estimation, while the section 6.5 corresponds to the ex post estimation of the LTA.

Apart from the LTA, the total net removals for the 100 year crediting period are 2,923,771 tCO₂e, corresponding to the Net GHG removals accumulated (tCO₂e) by 2116.

5 MONITORING

5.1 Data and Parameters Available at Validation

The table below are completed for all data and parameters that are determined or available at validation and remain fixed throughout the project crediting period. The values provided are used to estimate the net GHG emissions and removals for the project crediting period in Section 4 above.

Data / Parameter	A_i
Data unit	ha
Description	Area of stratum i
Source of data	Monitoring of strata and stand boundaries is done using a Geographical Information System (GIS) which allows for integrating data from different sources (including GPS coordinates and Remote Sensing data)
Value applied:	Variable according to stratum
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Determination of baseline scenario (AFOLU projects only) Calculation of baseline emissions Calculation of project emissions
Comments	N/A

Data / Parameter	BEF _{2,j}
Data unit	Dimensionless
Description	Biomass expansion factor for conversion of stem biomass to above-ground biomass for tree species or group of species j
Source of data	Tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs" (Version 04.2)

Value applied:	1.15
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of project emissions
Comments	N/A

Data / Parameter	CF _j
Data unit	t C t ⁻¹ d.m.
Description	Carbon fraction of tree biomass for species or group of species j
Source of data	The IPCC default value of 0.47 t C t ⁻¹ d.m.
Value applied:	0.47
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of project emissions
Comments	N/A

Data / Parameter	CO ₂ -e
Data unit	CO ₂
Description	The factor of 3.667 (44/12) is applied to convert the tree carbon sequestered to tree CO ₂ -e sequestered.
Source of data	The IPCC default value
Value applied:	3.667 (44/12)
Justification of choice of data or description of measurement methods	N/A

and procedures applied	
Purpose of Data	Calculation of project emissions
Comments	N/A

Data / Parameter	Dj
Data unit	t d.m. m ³
Description	Basic wood density for species or group of species j
Source of data	Local source: MADR (2010) and Arango, B. et al (2001) and Giraldo, D. et al (2014) quoted by "Proyectos sectoriales de mitigación de GEI sector AFOLU (Proclima)"
Value applied:	0.48 to 0.53
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of project emissions
Comments	N/A

Data / Parameter	R j
Data unit	Dimensionless
Description	Root-shoot ratio for species or group of species j
Source of data	Tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs" (Version 04.2)
Value applied:	0.22 to 0.43 depending on the tree age
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of project emissions

Comments	N/A
Data / Parameter	V TREE j p i
Data unit	m ³
Description	Stem volume of trees of species or group of species j in plot p in stratum i
Source of data	Growth model based on forest inventory (field data measured 2016 to 2020)
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of project emissions
Comments	The growth model is also based on the Mean Annual Increment of species -MAIj (m ³ .ha ¹ .yr ¹). <i>Eucalyptus pellita</i> : 24.7 m ³ .ha ¹ .yr ¹ ; <i>Eucalyptus urograndis</i> and <i>Eucalyptus urophyla</i> : 27.5 m ³ .ha ¹ .yr ¹ ; <i>Pinus caribea</i> : 20.0 m ³ .ha ¹ .yr ¹

Data / Parameter	Bark volume
Data unit	% of total stem volume
Description	Bark volume of trees of species
Source of data	Specific studies for each tree specie
Value applied:	7.3 to 10.2% for <i>Eucalyptus</i> sp. and 20% for <i>P. caribea</i>
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of project emissions

Comments	Stem volume estimations with models results in volume under bark, thus this factor is applied
----------	---

Data / Parameter	fIN,i
Data unit	Dimensionless
Description	Relative stock change factor for baseline input regime (e.g. crop residue returns, manure) in stratum i of the areas of land
Source of data	Tables 6 of “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM Project” activities.
Value applied:	1
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of project emissions
Comments	N/A

Data / Parameter	SOC REF
Data unit	t C ha-1
Description	Reference SOC stock corresponding to the reference condition in native lands (i.e. non-degraded, unimproved lands under native vegetation. normally forest) by climate region and soil type applicable to stratum i of the areas of land
Source of data	Table 3 of “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM Project” activities.
Value applied:	47
Justification of choice of data or description of measurement methods and procedures applied	Default reference for tropical, wet climate region and soils with low activity clay (LAC)

Purpose of Data	Calculation of project emissions
Comments	N/A

Data / Parameter	fMG,i
Data unit	Dimensionless
Description	Relative stock change factor for baseline management regime in stratum i of the areas of land; dimensionless
Source of data	Table 6 of “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM Project” activities.
Value applied:	0.97
Justification of choice of data or description of measurement methods and procedures applied	Overgrazed or moderately degraded grassland, with somewhat reduced productivity (relative to the native or nominally managed grassland) and receiving no management inputs
Purpose of Data	Calculation of project emissions
Comments	N/A

Data / Parameter	fLU,i
Data unit	Dimensionless
Description	Relative stock change factor for baseline land-use in stratum i of the areas of land; dimensionless
Source of data	Tables 6 of “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM Project” activities.
Value applied:	1
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of project emissions

Comments	N/A
----------	-----

Data / Parameter	Dead Wood
Data unit	t C ha-1
Description	Conservative default factor expressing carbon stock in dead wood as a percentage of carbon stock in tree biomass
Source of data	Tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”
Value applied:	6% of carbon stock in trees biomass
Justification of choice of data or description of measurement methods and procedures applied	Default value for biome tropical, elevation <2.000 m and precipitation >1.600 m per year
Purpose of Data	Calculation of project emissions
Comments	N/A

Data / Parameter	Litter
Data unit	t C ha-1
Description	Conservative default factor expressing carbon stock in litter as a percentage of carbon stock in tree biomass
Source of data	Tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”
Value applied:	1% of carbon stock in trees biomass
Justification of choice of data or description of measurement methods and procedures applied	Default value for biome tropical, elevation <2.000 m and precipitation >1.600 m per year
Purpose of Data	Calculation of project emissions
Comments	N/A

5.2 Data and Parameters Monitored

The tables below are completed for all data and parameters to be monitored during the project crediting period.

Data / Parameter	DBH
Data unit	cm
Description	Diameter at breast height of tree (DBH)
Source of data	Field measurements in sample plots
Description of measurement methods and procedures applied	Measurement methods according to Work Manual – permanent plots (2018). All the individuals within the sample plot will be measured. DBH is measured at a height of 1.3 m from the base of the stem (on the ridge). DBH must be measured where the stem has a normal shape (5cm above in case of deformations). If the individuals find a double arrow (fork), the measurement of this variable will be made based on the length at which the bifurcation occurs (below 1.3 m each stem should be measured and listed as different individuals). Calipper and measuring tape will be the monitoring equipment.
Frequency of monitoring/recording	Before every verification event
Value applied:	N/A
Monitoring equipment	N/A
QA/QC procedures applied	QA/QC procedures according to Work Manual – permanent plots (2018). Measuring crew from a different contractor will be responsible for cross-checking over 20% of the installed plots. These are selected directly by the planning manager and delivered to the crew based on the following criteria: (1) plots near roads, native forest, water courses; (2) accessibility and proximity to operations center; (3) sector with the highest plot intensity. The following items are reviewed: (1) plot without location error; (2) complies with radius and surface; (3) it has a center and a plot number; (4) clockwise numbering; (5) all Individuals are numbered; (6) missing trees identified with a plate; (7) forked trees marked separately; (8) DBH mark located at 1.3 m. Data is recorded in the form: "Quality control format", where is

	obtained a compliance percentage. A plot is considered installed when it meets the following tolerance ranges: 1. Tolerance 0 • plot with location errors, on tracks, native forest or mix of stands and species. • it does not have the radius (12.62 m) and specific area (500 m²). • numbering of individuals within the plot does not follow a defined sense (clockwise) 2. Tolerance 20% • individuals are not numbered. • missing trees do not have a plate. • forked trees were not marked separately. • trees with DBH marking outside 1.3 m Cross-checking of data is done following these two parameters: 1. Differential between years: it applies to those plots that have two measurements, where the measurement of the dendrometer parameters cannot be less than the data of the previous year. 2. Outliers: based on the diameter-height relationship, those data that do not represent the trend are tracked (e.g., thick, or tall trees with respect to their age) Once this information is traced, it is delivered to the measuring crew for verification. Checking is done firstly at a digital level, and then proceed to verify directly in the field.
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	N/A

Data / Parameter	H
Data unit	m
Description	Height of trees
Source of data	Field measurements in sample plots

Description of measurement methods and procedures applied	Measurement methods according to Work Manual – permanent plots (2018). All the individuals within the sample plot will be measured. Trees to be measured must meet the following requirements: have its apex and base visible from the measurement point; belong to the plot; and not be strongly deformed or broken. Vertex hypsometer and suunto clinometer will be the monitoring equipment. The distance from which the equipment is used must be as horizontal as possible. In cases of slope the correction must be made according to the table in Annex 1 of the Work Manual – permanent plots (2018). In the case of the use of a clinometer, it is not allowed to measure from a distance less than that indicated by the band used and then make corrections. It cannot exceed 45° or 100% slope. The observer must be located so that trees are perpendicular to the horizontal line. In sloping terrain, measurements should be prioritized from points that are sloping above the base of the tree.
Frequency of monitoring/recording	Before every verification event
Value applied:	N/A
Monitoring equipment	N/A
QA/QC procedures applied	QA/QC procedures according to Work Manual – permanent plots (2018). Measuring crew from a different contractor will be responsible for cross-checking over 20% of the installed plots. These are selected directly by the planning manager and delivered to the crew based on the following criteria: (1) plots near roads, native forest, water courses; (2) accessibility and proximity to operations center; (3) sector with the highest plot intensity. The following items are reviewed: (1) plot without location error; (2) complies with radius and surface; (3) it has a center and a plot number; (4) clockwise numbering; (5) all Individuals are numbered; (6) missing trees identified with a plate; (7) forked trees marked separately; (8) DBH mark located at 1.3 m. Data is recorded in the form: "Quality control format", where is obtained a compliance percentage. A plot is considered installed when it meets the following tolerance ranges:

	1. Tolerance 0 • plot with location errors, on tracks, native forest or mix of stands and species. • it does not have the radius (12.62 m) and specific area (500 m²). • numbering of individuals within the plot does not follow a defined sense (clockwise) 2. Tolerance 20% • individuals are not numbered. • missing trees do not have a plate. • forked trees were not marked separately. • trees with DBH marking outside 1.3 m Cross-checking of data is done following these two parameters: 1. Differential between years: it applies to those plots that have two measurements, where the measurement of the dendrometer parameters cannot be less than the data of the previous year. 2. Outliers: based on the diameter-height relationship, those data that do not represent the trend are tracked (e.g., thick, or tall trees with respect to their age) Once this information is traced, it is delivered to the measuring crew for verification. Checking is done firstly at a digital level, and then proceed to verify directly in the field.
Purpose of data	Together with DBH (previous parameter), they are used to estimate the stem volume of trees of species <i>j</i> in plot <i>p</i> in stratum <i>i</i> . These variables: <i>H</i> and <i>DBH</i> after being used to estimate the stem volume of trees, are also used, together with other constants (carbon fraction, basic wood density, biomass expansion factor) to estimate the standard deviation of biomass stock in stratum <i>i</i> ; t d.m. ha ⁻¹ .
Calculation method	N/A
Comments	N/A
Data / Parameter	T
Data unit	Year

Description	Time period elapsed between two successive estimations of carbon stock in trees and shrubs
Source of data	Recorded time
Description of measurement methods and procedures applied	N/A
Frequency of monitoring/recording	N/A
Value applied:	N/A
Monitoring equipment	N/A
QA/QC procedures applied	N/A
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	If the two successive estimations of carbon stock in trees are carried out at different points of time in year t2 and t1, (e.g., in the month of April in year t1 and in the month of September in year t2), then a fractional value is assigned to T

Data / Parameter	n _j
Data unit	units
Description	Number of sample plots in stratum i
Source of data	Field work
Description of measurement methods and procedures applied	Measurement methods according to Work Manual – permanent plots (2018).
Frequency of monitoring/recording	In every verification event
Value applied:	N/A

Monitoring equipment	GPS equipment
QA/QC procedures applied	N/A
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	N/A

Data / Parameter	N
Data unit	units
Description	Number of plots to be established in the project area
Source of data	Field work
Description of measurement methods and procedures applied	Measurement methods according to Work Manual – permanent plots (2018).
Frequency of monitoring/recording	In every verification event
Value applied:	N/A
Monitoring equipment	GPS equipment
QA/QC procedures applied	N/A
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	N/A

Data / Parameter	Ap,i
Data unit	ha
Description	Area of sample plot

Source of data	Field measurement
Description of measurement methods and procedures applied	Measurement methods according to Work Manual – permanent plots (2018). All the individuals within the sample plot are measured.
Frequency of monitoring/recording	N/A
Value applied:	N/A
Monitoring equipment	N/A
QA/QC procedures applied	QA/QC procedures according to Work Manual – permanent plots (2018). Measuring crew from a different contractor will be responsible for cross-checking over 20% of the installed plots. These are selected directly by the planning manager and delivered to the crew based on the following criteria: (1) plots near roads, native forest, water courses; (2) accessibility and proximity to operations center; (3) sector with the highest plot intensity. The following items are reviewed: (1) plot without location error; (2) complies with radius and surface; (3) it has a center and a plot number; (4) clockwise numbering; (5) all Individuals are numbered; (6) missing trees identified with a plate; (7) forked trees marked separately; (8) DBH mark located at 1.3 m. Data is recorded in the form: "Quality control format", where is obtained a compliance percentage. A plot is considered installed when it meets the following tolerance ranges: 1. Tolerance 0 • plot with location errors, on tracks, native forest or mix of stands and species. • it does not have the radius (12.62 m) and specific area (500 m²). • numbering of individuals within the plot does not follow a defined sense (clockwise) 2. Tolerance 20% • individuals are not numbered. • missing trees do not have a plate. • forked trees were not marked separately. • trees with DBH marking outside 1.3 m

	Cross-checking of data is done following these two parameters: 1. Differential between years: it applies to those plots that have two measurements, where the measurement of the dendrometer parameters cannot be less than the data of the previous year. 2. Outliers: based on the diameter-height relationship, those data that do not represent the trend are tracked (e.g., thick, or tall trees with respect to their age) Once this information is traced, it is delivered to the measuring crew for verification. Checking is done firstly at a digital level, and then proceed to verify directly in the field.
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	Sample plot location is registered with a GPS and marked on the project map

Data / Parameter	Ai
Data unit	ha
Description	Area of each stratum
Source of data	GIS Database
Description of measurement methods and procedures applied	Total ha for each stratum (specie and planting year)
Frequency of monitoring/recording	Continuously
Value applied:	NA
Monitoring equipment	NA
QA/QC procedures applied	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied
Purpose of data	Calculation of project emissions

Calculation method	N/A
Comments	N/A

5.3 Monitoring Plan

The aim of the Monitoring Plan is to record and monitor a number of different parameters in order to ensure that the project followed the corresponding methodology in the validated and registered PD and that the inputs to the carbon calculations are both accurate and up to date. Monitoring was done according to the consolidated CDM methodology AR-ACM0003 “Afforestation and reforestation of lands except wetlands” (version 02.0).

Monitoring stage comprised gathering information, performing calculations, and making estimations of GHG removals. In this monitoring event, it is ensured that commonly established principles of forest inventory and management were put into practice with the elaboration of a Monitoring Plan.

GHG information system

The GHG removals generated by the project will be revised that have not been used for compliance under other programs and mechanisms in every monitoring period.

As this is a grouped project for activities that will be implemented in several sites in department of Meta and Vichada, the controls associated with the multiple project instances and its monitoring is ensured with a central GHG information system.

This centralized GHG information system is directly linked to the forest monitoring plan, as it is the basis for the measurement, registration, calculation and quality control of the standing volume in trees. An additional module is included to it: the variables needed to translate volume in standing trees to carbon stocks in aboveground biomass, belowground biomass, deadwood and litter.

The forest monitoring plan, the core element of the GHG information system is managed and maintained by Campo Forestal. The following paragraphs describes the different elements that forms it: definition of stratum and number of plots (methods and process), data management (archiving), data quality and organizational structure.

Methods and process

According to the methodology applied, monitoring covered carbon stock changes for living above-ground. Below ground biomass was estimated indirectly based on above-ground biomass measurements and litter and dead wood were estimated as a percentage of carbon stock in tree biomass.

Project boundaries are defined at the beginning of project activity and the same geographic boundary will be maintained, according to VCS AFOLU requirements. However, the project area will be permanently monitored along the crediting period, since new strata may be created due to new plantations in the coming years, and after potential disturbances effects (pests, droughts, fire). Geographic coordinates are established recorded and archived. A Geographic Information System was implemented for the validation and verification.

With the purpose of developing the monitoring plan, the property was stratified into 10 strata, and 219 plots were installed. Stratification was done considering age class (plantation date); and species planted. The location of the plots followed the guidance given by the corresponding methodological tool,

as well as IPCC Good Practice Guidance for LULUCF (2002), chapter 4.3, and described in the Work Manual – permanent plots (2018). Permanent sampling plot's location is systematic, with random start.

The number of plots were estimated according to A/R Methodological Tool “Calculation of the number of sample plots for measurements within A/R CDM project activities”. In the following table is shown the methodological tool estimation and number of plots installed for the measurement of forest stands.

Table 17. Number of sample plots per stratum

Stratum	Strata area (ha)	N° Plots/stratum - Tool estimation	N° Plots/stratum - plots installed
<i>E. pellita</i> 2016	1,673.9	10	49
<i>E. pellita</i> 2017	1,383.7	22	43
<i>E. pellita</i> 2018	944.0	42	51
<i>E. pellita</i> 2019	539.0	17	28
<i>E. pellita</i> 2020	43.1	NE*	NE*
<i>E. urograndis</i> 2016	42.1	2	3
<i>E. urograndis</i> 2017	450.1	13	21
<i>E. urograndis</i> 2018	92.6	4	6
<i>E. urograndis</i> 2019	118.5	6	9
<i>E. urograndis</i> 2020	37.8	NE*	NE*
<i>E. urophylla</i> 2016	0	NE*	NE*
<i>E. urophylla</i> 2017	6.5	3	3
<i>E. urophylla</i> 2018	37.6	5	6
<i>E. urophylla</i> 2019	34.7	NE*	NE*
<i>E. urophylla</i> 2020	46.0	NE*	NE*
<i>P. caribea</i> 2016	30.8	NE*	NE*
<i>P. caribea</i> 2017	46.6	NE*	NE*
TOTAL area included in this monitoring event (ha)	5,287.8	124	219

TOTAL area planted (ha)	5,526.6	124	219
--------------------------------	----------------	------------	------------

* NE: Not estimated

The total area planted is 5,526.6 ha but considering the recent pandemic it was not possible to install all the needed plots in every stratum. Thus, the area considered for this monitoring event is lower than the total area planted. The carbon credits claimed are only applicable to the area measured (5,288 ha).

By applying BEF method, volume equations are used to convert tree dimensions to stem volume of trees based on DBH and height measurement in each plot. Stem volume of trees is then converted to above-ground and below-ground tree biomass using basic wood density (D) and root-to-shoot ratio (R). Default carbon fraction (CF) value was used in order to estimate the carbon stock. Moreover, above ground carbon pool was measured following the methodology procedures and IPCC Good Practice Guidance for LULUCF (2003) established in the PD and Monitoring Plan. Carbon stocks in above ground biomass of trees are estimated by applying the BEF method, which calculates the biomass of trees of each species per unit area in each stratum at a given point of time, based on the following three dimensions: diameter, basal area, and height, obtained from field measurements.

Prior to the start of the inventory, all equipment used during the field work was checked and calibrated.

New plots were installed when reaching the minimum monitoring age (one year), with an intensity of 1 plot every 25 ha (each with a total area of 500 m² - radius of 12.62 m). The remeasuring process of the established plots will continue until the end of the plantation rotation age. The diversity of species, years of planting, genetic origin (seed / clone), soil types (valley, hilly and mountainous area) are represented by this network of plots. The establishment and initial measurement of the plots began in June – July. In addition, monitoring measurements were carried out annually during September – October, in order to match with the annual growth cycles of the plantations. Each plot was geo-referenced. Each tree has been identified either with paint or nameplate (trees with smaller ages and limited developments cannot be identified with paint).

Each plot was installed according to the geo-referenced location and numbering determined by the pdf map (that behold the complete network of permanent plots). The maps in pdf format were generated by the Cartography department (desktop work), based on the strata generated for the distribution of plots. It is necessary for the crew to verify in the field that the location of the plot is associated with a representative sector (otherwise relocate to achieve this objective).

Once located in the plot, the center is marked with a stake (either wood or plastic) with the number indicated on the map (the number must be unique in order to easily relocate and remedy the following years). All trees in the plot should be marked at DBH height with their number from 1 to N (painted or with a metal plate) facing the center of it. A sketch must be made with the location of each tree in the plot, according to the following model:

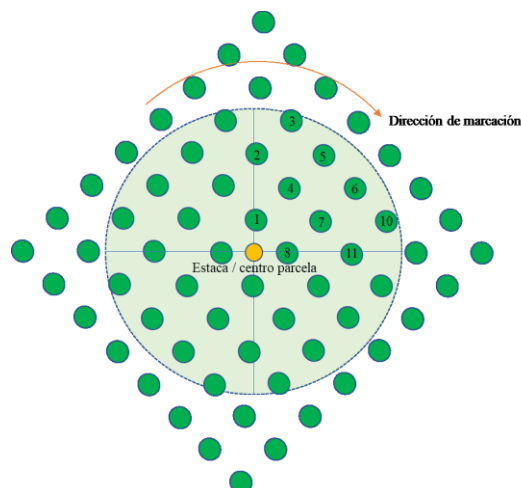


Figure 43. Permanent plots

Once the plot is installed, the qualitative and / or descriptive information of both the plot and the trees are registered according to the form described in Annex No. 1 of the Work Manual – permanent plots (2018). Furthermore, the diameters and heights for each tree is measured, as well as a classification corresponding to the shape and health status of the tree measured. In case of finding specific observations, this comment must be included, both at the plot level and at individual tree.

The processing and analysis of the information is done through databases in Microsoft Excel. The synthesis of the collected information is presented in dynamic tables and graphs that associate frequency distributions of the variables of interest (volume without bark, basal area, number of individuals, diameter - average height). Most of the variables of interest are taken directly in the field, and further analysis corresponds to the application of inferential statistics (volume). All data gathered as part of the monitoring plan was archived electronically and will be kept at least for two years after the end of the crediting period.

Data quality

A Quality Control System will be implemented for routinely checking for data consistency, correctness, and completeness; for identifying and correcting errors and omissions; and for properly documenting and archiving data and documentation related with the monitoring activities (For more information go to annex 8). Quality Assurance measures will be implemented, in order to verify that data quality objectives are met, and in general, to support the effectiveness of the QC system.

Measuring crew from a different contractor is responsible for cross-checking over 20% of the installed plots. The selection of plots prioritizes following criteria:

- 1) plots near roads, native forest, water courses.
- 2) Accessibility and proximity to operations center.
- 3) Sector with the highest plot intensity.

Also, cross-checking of data is done following these two parameters:

1. Differential between years: it applies to those plots that have two measurements, where the measurement of the dendrometer parameters cannot be less than the data of the previous year.

2. Outliers: based on the diameter-height relationship, those data that do not represent the trend are tracked (e.g., thick, or tall trees with respect to their age)

Once this information is traced, it is delivered to the measuring crew for verification. Checking is done firstly at a digital level, and then proceed to verify directly in the field.

The following items are reviewed in the field:

- 1) plot location.
- 2) complies with radius and surface.
- 3) it has a center and a plot number.
- 4) clockwise numbering.
- 5) all Individuals are numbered.
- 6) missing trees identified with a plate.
- 7) forked trees marked separately.
- 8) DBH mark located at 1.3 m.

Data is recorded in the form: "Quality control format", obtaining a compliance percentage. Installation is considered done when it meets the following tolerance ranges:

1. Tolerance 0

plot with location errors, on tracks, native forest or mix of stands and species.

it does not have the radius (12.62 m) and specific area (500 m²).

numbering of individuals within the plot does not follow clockwise criteria

2. Tolerance 20%

individuals are not numbered.

missing trees do not have a plate.

forked trees were not marked separately.

trees with DBH marking outside 1.3 m

Organizational structure

Monitoring event took place during 2020, ending in November 2020 (for more information go to annex 9). The correct compliance with the specific guidelines in this document was oversee by Campo Forestal SAS, under the coordination with the technical and planning team of an independent third party (Cambium SA). On the other hand, proper implementation of the monitoring plan in the field is the obligation of the technical team of the contractor, which is under control of Campo Forestal SAS. Carbon estimations and general calculations were developed by CAIA.

Data archiving

Campo Forestal has a Standard Operational Procedure to archive the data collected. The document specifies the person in charge of archiving, the place the information is kept, and the procedures followed to transfer, archive, and manage all the information obtained in the monitoring events.

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1 Data and Parameters Monitored

The present section includes the data and parameters monitored during the monitoring period from 01 November 2016 to 25 November 2020. The values provided are used to quantify actual GHG emissions and removals achieved for the monitoring period. Data and parameters determined or available at validation which remain fixed throughout the project crediting period are included in Section 5.1 (Data and Parameters Available at Validation) above

Data / Parameter	Diameter at breast height of tree (DBH)
Data unit	cm
Description	Measurement methods according to Work Manual – permanent plots (2018). All the individuals within the sample plot are measured. DBH is measured at a height of 1.3 m from the base of the stem (on the ridge). DBH is measured where the stem has a normal shape (5cm above in case of deformations). If the individuals find a double arrow (fork), the measurement of this variable is made based on the length at which the fork occurs (below 1.3 m each stem is measured and listed as different individuals). Caliper and measuring tape is the monitoring equipment.
Value applied:	24.357 values in 10 strata in 219 plots.
Comments	N/A

Data / Parameter	Height of trees (H)
Data unit	m
Description	Measurement methods according to Work Manual – permanent plots (2018). All the individuals within the sample plot are measured. Measuring trees must meet the following requirements: have its apex and base visible from the measurement point; belong to the plot; and not be strongly deformed or broken. Vertex hypsometer and suunto clinometer is the monitoring equipment. The distance from which the equipment is used must

	be as horizontal as possible. In cases of slope the correction is according to the table in Annex 1 of the Work Manual – permanent plots (2018). In the case of the use of a clinometer, it is not allowed to measure from a distance less than that indicated by the band used and then make corrections. It cannot exceed 45° or 100% slope. The observer is located so that trees are perpendicular to the horizontal line. In sloping terrain, measurements are prioritized from points that are sloping above the base of the tree.
Value applied:	24,357 values in 10 strata in 219 plots.
Comments	N/A

Data / Parameter	T
Data unit	Year
Description	Time period elapsed between two successive estimations of carbon stock in trees. The time period went from 01 November 2016 to 25 November 2020
Value applied:	N/A
Comments	If the two successive estimations of carbon stock in trees are carried out at different points of time in year t2 and t1, (e.g., in the month of April in year t1 and in the month of September in year t2), then a fractional value is assigned to T

Data / Parameter	Area of sample plot ($A_{p,i}$)
Data unit	ha
Description	Each plot will be installed according to the geo-referenced location and numbering determined by the map (according to permanent sample plot network). The maps in PDF format will be generated by the Cartography area, based on the strata generated for the distribution of plots. It is necessary for the staff to verify in the field that the location of the plot is associated with a representative sector (otherwise relocate to achieve this objective).

	Once located on the plot, the center will be marked with a stake (either wood or plastic) with the number indicated on the map (the number must be unique in order to easily relocate and remeasure the following years). All trees in the plot should be marked at the DBH height with their number from 1 to N (painted or with a metal plate) facing the center of the plot. A sketch should be made with the location of each tree on the plot.
Value applied:	500 m ²
Comments	N/A

Data / Parameter	Area of each stratum (A _i)
Data unit	ha
Description	Area of each stratum
Value applied:	Different values for 10 stratum
Comments	N/A

6.2 Baseline Emissions

The baseline net GHG removals by sinks needs to follow the equation below (already mention in section 4.1).

$$\Delta C_{BSL,t} = \Delta C_{TREE_BSL,t} + \Delta C_{SHRUB_BSL,t} + \Delta C_{DW_BSL,t} + \Delta C_{LI_BSL,t}$$

Where:

$$\Delta C_{BSL,t}$$

Baseline net GHG removals by sinks in year t; t CO₂-e

$$\Delta C_{TREE_BSL,t}$$

Change in carbon stock in baseline tree biomass within the project boundary in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO₂-e

$$\Delta C_{SHRUB_BSL,t}$$

Change in carbon stock in baseline shrub biomass within the project boundary, in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO₂-e

$$\Delta C_{DW_BSL,t}$$

Change in carbon stock in baseline dead wood biomass within the project boundary, in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”; t CO₂-e

$$\Delta C_{LI_BSL,t}$$

Change in carbon stock in baseline litter biomass within the project boundary, in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”; t CO₂-e

Despite the equations presented above, the baseline has not been calculated since continuation of an activity that has not trees, shrubs, deadwood, or litter (cattle grazing), that has been applied without changes for more than 20 years has been selected as the baseline scenario. It is assumed, in agreement with IPCC Good Practice Guidance for Land Use, Land Use Change and Forestry (2003), that the net GHG removals by sinks in the baseline equals zero.

6.3 Project Emissions

Change in the carbon stocks in project: general overview of the calculation process (ex-post)

The total carbon stock in 2020 is 503,404 tCO₂e which is the same as the carbon removals for the period 2016 to 2020, since there are no project emissions, there has not been any verification before, and the initial carbon stock is zero. As it has been described in the previous sections, this is the real and actual volume of carbon captured in the forest. Thus, these are *expost* estimations.

For *expost* calculations, the process starts again with the Geographical Information System. The strata area and the number of sampling plots is estimated in the Workbook “Carbon stocks - VCS Grouped project 10122021.xlsx”.

The estimations originate with the collection of data (section 6.1) on the field. The sample plots are visited, and the standing volume of each tree in the plot is estimated following a standardized method to measure diameter at breast height and total height. This method is presented in the Forest Inventory Manual, described in section 5.3 “Monitoring plan”. The Inventory considers the standing volume as timber and the information of each measured tree is presented in “BD plot – tree level”. With the use of different factors and applying the correspondent allometric equations (see below) this information is translated into volume per tree and carbon stock per tree, as it is described in the *exante* calculation. The raw data present in this sheet is then grouped by plot and strata using a pivot table which can be seen in “*expost accurate*” worksheet. The rest of the worksheets in the workbook “Carbon stocks - VCS Grouped project 10122021.xlsx” are supporting material for the calculation of vintages.

Exante estimation are not considered to estimate the real carbon captured, however it is used to contrast the real values against what has forecasted. The real growth curves serve as inputs to recalibrate the volume forecasted to the project.

The Carbon stock changes in different pools are estimated following the procedures described in section 4.2, *mutatis mutandis* “*exante*” with “*expost*”.

The Change in the carbon stocks in project is presented below, step by step:

8) Apply the allometric equation $0,000051265 \cdot (DBH^{1,8753}) \cdot (H^{0,9888})$ from Nieto et al. 2016 to the raw data collected on the field to estimate the under-bark volume of trees

- 9) Use the bark percentages of every species to estimate the aboveground volume of trees: *E. pellita* (9%), *E. urograndis* (7.3%), *E. urophylla* (10.2%), *P. caribea* (20.0%)
- 10) Using the parameters presented in table 12 (basic density, biomass expansion factor, root-to-shoot ratio and carbon fraction, estimate the carbon stock in aboveground and belowground biomass.
- 11) With Excel, this information is grouped by strata using a pivot table. Automatically, the carbon stock in tree biomass is calculated, together with the uncertainty of the mean tree biomass
- 12) Using the default and conservative value of 6% and 1% of carbon stock in tree biomass for dead wood and litter respectively, the total carbon in deadwood and litter is estimated.
- 13) In the end, the soil organic carbon increase in stock is added, following the equations and parameters presented in section 4.2 and below.

It is important to clarify that the ex ante estimation considers a single instance initially (El Porvenir) and two instances (El Porvenir and Caricare) from 2022, when the Caricare farm will join the group. Note that this second instance is not yet validated, but it will be in the next –second- monitoring period. On the other hand, the ex post estimates (01-November-2016 to 25-November-2020) will only claim VCU's for the single instance -El Porvenir- within the group in this period.

Ex-post estimation: detailed procedure

Net anthropogenic GHG removals by sinks is estimated as the actual net GHG removals by sinks minus the baseline net GHG removals, minus leakage. The following general formula described in the methodology is used to calculate the net anthropogenic GHG removals by sinks of an A/R project activity, in t CO₂-e:

$$C_{AR-CDM} = \Delta C_{ACTUAL} - \Delta C_{BSL} - LK$$

Where:

C_{AR-CDM}	Net anthropogenic GHG removals by sinks; t CO ₂ -e
ΔC_{ACTUAL}	Actual net GHG removals by sinks; t CO ₂ -e
ΔC_{BSL}	Baseline net GHG removals by sinks; t CO ₂ -e
LK	Total GHG emissions due to leakage; t CO ₂ -e

The actual net greenhouse gas removals by sinks were estimated using the following equation described in the methodology:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t}$$

Where:

$\Delta C_{ACTUAL,t}$	Actual net GHG removals by sinks, in year t; t CO ₂ -e
$\Delta C_{P,t}$	Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO ₂ -e
GHG _{E,t}	Increase in non-CO ₂ GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t, as estimated in the tool

“Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity”; t CO₂-e

The tool for “*Estimation of non-CO₂ GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity*” (Version 04.0.0) has been considered. The use of fire for site preparation and/or to clear the land of harvest residue prior to replanting is specifically excluded from the project management and therefore project emissions are estimated as zero. Moreover, there were no forest fires over the monitoring period.

Carbon stock changes

ΔCP is the sum of the changes in above-ground and below-ground tree biomass, dead wood, litter, and soil organic carbon stocks in the project scenario. Changes in the carbon stocks in project were estimated using the following equation described in the methodology:

$$\Delta C_{P,t} = \Delta C_{TREE_PROJ,t} + \Delta C_{SHRUB_PROJ,t} + \Delta C_{DW_PROJ,t} + \Delta C_{LI_PROJ,t} + \Delta SOC_{AL,t}$$

Where:

ΔCP, t	Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO ₂ -e
ΔCTREE_PROJ, t	Change in carbon stock in tree biomass in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO ₂ -e
ΔCSHRUB_PROJ, t	Change in carbon stock in shrub biomass in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”; t CO ₂ -e. This pool is conservatively dismissed in these estimations.
ΔCDW_PROJ, t	Change in carbon stock in dead wood in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”; t CO ₂ -e
ΔCLI_PROJ, t	Change in carbon stock in litter in project in year t, as estimated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”; t CO ₂ -e
ΔSOCAL, t	Change in carbon stock in SOC in project, in year t, in areas of land meeting the applicability conditions of the tool “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities”, as estimated in the same tool; t CO ₂ -e

Biomass carbon pools

Above and below ground biomass have been estimated according to the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activity”. Carbon estimations in trees are based on field measurements of monitored parameters (chapter 6.1). Estimations are archived as part of the project verification.

The aboveground biomass corresponds to tree biomass, no shrubs are considered for estimation. The method used for estimating change in carbon stock in trees is the “stock change method”. Change in carbon stock in trees in two successive points in time is calculated as the difference between the two estimated stocks. Carbon values in every pool is estimated as the sum for the period, and the starting point of the crediting period is zero carbon, since this is the first monitoring report.

According to the chapter “Estimating carbon stock in trees at a point of time” of the tool, the following equation is used in order to estimate ex-post above and below ground biomass:

$$C_{TREE} = \frac{44}{12} \times CF_{TREE} \times B_{TREE}$$

Where:

CTREE	Carbon stock in trees in the tree biomass estimation strata; t CO ₂ e
CFTREE	Carbon fraction of tree biomass; t C (t d.m.) ⁻¹ . A default value of 0.47 is used
BTREE	Tree biomass in the tree biomass estimation strata; t d.m.

Above ground and below ground biomass

Measurement of fixed area plots of the tool (Appendix 1 -Methods of plot biomass measurement) was applied in order to estimate the biomass of trees:

$$B_{TREE,l,j,p,i} = V_{TREE,j}(x_{1,l}, x_{2,l}, x_{3,l}, \dots) \times D_j \times BEF_{2,j} \times (1 + R_j)$$

Where:

BTREE _{j,p,l,t}	Biomass of trees of species j in sample plot p of stratum i at late 2019 – early 2020.
VTREE _j ,	Stem volume of tree species using field measurements of tree parameters (DBH and height), default values (allometric equation); m ³ . For ex-post estimation, the allometric equation used derived from the paper by Nieto et al., 2016 “Effects of provenance and genetic variation on the growth and stem formation of eucalyptus pellita in Colombia”. The applied allometric equation is $0,000051265 \times (DBH^{1,8753}) \times (H^{0,9888})$. The equation predicts under-bark volume. As suggested by the tool, suitable correction was applied to estimate the over-bark volume.
D _j	Basic wood density of tree species j. The species j corresponds to the species used in this project: <i>E. pellita</i> , <i>E. urograndis</i> , <i>E. urophylla</i> , <i>P. caribea</i> ., with a basic density varying from 0.48 to 0.53 t.d.m./m ³ . This parameter was established as “available at validation” in the Project Design, thus it was not measured or monitored. The

value was obtained and corresponds to default value from the local source: “Proyectos sectoriales de mitigación de GEI sector AFOLU (Proclima)”.

BEF_{2,j} Biomass expansion factor for conversion of stem biomass to above-ground tree biomass, for tree species j; dimensionless. According to the methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs", for ex-post estimation the conservative default value of 1.15 is used.

R_j Root-shoot ratio for tree species j; dimensionless. The values applied were taken from the suggested equation from the methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs". The value of R_j is estimated as:

$$R_j = \frac{e^{(-1.085+0.9256 \times \ln b)}}{b}$$

where b is the above-ground tree biomass per hectare (in t d.m. ha⁻¹).

Soil organic carbon

Estimations of soil organic carbon (SOC) stocks were done in accordance with the “Tool for the estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activity”. As suggested by the tool, it is assumed that the implementation of the project activity firstly decreases the SOC content of the lands from pre-project level, due to the site preparation.

Afterwards, the SOC increases to the level that is equal to the steady-state SOC content under native vegetation. The increase in SOC content in the project scenario takes place at a constant rate over a period of 20 years from the year of planting. The project meets the applicability conditions of this tool as demonstrated in chapter 3.2 Applicability of Methodology. The correspondent carbon sequestration calculation uses parameters in table 14 and is available to the verification team in the total carbon stock estimation worksheet.

Table 18 Parameters used for estimation of SOC

Parameter	Symbol	Value	Source (SOC estimation tool, V01.1.0)
Reference SOC (tC/ha)	SOC _{REF,i}	47	Table 3 LAC soils, tropical moist
Land use factor	fLU ,i	1	Table 6 All permanent grassland
Management factor	f MG,i	0.97	Table 6 Moderately degraded grassland Overgrazed or moderately degraded grassland, with somewhat reduced productivity (relative to the native or nominally managed grassland) and receiving no management inputs
Input factor	fIN,i	1	Table 6 Grassland without input of fertilizer

Litter and Dead Wood

Estimations were done in accordance with the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities” using a default and conservative value of 6% and 1% of carbon stock in tree biomass for dead wood and litter respectively.

Uncertainty

Appendix 2 of the methodology tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities”, there is a procedure to apply an uncertainty discount if estimates have high uncertainty. Since the uncertainty in the estimated mean value of the average carbon stock in trees is less than 10% (5.36%), no uncertainty discount is applied.

Project emissions (removals, tCO₂e) and their vintage

The total amount of that REFORESTADORA CUMARE SAS is requesting in this monitoring event is presented in the following table:

Table 19. Project emissions (removals, tCO₂e) requested by Campo Forestal by vintage

Vintage	C stocks (tCO ₂ e) – cumulative	Project emissions (removals, tCO ₂ e)
2016	-	-
2017	30,404	30,404
2018	105,521	105,521
2019	206,517	206,517
2020	160,961	160,961
Total	503,404	503,404

Vintages are estimated starting from the total volume and carbon stocks (503.404 tCO₂e). This total carbon stock corresponds to the amount of timber volume measured from the 1 November 2016 to 25 November 2020, which is the last day of field measurement (see Annex 9).

With the real data collected on field and considering the different plantation years, a growth curve is modelled. The form of the curve is the basis for the distribution of the total carbon stock into vintages.

6.4 Leakage

Leakage emissions are estimated with the application of the tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”.

According to the methodology AR-ACM003 v.2.0, section 5.6, leakage emissions shall be estimated as follows:

$$LK_t = LK_{AGRIC,t}$$

Where:

LK_t= GHG emissions due to leakage, in year t; t CO₂-e

$LK_{AGRIC,t}$ = Leakage due to the displacement of agricultural activities in year t , as estimated in the tool “Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”; t CO₂-e.

Leakage emissions are equal to zero, as it is demonstrated in chapter 4.3.

6.5 Net GHG Emission Reductions and Removals

The net GHG removals achieved for this monitoring period (1 November 2016 to 25 November 2020) (for the first and only one instance) are summarized in the table below.

Year (vintage)	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2016	0	-	0	-
2017	0	30,404	0	30,404
2018	0	105,521	0	105,521
2019	0	206,517	0	206,517
2020	0	160,961	0	160,961
Total	0	503,404	0	503,404

Also, the non-permanence risk rating (as determined in the AFOLU non-permanence risk report) is used to calculate the total number of buffer credits that need to be deposited into the AFOLU pooled buffer account.

Year (vintage)	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)	Buffer pool allocation	VCUs eligible for Issuance
2016	0	-	0			
2017	0	30,404	0	30,404	3,040	27,364
2018	0	105,521	0	105,521	10,552	94,969
2019	0	206,517	0	206,517	20,652	185,865
2020	0	160,961	0	160,961	16,096	144,865

Total	0		0	503,404	50,340	453,064
-------	---	--	---	---------	--------	---------

By applying the Risk report calculation tool (version 4.0) and AFOLU Non-Permanence Risk tool (version 4.0)²⁰, the Non-Permanence Risk assessment resulted in a 4,5%, however as it is established in the VCS Standard, the minimum percentage is 10%, so as the marketable VCU in this monitoring period is: 453,064 tCO₂e and the VCUs withhold in the buffer account are 50,340 tCO₂e.

In relation to the Long-Term Average attributable to the monitoring period under analysis, the method used for its estimation is presented below. The method applied as input, values from the forest inventory conducted in 2020. The actual and real values from the field are used to understand how much timber volume is present in the forest and to be used as part of the volume yield curve for every species.

$$LA = \frac{\sum_{t=0}^n PE_t - BE_t}{n}$$

Where:

- LA = The long-term average GHG benefit
- PE_t = The total to-date GHG emission reductions and removals generated in the project scenario (tCO₂e). Project scenario emission reductions and removals shall also consider project emissions of CO₂, N₂O, CH₄ and leakage.
- BE_t = The total to-date GHG emission reductions and removals projected for the baseline scenario (tCO₂e)
- t = Year
- n = Total number of years in the established time period

The total to date GHG removals generated by the project (503,404 tCO₂) are being used as input for a new estimation of the Long-Term Average presented below. The full set of variables and data used are the same than the ex-ante estimation of the Long-Term Average (see section 4.4).

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)	Net GHG removals accumulated (tCO ₂ e)	Number of instances
2016	0	0	0	0	0	1
2017	0	29.378	0	29.378	29.378	1
2018	0	125.200	0	125.200	154.578	1
2019	0	240.098	0	240.098	394.675	1
2020	0	244.247	0	244.247	638.922	1
2021	0	249.226	0	249.226	888.149	1

²⁰ https://verra.org/wp-content/uploads/2019/09/AFOLU_Non-Permanence_Risk-Tool_v4.0.pdf

2022	0	228.726	0	228.726	1.116.875	2
2023	0	224.503	0	224.503	1.341.377	2
2024	0	262.579	0	262.579	1.603.956	2
2025	0	333.805	0	333.805	1.937.760	2
2026	0	425.989	0	425.989	2.363.750	2
2027	0	-266.235	0	-266.235	2.097.515	2
2028	0	-320.362	0	-320.362	1.777.153	2
2029	0	42.966	0	42.966	1.820.118	2
2030	0	181.624	0	181.624	2.001.742	2
2031	0	389.159	0	389.159	2.390.901	2
2032	0	405.125	0	405.125	2.796.026	2
2033	0	199.564	0	199.564	2.995.590	2
2034	0	6.106	0	6.106	3.001.696	2
2035	0	-273.255	0	-273.255	2.728.442	2
2036	0	-260.144	0	-260.144	2.468.298	2
2037	0	-256.926	0	-256.926	2.211.372	2
2038	0	-324.893	0	-324.893	1.886.478	2
2039	0	37.929	0	37.929	1.924.408	2
2040	0	175.870	0	175.870	2.100.277	2
2041	0	383.266	0	383.266	2.483.543	2
2042	0	399.200	0	399.200	2.882.743	2
2043	0	193.092	0	193.092	3.075.835	2
2044	0	-1.460	0	-1.460	3.074.376	2
2045	0	-293.501	0	-293.501	2.780.875	2
2046	0	-260.364	0	-260.364	2.520.511	2
2047	0	-267.095	0	-267.095	2.253.416	2
2048	0	-332.378	0	-332.378	1.921.038	2
2049	0	31.622	0	31.622	1.952.660	2
2050	0	170.282	0	170.282	2.122.942	2
2051	0	377.818	0	377.818	2.500.759	2
2052	0	393.785	0	393.785	2.894.544	2
2053	0	188.224	0	188.224	3.082.768	2
2054	0	-16.009	0	-16.009	3.066.758	2
2055	0	-284.218	0	-284.218	2.782.541	2
2056	0	-261.004	0	-261.004	2.521.537	2
2057	0	-267.064	0	-267.064	2.254.473	2
2058	0	-332.346	0	-332.346	1.922.127	2
2059	0	31.654	0	31.654	1.953.781	2
2060	0	170.315	0	170.315	2.124.096	2
2061	0	377.851	0	377.851	2.501.947	2
2062	0	393.818	0	393.818	2.895.765	2
2063	0	177.481	0	177.481	3.073.247	2
2064	0	-4.823	0	-4.823	3.068.424	2
2065	0	-284.857	0	-284.857	2.783.566	2
2066	0	-260.973	0	-260.973	2.522.593	2
2067	0	-267.032	0	-267.032	2.255.561	2

2068	0	-332.313	0	-332.313	1.923.248	2
2069	0	31.688	0	31.688	1.954.936	2
2070	0	170.348	0	170.348	2.125.284	2
2071	0	377.885	0	377.885	2.503.169	2
2072	0	383.076	0	383.076	2.886.244	2
2073	0	188.668	0	188.668	3.074.912	2
2074	0	-5.463	0	-5.463	3.069.450	2
2075	0	-284.827	0	-284.827	2.784.623	2
2076	0	-260.941	0	-260.941	2.523.682	2
2077	0	-266.999	0	-266.999	2.256.682	2
2078	0	-332.280	0	-332.280	1.924.402	2
2079	0	31.721	0	31.721	1.956.123	2
2080	0	170.382	0	170.382	2.126.505	2
2081	0	367.142	0	367.142	2.493.648	2
2082	0	394.262	0	394.262	2.887.909	2
2083	0	188.028	0	188.028	3.075.938	2
2084	0	-5.432	0	-5.432	3.070.506	2
2085	0	-284.795	0	-284.795	2.785.711	2
2086	0	-260.908	0	-260.908	2.524.803	2
2087	0	-266.966	0	-266.966	2.257.837	2
2088	0	-332.247	0	-332.247	1.925.590	2
2089	0	31.755	0	31.755	1.957.345	2
2090	0	159.639	0	159.639	2.116.984	2
2091	0	378.328	0	378.328	2.495.313	2
2092	0	393.623	0	393.623	2.888.935	2
2093	0	188.059	0	188.059	3.076.994	2
2094	0	-5.400	0	-5.400	3.071.595	2
2095	0	-284.762	0	-284.762	2.786.833	2
2096	0	-260.875	0	-260.875	2.525.958	2
2097	0	-266.933	0	-266.933	2.259.025	2
2098	0	-332.213	0	-332.213	1.926.812	2
2099	0	21.012	0	21.012	1.947.824	2
2100	0	170.826	0	170.826	2.118.650	2
2101	0	377.689	0	377.689	2.496.339	2
2102	0	393.653	0	393.653	2.889.992	2
2103	0	188.091	0	188.091	3.078.083	2
2104	0	-5.367	0	-5.367	3.072.716	2
2105	0	-284.729	0	-284.729	2.787.987	2
2106	0	-260.842	0	-260.842	2.527.145	2
2107	0	-266.899	0	-266.899	2.260.246	2
2108	0	-342.956	0	-342.956	1.917.291	2
2109	0	32.198	0	32.198	1.949.489	2
2110	0	170.186	0	170.186	2.119.675	2
2111	0	377.720	0	377.720	2.497.395	2
2112	0	393.685	0	393.685	2.891.080	2
2113	0	188.124	0	188.124	3.079.204	2

2114	0	-5.334	0	-5.334	3.073.870	2
2115	0	-284.695	0	-284.695	2.789.175	2
2116	0	-260.808	0	-260.808	2.528.367	2
2117	0	-277.642	0	-277.642	2.250.725	2
2118	0	-331.769	0	-331.769	1.918.956	2
2119	0	31.559	0	31.559	1.950.515	2
2120	0	170.217	0	170.217	2.120.732	2
Total (long-term average)	0	2.318.517	0	2.318.517	2.318.517	2

For the purpose of clarification, (+) values mean an increase in carbon stocks and (–) values represents a decrease in carbon stocks due to harvest activities.

The long-term average is the mean value of all the carbon stocks in a period of time defined by the VCS Standard. It represents the maximum amount of carbon credits (VCUs) that the project can claim. The long-term average method for determination is in section 4.2 and the ex post result is 2,318,517 tCO₂e. This value has been estimated using the actual net removals achieved for the monitoring period and the ex ante values from the end of the monitoring period onwards.

ANNEX 1. PURCHASE CONTRACT

Escritura compraventa El Porvenir



República de Colombia

Pag. 1



NOTARIA 9 - BOGOTA D.C.
REPUBLICA DE COLOMBIA

Escritura: **5.661**

CINCO MIL SEISCIENTOS SESENTA Y UNO,

Fecha: **AGOSTO - 13 - 2013.**

FORMATO DE CALIFICACIÓN
ART. 8 PAR. 4 LEY 1579/2012

MATRÍCULA INMOBILIARIA	236-20543	CÓDIGO CATASTRAL	00-03-0003-0066-000
UBICACIÓN DEL PREDIO	MUNICIPIO	VEREDA	
	SAN MARTÍN DE LOS LLANOS - META	SERRANÍA DE MELÚA	
URBANO:			
RURAL:	☒ NOMBRE O DIRECCIÓN: Predio denominado EL PORVENIR		

DOCUMENTO

CLASE	NUMERO	FECHA	OFICINA DE ORIGEN	CIUDAD
Escritura Pública	5.661	13-08-2013	Notaria 9	Bogotá

	NATURALEZA JURÍDICA DEL ACTO	
CÓDIGO REGISTRAL	ESPECIFICACIÓN	VALOR DEL ACTO
0125	Compraventa	

PERSONAS QUE INTERVIENEN EN EL ACTO:	NUMERO DE IDENTIFICACIÓN:
Vendedor: ABRAHAM NEIRA GALINDO	cc. 108.501 de Bogotá
Compradora: REFORESTADORA CUMARE S.A.S.,	NIT. 900.614.469-0

Papel notarial para uso exclusivo en la escritura pública - No tiene valor para el usuario

Annex 2. CERTIFICATE OF EXISTENCE AND LEGAL REPRESENTATION



Cámara de Comercio de Bogotá
Sede Virtual

CERTIFICADO DE EXISTENCIA Y REPRESENTACIÓN LEGAL

Fecha Expedición: 9 de julio de 2021 Hora: 08:11:18

Recibo No. AB21041074

Valor: \$ 6,200

CÓDIGO DE VERIFICACIÓN B2104107428F2B

Verifique el contenido y confiabilidad de este certificado, ingresando a www.ccb.org.co/certificados/electronicos y digite el respectivo código, para que visualice la imagen generada al momento de su expedición. La verificación se puede realizar de manera ilimitada, durante 60 días calendario contados a partir de la fecha de su expedición.

CON FUNDAMENTO EN LA MATRÍCULA E INSCRIPCIONES EFECTUADAS EN EL REGISTRO MERCANTIL, LA CÁMARA DE COMERCIO CERTIFICA:

NOMBRE, IDENTIFICACIÓN Y DOMICILIO

Razón social: REFORESTADORA CUMARE SAS
Nit: 900.614.469-0 Administración : Direccion Seccional De Impuestos De Bogota, Regimen Comun
Domicilio principal: Bogotá D.C.

MATRÍCULA

Matrícula No. 02318894
Fecha de matrícula: 6 de mayo de 2013
Último año renovado: 2021
Fecha de renovación: 30 de marzo de 2021
Grupo NIIF: Grupo I. NIIF Plenas

UBICACIÓN

Dirección del domicilio principal: Cr 7 No. 113-16 Of 504
Municipio: Bogotá D.C.
Correo electrónico: paula.sanches@campocapital.com
Teléfono comercial 1: 3257300
Teléfono comercial 2: No reportó.
Teléfono comercial 3: No reportó.

Dirección para notificación judicial: Cr 7 No. 113-16 Of 504
Municipio: Bogotá D.C.
Correo electrónico de notificación: paula.sanches@campocapital.com
Teléfono para notificación 1: 3257300
Teléfono para notificación 2: No reportó.
Teléfono para notificación 3: No reportó.

La persona jurídica SI autorizó para recibir notificaciones personales a través de correo electrónico, de conformidad con lo establecido en los artículos 291 del Código General del Procesos y 67 del Código de Procedimiento Administrativo y de lo Contencioso Administrativo.

ANNEX 3. FORESTRY CERTIFICATE

ica		REPUBLICA DE COLOMBIA MINISTERIO DE AGRICULTURA Y DESARROLLO RURAL INSTITUTO COLOMBIANO AGROPECUARIO - ICA			
REGISTRO DE CULTIVOS FORESTALES Y SISTEMAS AGROFORESTALES CON FINES COMERCIALES					
Que el artículo 3 del Decreto 1498 de 2008 establece que todo sistema agroforestal o cultivo forestal con fines comerciales debe ser registrado ante el Ministerio de Agricultura y Desarrollo Rural o ante la entidad que este delegue. Del mismo modo, el literal b del artículo 4 del Decreto 1498 de 2008, establece como criterio para otorgamiento de registros de sistemas agroforestales o cultivos forestales con fines comerciales, que el mismo se establezca dentro de planes nacionales y regionales que contemplen el desarrollo y fomento de plantaciones forestales de carácter productor y núcleos forestales, previamente definidos por el Ministerio de Agricultura y Desarrollo Rural. Que la Resolución 00182 de 2008 expedida por el Ministerio de Agricultura y Desarrollo Rural, modificada por la Resolución 240 de 2008, establece en su artículo 1 los requisitos que deben acompañar la solicitud de registro, los cuales fueron debidamente acreditados por el solicitante. Que el ICA ha efectuado la visita técnica correspondiente comprobando que el cultivo forestal y/o sistema agroforestal con fines comerciales corresponde a especies forestales establecidas con la mano del hombre, emitiendo concepto favorable para registro. El presente registro no otorga derechos para el aprovechamiento y movilización de bosques naturales o remanentes de bosque natural, ni aplica para áreas forestales protectoras, áreas de manejo especial o cualquier otra categoría de manejo de conservación o protección; así como ecosistemas estratégicos, tales como páramos, manglares, humedales y coberturas vegetales naturales secas y en general que tengan restricción ambiental, establecidas por el Ministerio de Ambiente y Desarrollo Sostenible, por las Corporaciones Autónomas Regionales, por los Municipios, a través de los planes de ordenamiento territorial o cualquier otra autoridad con competencia en el tema. Así mismo, el presente registro no aplica para áreas de servidumbres de líneas de transmisión eléctrica acorde con lo establecido en el Reglamento Técnico de Instalaciones Eléctricas del Ministerio de Minas y Energía RETIE. Que los impactos ambientales que genere el aprovechamiento de productos contenidos en el registro de cultivos forestales y sistemas agroforestales con fines comerciales son de exclusivo conocimiento de la autoridad ambiental competente en cada jurisdicción.					
REGISTRO No.		9006144690-50-14-21552			
INFORMACION DEL PREDIO					
Nombre predio	Matrícula inmobiliaria No.	Coordenadas geográficas			
EL PORVENIR	236-20543	Latitud: 03,41199	Longitud: -72,32515		
Departamento	Municipio	Vereda			
META	SAN MARTIN	SAN MARTIN			
Observaciones	Modificación	Actualización Volumen	(13/06/2018 10:57:45)		
LOS BOSQUES NATURALES NO SON OBJETO DE ESTE REGISTRO.					
9/01/2015 Se realiza adición de nuevas áreas plantadas al registro del cultivo forestal.					
27/11/2015 Se realiza edición de registro por actualización de áreas sembradas basados en el informe técnico enviado por la líder del PFF de la Seccional.					
07/04/2017 Se realiza edición de registro por actualización de áreas sembradas basados en el informe técnico enviado por PFF de la Seccional.					
(09/08/2018 Se realiza edición de registro por actualización de áreas sembradas y actualización de volumen basados en el informe técnico enviado por PFF de la Seccional Meta)					
INFORMACION DE LAS ESPECIES					
Sistema	N. Científico/Especie	Año establecimiento	Hectáreas - No. árboles	Cantidad	Volumen M3
Plantación Forestal	Acacia mangium	2014	Hectáreas	0,39	30
Plantación Forestal	Eucalyptus pellita	2015	Hectáreas	2435,86	246292
Plantación Forestal	Eucalyptus urograndis	2015	Hectáreas	402,76	37959
Plantación Forestal	Pinus caribaea	2015	Hectáreas	50,66	6252
Plantación Forestal	Eucalyptus pellita	2016	Hectáreas	1688,54	170612
Plantación Forestal	Eucalyptus urograndis	2016	Hectáreas	384,97	10316
Plantación Forestal	Pinus caribaea	2016	Hectáreas	31,72	1716
Plantación Forestal	Eucalyptus pellita	2014	Hectáreas	1146,74	207722
Plantación Forestal	Eucalyptus urophylla	2014	Hectáreas	4,31	448
Plantación Forestal	Eucalyptus pellita	2017	Hectáreas	1408,10	0,50
Plantación Forestal	Eucalyptus urograndis	2017	Hectáreas	509	0,50
Plantación Forestal	Eucalyptus urophylla	2017	Hectáreas	12,02	0,50
Plantación Forestal	Pinus caribaea	2017	Hectáreas	48,76	0,50
INFORMACION DEL TITULAR DE REGISTRO					
Propietario o representante legal			Identificación:		
REFORESTADORA CUMARE SAS			NIT 9006144690		
Dirección	Municipio	Departamento			
CARRERA 7 No 113-16 OFICINA 504	BOGOTÁ	BOGOTÁ D. C.			
Mail:	Teléfono				
diego.lozano@campocapital.com	8052020				

ANNEX 4. LAND CERTIFICATE



**SUPERINTENDENCIA
DE NOTARIADO
& REGISTRO**
de gestión de la fe pública

OFICINA DE REGISTRO DE INSTRUMENTOS PUBLICOS DE SAN MARTIN
CERTIFICADO DE TRADICION
MATRICULA INMOBILIARIA

Certificado generado con el Pin No: 210709850344944641
Nro Matricula: 236-20543

Pagina 1 TURNO: 2021-236-1-21675

Impreso el 9 de Julio de 2021 a las 08:23:05 AM

**"ESTE CERTIFICADO REFLEJA LA SITUACION JURIDICA DEL INMUEBLE
HASTA LA FECHA Y HORA DE SU EXPEDICION"**

No tiene validez sin la firma del registrador en la ultima página

CIRCULO REGISTRAL: 236 - SAN MARTIN DEPARTAMENTO: META MUNICIPIO: SAN MARTIN VEREDA: SAN MARTIN
FECHA APERTURA: 02-02-1988 RADICACIÓN: OFICIO CON: CERTIFICADO DE: 21-01-1988
CODIGO CATASTRAL: 50689000300000000000000000000000 COD CATASTRAL ANT: 50689000300030068000
NUPRE:

ESTADO DEL FOLIO: **ACTIVO**

=====

DESCRIPCION: CABIDA Y LINDEROS

3.000 HECTAREAS. POR EL NORTE CON EL CAÑO GARNAY. POR EL SUR, CON EL CAÑO CUMARAL, POR EL ORIENTE CON CAJALITO LIMITADA, TULIO OSSA SEPARADOS ESTOS DOS LINDEROS POR CERCA DE ALAMBRE DE PUAS Y ENCIERRA ASI LA EXTENSION TOTAL DE LA FINCA Y LAS MEJORAS EN ELLA EXISTENTES. CABIDA ACTUALIZADA POR ESCRITURA 1055 DEL 16-06-88 NOTARIA UNICA DE ACACIAS. 21.438 HECTAREAS. - AREA CORRECTA DEL REMANENTE 17.250 HECTAREAS Y VER LINDEROS EN LA ESCRITURA 848 DEL 7-8-2008 NOTARIA SAN MARTIN. - AREA CORRECTA DEL PREDIO 21.438 HECTAREAS.-SEGUN SENTENCIA DEL JUZGADO PROMISCUO DEL CIRCUITO DE SAN MARTIN DE LOS LLANOS.- SEGUN ESC. 2723 DEL 10/07/2013 NOTARIA 47 DE BOGOTA EL AREA CORRECTA ES DE 17.250 HECTAREAS CERTIFICADO CATASTRAL NO. 24813 DEL 20/02/2013 Y RESOLUCION -689-0059-2012 DEL 11/07/2012 EXPEDIDOS POR EL IGAC.

AREA Y COEFICIENTE

AREA - HECTAREAS: METROS : CENTIMETROS :
AREA PRIVADA - METROS : CENTIMETROS : / AREA CONSTRUIDA - METROS : CENTIMETROS:
COEFICIENTE : %

COMPLEMENTACION:

DIRECCION DEL INMUEBLE

Tipo Predio: RURAL

1) SIN DIRECCION . EL PORVENIR.

DETERMINACION DEL INMUEBLE:

DESTINACION ECONOMICA:

MATRICULA ABIERTA CON BASE EN LA(s) SIGUIENTE(s) (En caso de integración y otros)

ANOTACION: Nro 001 Fecha: 27-03-1961 Radicación: SR

Doc: ESCRITURA 27 DEL 01-03-1961 NOTARIA UNICA DE SAN MARTIN VALOR ACTO: \$26,000

ESPECIFICACION: OTRO: 915 COMPRAVENTA

PERSONAS QUE INTERVIENEN EN EL ACTO (X-Titular de derecho real de dominio,J-Titular de dominio incompleto)

DE: AGUILERA CASTRO JEREMIAS CC# 480343

A: NEIRA GALINDO ABRAHAM CC# 108501 X

ANOTACION: Nro 002 Fecha: 26-08-1988 Radicación: 02782

Doc: ESCRITURA 1055 DEL 16-06-1988 NOTARIA UNICA DE ACACIAS VALOR ACTO: \$

ESPECIFICACION: OTRO: 915 ACTUALIZACION EN CUANTO A LA CABIDA SEGUN CATASTRO DEPARTAMENTAL. SON 21438 HAS Y NO 3000 HAS COMO REZA EL TITULO ADQUISITIVO

ANNEX 5. SOIL DESCRIPTION (I)

Entisol. It includes soils of very low pedogenetic evolution that are distributed in all the landscapes of the Meta Department. These soils have originated from sediments alluvial and present a very incipient evolutionary degree. They are characterized by their textures varied (thin to thick). Some record variable content of rock fragments (gravel, gravel and stone) both on the surface and within the profile. The soils of the Aquepts group have poor drainage and an aquic moisture regime, distributed in the concave areas of the low terraces and in the floodplain of the plains and alluvial valleys, subject to flooding and stagnation during the winter season. Sometimes they are located in the floodplains of the floodplain and in some colluvium-alluvial valleys that drain numerous sectors of the Department

Inceptisol. They are soils of little genetic development, however, they present a stage of greater evolution than Entisols, and the horizons are clearly distinguishable. Some soils have evolved from mixed alluvial sediments in flat areas to slightly flat. The soils Aquepts are located in areas with concave topography of some terraces of the plains and also in piedmont and in the floodplains of the valley landscapes and floodplain. When they have evolved in an aquic environment, they appear gray colors. In the Inceptisols, the Dystropepts are included, which occur in all landscapes and under different gradients of slope and humidity.

Oxisol., Are soils with pedogenetic horizons that contain mixtures of kaolin, oxides hydrated and quartz, they contain few weatherable minerals. The properties that characterize Oxisols are related to the very advanced degree of alteration and with the predominance of very stable minerals both in the sandy fraction (quartz) and in clay (kaolinite). At the suborder level, the classification is based on the regimes of humidity in the subsoil. They are located in the landscapes of Lomerío and the low plateau warm climate and sufficient time of action of the factors and processes of formation of soils

Ultisol. They are soils that present subsurface horizons with accumulation of clays and a low supply of bases, usually wet or damp for 90 days consecutive during a period when temperatures are suitable for the plant growth. They are located in the upper level of terraces of the alluvial plain, in some sectors of the lomerío landscape and on undulating surfaces within the plateau. They present a degree quite advanced evolution, finding a clay horizon, resulting from clay translocation processes in the profile under extreme climatic conditions. The low percentage of base saturation less than 35%, explained by the intense washing of bases to which they have been subjected and their high degree of weathering, which determines their low fertility²¹.

²¹ Extracted from "INFORME DE EVALUACION FÍSICA FINCA EL PORVENIR 19 - Febrero - 2013"

ANNEX 6. SOIL DESCRIPTION (II)

LVJ c1: It is a soil association dominated by a unit called Typic Hapludox (Order Oxisol) with slopes between 3% to 7% and another classified as Oxic Dystropepts (Ordsen Entisol) with a similar slope, this association is distributed in the central part of the farm.

The texture of Typic Hapludox in the first horizon is sandy loam and from the second horizon becomes sandy-clay loam up to 150 cm. The drainage is medium, the consistency is friable. It is a soil with a good development of its profile.

The texture of the Oxic Dystropepts is sandy-loam throughout the profile, with the presence of mottled from 80 cm. Unlike the previous one, this soil is incipient in its formation, it is a young soil with little development of the profile.

LVH dc2. A second association occupies wide sectors in the north and south of the farm corresponds to the cartographic unit that includes the Petroférric Hapludox Complex and the Typic Hapludults.

The soils of the Petroferric Hapludox Complex (Order Oxisol; suborder Udox; Large Group Hapludox) are distributed on the upper terrace levels of the piedmont landscapes and alluvial plain, on hills and hills of the lomerío landscape and on the mesa and surfaces rolling hills of the highlands.

Moderately deep soils, limited by layers of petroferic gravel, drainage moderate natural and advanced pedogenesis from claystones.

The surface texture is sandy-loam and the structure varies from granular to subangular blocks. The second and third horizons are 100 cm thick and have a sandy loam texture. At the top of the B horizon is a layer of petroferic gravel where you can find between 60 and 80% stony

LVK bc1. It corresponds to the Typic Haplustox association, which has pending vary between 3% to 12% and Ustoxic Dystropepts with slopes between 3% to 7%. The Soil generating material of Typic Haplustox corresponds to conglomerates of varied composition, instead the parent material of Ustoxic Dystropepts are clays.

Typic Haplustox are found on ridges and hills associated with mixed glacis within of the lomerío landscape and in sectors of mesa and undulating surfaces of the high plateau under warm subhumid climate. Ustoxic Dystropepts are located in areas depressed areas of some terraces of the plain and piedmont and in the floodplains of valley and floodplain landscapes

Valley soils: Two soil associations predominate on the farm, occupying fluvial-depositary surfaces encased within landscapes of higher relief, generating strips elongated, narrow and parallel to the riverbeds and streams. The generating material are mixed sediment deposits, which have given rise to poorly evolved soils, the floods and puddles that occur in winter periods constitute a limiting problem for forest use. Photo 5 shows point 015

VVB axy. The water table is highly fluctuating, sometimes with layers of stones and ridges, natural drainage is poor to moderate. The texture is frank - sandy, black, block structure den subangular type. There are sectors with poorer drainage

WC axy. This unit is located at altitudes between 125 to 300 m, it is in the vegas of the colluvio-alluvial valleys of the main secondary streams that drain the waters of the landscapes of the piedmont and hills²².

²² Extracted from “INFORME DE EVALUACION FÍSICA FINCA EL PORVENIR 19 - Febrero – 2013”

ANNEX 7. SOIL DESCRIPTION (III), SOIL PROPERTIES

Physical and chemical properties of the soil profiles of El Porvenir

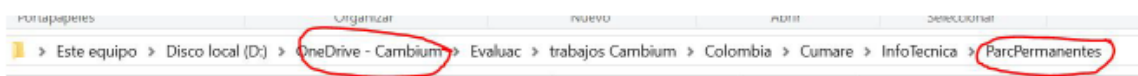
Unidad Cartografica de Suelo	Profundidad (cm)	Granulometría %			Clase textural	pH 1:1	C.O %	M.O %	Fósforo ppm	Drenaje Natural	Fertilidad Calificación
		Arenas	Limos	Arcillas							
CONSOCIACIÓN LAS CIMAS (LC) PERFIL MODAL 14	0 – 45	6	77	17	FL	4.83	2.08	3.59	1	Bien drenados	Moderada
	45 – 90	0	60	40	FArL	5.49	1.27	2.19	1		
	90 – 140	8	46	46	ArL	4.79	1.25	2.16	1		
CONSOCIACIÓN LOMAS LADERA 1 (LL1) PERFIL MODAL 05	0 – 25	70	19	11	FA	4.73	1.07	1.84	1	Bien drenados	Muy Baja
	25 – 100	7	58	35	FArL	4.93	1	1.72	4		
	100 – X	44	31	25	F	4.92	0.96	1.66	3		
CONSOCIACIÓN LOMAS LADERA 2 (LL2) PERFIL MODAL 09	0 – 23	91	9	0	A	4.88	1.64	2.83	1	Bien drenados	Muy Baja
	23 – 50	51	27	22	FArA	4.83	0.81	1.40	1		
	50 – 95	13	36	51	Ar	5.71	0.95	1.64	1		
CONSOCIACIÓN LOMAS LADERA 3 (LL3) PERFIL MODAL 13	0 – 28	86	14	0	A	5.9	2.08	3.59	1	Bien drenados	Baja
	28 – 40	6	63	31	FArL	5.37	0.97	1.67	1		
	40 – 100	6	50	44	ArL	5.2	1.05	1.81	1		
CONSOCIACIÓN LOMAS LADERA 4 (LL4) PERFIL MODAL 12	0 – 15	73	24	3	FA	5	0.9	1.55	5	Bien drenados	Muy Baja
	15 – 35	7	52	41	ArL	4.82	0.98	1.69	1		
	35 – 160	10	42	48	ArL	5.39	1.03	1.78	1		
CONSOCIACIÓN TALUD (TD) PERFIL MODAL 02	0 – 40	5	74	21	FL	4.68	1.96	3.38	1	Bien drenados	Moderada
	40 – 75	30	45	25	F	5.38	1.44	2.48	1		
	75 – 100	46	36	18	F	4.94	1.19	2.05	1		
CONSOCIACIÓN DEPRESIÓN (DP) PERFIL MODAL 01	0 – 25	12	47	41	ArL	4.64	1.04	1.79	1	Bien drenados	Baja
	25 – 55	0	36	64	Ar	4.75	1.01	1.74	1		
	55 – 85	18	41	41	ArL	4.84	1.05	1.81	1		
CONSOCIACIÓN GLACIS (GL) PERFIL MODAL 06	0 – 15	46	29	25	F	4.59	0.98	1.69	5	Bien drenados	Muy Baja
	15 – 31	4	41	55	ArL	4.6	0.82	1.41	1		
	31 – X	12	26	62	Ar	5.3	0.85	1.47	1		
CONSOCIACIÓN DESBORDE (CB) PERFIL MODAL 08	0 – 10	0	92	8	L	5.47	1.61	2.78	1	Bien drenados	Muy Baja
	10 – 75	26	44	30	FAr	5.37	0.86	1.48	1		
	75 – 115	25	43	32	FAr	5.01	0.81	1.40	1		
CONSOCIACIÓN TERRAZA (TZ) PERFIL MODAL 07	0 – 35	33	67	0	FL	4.41	1.87	3.22	1	Imperfectamente drenados	Baja
	35 – 75	18	55	27	FArL	5	1.26	2.19	1		
	75 – X	6	50	44	ArL	4.81	0.96	1.66	1		
CONSOCIACIÓN VEGA (VG) PERFIL MODAL 04	0 – 26	18	66	16	FL	4.64	2.05	3.53	1	Imperfectamente drenados	Baja
	26 – 80	7	52	41	ArL	5.04	1.34	2.31	2		
	80 – 100	10	52	38	FArL	5	1.16	2.00	1		
CONSOCIACIÓN MEÁNDROS (MD) PERFIL MODAL 03	0 – 20	5	81	14	FL	4.47	1.07	1.84	3	Pobrementemente drenados	Muy Baja
	20 – 40	19	21	60	Ar	4.58	1.18	2.03	1		
	40 – X	1	30	69	Ar	4.4	1.71	2.95	1		
CONSOCIACIÓN CUBETA DE DECANTACIÓN (CD) PERFIL MODAL 15	0 – 20	6	82	12	FL	4.4	5.19	8.95	28	Pobrementemente drenados	Baja
	20 – 40	0	50	50	ArL	4.4	0.86	1.48	1		
	40 – 90	12	48	40	FArA	4.4	0.97	1.67	1		
CONSOCIACIÓN VALLECITOS (VT) PERFIL MODAL 11	0 – 50	7	85	8	L	4.4	8.89	15.33	1	Pobrementemente drenados	Alta
	50 – X	13	46	41	ArL	4.75	1.04	1.76	3		

ANNEX 8. DATA MANAGEMENT STANDARD OPERATIONAL PROCEDURE

Protocolo respaldo información Parcelas Permanentes Cumare

El presente texto describe brevemente el proceso que se aplica para el cuidado de los datos y resultados de las mediciones de la red de parcelas permanentes (PP) de Cumare.

- Los datos de la medición de cada año se envían al área técnica de Cambium Chile (representado por Mariana Lobel) al final del proceso de medición, digitación y revisión realizado por el área de planificación silvícola de Campo Forestal (representada por Fabián Herrera).
- Esto se realiza en formato planilla y vía correo electrónico con las direcciones de correo electrónico institucionales de ambas partes.
- Una vez recibido el correo con los datos, estos se guardan en la carpeta de trabajo correspondiente a las parcelas permanentes, en el disco duro del Notebook de la encargada del área técnica de Cambium.
- Dicha carpeta se encuentra anidada dentro de la carpeta raíz “OneDrive – Cambium” como se observa en la siguiente imagen:



- Específicamente, la siguiente imagen muestra las planillas asociadas a los datos de las parcelas permanentes a través del tiempo.

Disco local (D:) > OneDrive - Cambium > Evaluac > trabajos Cambium > Colombia > Cumare > InfoTécnica > ParcPermanentes			
Nombre	Estado	Fecha de modificación	
Datos Parcelas permanentes Instalac 2016.xlsx	✓	24-10-2019 10:37	
Datos Parcelas permanentes Instalac 2018 red 2018.xlsx	✓	01-11-2019 22:14	
Datos Parcelas permanentes Instalac 2019 red 2019 en plantac 2018.xlsx	✓	24-02-2021 16:11	

ANNEX 9. FIELD DATA COLLECTION FORM

Note that this forms were collected on the 25th November 2020, this is the last day of the measurement campaign 2020

Parcela		Árbol		2019		2020		Observaciones	
Parcela	Árbol	DAP (cm)	Hi (m)	Fecha	DAP (cm)	Hi (m)	Sanidad	Forma	IAF
291	54	9,9	10,9		11,4	12,5			
291	55	10,7	11,3		12,5	12,7			
291	56	10,9	11,2		12,7	12,7		2010	
291	57	8,8	10,2		9,8	11,7			
291	58	6,4	7,8		7,2	10,1		2030	
291	59	9,8	10,3		11,1	12,4			
291	60	8,3	10,7		9,6	11,7			
291	61	9,8	12,2		15,3	14,7			
291	62	9,5	12,1		11,5	14,4			
291	63	9,0	10,7		10,9	13,4			
291	64	10,8	12,6		12	14			
291	65	9,0	10,8		10,5	12,3			
291	66	6,8	9,5		8,2	12,6			
291	67	12,5	11,5		14,8	13,4			
291	68	10,2	10,8		12,8	13,6			
291	69	2,3	2,5		0	0		3000	
291	70	7,0	6,4		7,2	7,4		2030	
291	71	8,9	10,8		10,5	12,4			
291	72	7,8	9,2		8,4	11,7			
291	73	8,7	10,3		9,2	11,3			
291	74	10,7	12,4		13	14,4			
291	75	9,1	10,7		9,4	12,3			
291	76	11,2	12,2		13,6	14,6			
291	77	8,4	9,8		8,6	11,7			
296	1	11,3	11,7		13,2	17,0			
296	2	11,9	11,8		14,8	15,1			
296	3	11,5	12		13,8	15,0			
296	4	9,9	10,7		11,1	14,0			
296	5	8,8	10,4		10,0	13,8			
296	6	0,0	0					4000	
296	7	10,5	10,5		13,3	14,2			
296	8	13,3	10,5		15,5	14,2			
296	9	10,5	12,7		11,8	15,6			
296	10	9,4	10,4		11,3	13,8			
296	11	8,8	8,4		9,7	10,4			
296	12	13,3	10,4		15,2	13,1			
296	13	5,5	4,4					3000	

25/11/20
EV-56

	Formato de medición de parcelas permanentes Rodales 2014 - 2018		Cuadrilla:
			Parcela:
			Pendiente:
			Maleza:

Parcela	Árbol	2019		Fecha	2020					Observaciones
		DAP (cm)	Ht (m)		DAP (cm)	Ht (m)	Sanidad	Forma	IAF	
301	1	8,1	9,6		9,0	13,1				
301	2	10,2	9,9				3050			
301	3	10,4	10,2		13,2	12,9				
301	4	12,5	10,2		15,5	13,3				
301	5	6,2	8,1		7,1	9,7				
301	6	0,0	0		3,4	6,6				rebrote
301	7	3,9	5		4,4	6,2				
301	8	9,2	8,5		10,5	10,6				
301	9	9,1	9,3		9,9	11,5				
301	10	10,5	10,4		12,5	13,2				
301	11	0,0	0		5,6	8,3				rebrote
301	12	9,7	6,9		10,1	8,1				
301	13	10,2	9,5		11,9	12,5				
301	14	10,2	7,2		8,7	9,8				
301	15	10,2	6,8		10,0	8,9				
301	16	10,2	6,7		2,5	4,3				rebrote
301	17	11,5	9,5		13,7	12,8				
301	18	9,9	7,7		11,8	10,6				
301	19	7,2	7,8		7,5	8,5				
301	20	8,7	9,7		12,0	12,3				
301	21	11,0	9,6		13,0	12,1				
301	22	11,2	9,9		13,0	13,8				
301	23	11,6	11		14,1	14,0				
301	24	6,7	5,7		7,5	9,2				
301	25	4,0	5,3		5,5	7,4				
301	26	12,3	9,3		13,8	11,8				
301	27	7,6	7,5		6,4	9,1				
301	28	0,0	0				400			
301	29	0,0	0		3,9	5,1				
301	30	4,9	7,7		6,5	9,2				
301	31	13,5	13,3		16,6	17,0				
301	32	13,5	9		16,2	12,4				
301	33	3,7	4,8		5,1	6,7				
301	34	12,9	8,5		14,0	11,7				
301	35	9,3	9,2		11,7	12,1				
301	36	7,0	8,9		9,4	11,0				
301	37	8,6	8,3		9,2	10,8				

EV-JG
25/1/20

	Formato de medición de parcelas permanentes Rodales 2014 - 2018			Cuadrilla:	
				Parcela:	
				Pendiente:	
				Maleza:	

301	38	11,2	10,7	13,5	5+25	14,2	
301	39	0,0	0		7,5-3	3000	
301	40	9,4	9,7	11,0	12,9		
301	41	10,8	10,3	13,4	15,3		
301	42	12,6	11,3	15,4	15,4		
301	43	6,9	8,5	8,4	11,3		
301	44	8,4	9,9	9,8	11,3		
302	1	11,8	11	13,3	13,6		
302	2	0,0	0	14,4	11,2		
302	3	11,7	12	14,1	14,0		
302	4	5,4	4	5,4	4,0	2020	
302	5	12,4	12	14,8	14,8		
302	6	12,5	11	12,9	15,1		
302	7	13,8	11	12,6	15,6		
302	8	10,7	11	12,8	12,6		
302	9	6,8	8	8,4	7,3		
302	10	11,7	12	16,7	14,1		
302	11	6,8	5	6,7	9,0		
302	12	6,8	6	7,4	8,2		
302	13	7,0	7	7,9	8,1		
302	14	6,9	6	-	-	3000	
302	15	11,1	10	11,1	13,8		
302	16	4,3	5	5,0	5,3		
302	17	11,7	10	11,8	13,1		
302	18	9,4	8	9,5	11,4		
302	19	8,7	8	11,5	9,7		
302	20	10,5	8	10,6	12,7		
302	21	11,0	9	12,7	12,4		
302	22	8,0	7	8,6	9,3		
302	23	7,7	6	8,0	8,1		
302	24	9,7	10	12,9	12,2		
302	25	11,8	9	11,9	13,5		
302	26	11,1	10	11,2	13,1		
302	27	8,3	8	9,4	9,8		
302	28	14,6	11	14,7	17,2		
302	29	7,4	9	10,1	8,1		
302	30	10,7	11	12,4	12,3		
302	31	11,3	11	7,1	14,3	2030	
302	32	9,5	10			3000	

700000 con
rebrado

301

EV-36
25/11/20

ANNEX 10. GESFOR DETAILED PLANTINGS 2016

Usuario : manager

Documentos

Patrones

Servicios

Consultas

Administración

Administración

Operaciones

Unidad

Ordenes de Servicio

Servicios Contratistas

Servicios Informes

Liquidaciones

Resumen de Liquidaciones

Pre-Factura

GEMIS

Liquidaciones

Periodo Desde : 04/2016

Hasta : 12/2016

Pais : Colombia

Empresa : Cumare

Predio : Rodal

Numero O.S. :

Tipo Orden Servicio :

Estado :

Moneda : Sectores :

Servicio : 4290

Plantacion Semilla

Contratista :

Buscar

Limpiar

Salir

Previous

Show All 27

Next

PERIODO	EMBARCANTE	CONTRATISTA	O.S.	TIPO O.S.	TIPO SERVICIO	SERVICIO	AREA	SECTOR	NOIMPREDIO	PREDIO	CD.RODAL	EPOCA	ESPECIE	PLANT.	NOIMPREDIO	ESTADO	CANT. UMS	PRECIO MONEDA	TOTAL \$ UMS	UMS	CENTRO	CUENTA	OBSERVACION	FECHA PERIODO	TOTAL US\$	TASA IMPUESTO	
10-2016	Cumare	Referente S.A.S.	2015801	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	17,100	na	242,220.00	COP	4,141,962.00	17,100	na	Plantacion eucalipto	Contratistas Forestales		19201601	1,395.70	0
10-2016	Cumare	Referente S.A.S.	2015198	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	70,000	na	206,845.00	COP	14,479,150.00	70,000	na	Plantacion eucalipto	Contratistas Forestales		19201601	4,876.96	0
10-2016	Cumare	Grupo VALT S.A.S.	2016102	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	142,000	na	60,476.00	COP	8,587,592.00	142,000	na	Plantacion eucalipto	Contratistas Forestales		19201601	2,893.73	0
10-2016	Cumare	Grupo VALT S.A.S.	2016102	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	22,000	na	66,885.00	COP	1,471,470.00	22,000	na	Plantacion eucalipto	Contratistas Forestales	25% tarifa x no ejecucion	19201601	495.84	0
11-2016	Cumare	Referente S.A.S.	2016164	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	-19,900	na	206,845.00	COP	-4,116,216.00	-19,900	na	Plantacion eucalipto	Contratistas Forestales	Esta superfi se descuenta por cambio de tarifa. Se paga a \$234658	19201601	-1,300.51	0
11-2016	Cumare	Referente S.A.S.	2016164	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	19,900	na	234,658.00	COP	4,669,694.00	19,900	na	Plantacion eucalipto	Contratistas Forestales	Superficie Plantada a 1300 Planta	19201601	1,475.37	0
5-2016	Cumare	Referente S.A.S.	2015801	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	57,000	na	287,916.00	COP	16,411,212.00	57,000	na	Plantacion eucalipto	Contratistas Forestales		19201601	5,347.12	0
5-2016	Cumare	Grupo VALT S.A.S.	2016102	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	166,000	na	267,542.00	COP	44,411,972.00	166,000	na	Plantacion eucalipto	Contratistas Forestales	plantacion en serrana	19201601	14,470.35	0
6-2016	Cumare	Referente S.A.S.	2015801	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	63,000	na	242,220.00	COP	20,104,260.00	63,000	na	Plantacion eucalipto	Contratistas Forestales		19201601	6,894.11	0
6-2016	Cumare	Referente S.A.S.	2015801	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	002	19201601	Primavera 19	2016	01	Avance	50,000	na	242,220.00	COP	12,111,000.00	50,000	na	Plantacion eucalipto	Contratistas Forestales		19201601	4,153.68	0
6-2016	Cumare	Referente S.A.S.	2015198	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	170,000	na	206,845.00	COP	35,163,648.00	170,000	na	Plantacion eucalipto	Contratistas Forestales		19201601	12,058.24	0
7-2016	Cumare	Referente S.A.S.	2015801	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	34,200	na	242,220.00	COP	8,283,924.00	34,200	na	Plantacion eucalipto	Contratistas Forestales	plantacion pella	19201601	2,688.06	0
7-2016	Cumare	Referente S.A.S.	2015801	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	1,000	na	253,250.00	COP	253,250.00	1,000	na	Plantacion eucalipto	Contratistas Forestales	compensacion tiempo	19201601	82.18	0
7-2016	Cumare	Referente S.A.S.	2015801	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	126,700	na	269,837.00	COP	34,188,348.00	126,700	na	Plantacion eucalipto	Contratistas Forestales	plantacion urugrandis 2016	19201601	11,093.81	0
7-2016	Cumare	Referente S.A.S.	2015198	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	25,000	na	206,845.00	COP	5,171,125.00	25,000	na	Plantacion eucalipto	Contratistas Forestales	plantacion de pino en serrana 2016	19201601	1,677.98	0
7-2016	Cumare	Referente S.A.S.	2015198	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	65,000	na	206,845.00	COP	13,444,925.00	65,000	na	Plantacion eucalipto	Contratistas Forestales	Plantacion de eucalyptus pella 2016 en serrana	19201601	4,982.76	0
7-2016	Cumare	Referente S.A.S.	2015198	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	110,000	na	234,658.00	COP	25,812,380.00	110,000	na	Plantacion eucalipto	Contratistas Forestales	Plantacion de eucalyptus urugrandis 2016 en serrana	19201601	6,375.88	0
7-2016	Cumare	Grupo VALT S.A.S.	2016102	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	48,000	na	241,902.00	COP	11,611,296.00	48,000	na	Plantacion eucalipto	Contratistas Forestales	Plantacion eucalyptus pella	19201601	3,767.76	0
8-2016	Cumare	Referente S.A.S.	2015801	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	200,000	na	242,220.00	COP	48,444,000.00	200,000	na	Plantacion eucalipto	Contratistas Forestales	plantacion semilla pella	19201601	16,012.26	0
8-2016	Cumare	Referente S.A.S.	2015801	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	002	19201601	Primavera 19	2016	01	Cierre	50,000	na	242,220.00	COP	12,111,000.00	50,000	na	Plantacion eucalipto	Contratistas Forestales		19201601	4,128.07	0
8-2016	Cumare	Referente S.A.S.	2015198	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	110,000	na	206,845.00	COP	22,752,950.00	110,000	na	Plantacion eucalipto	Contratistas Forestales	Plantacion semilla pella	19201601	7,755.40	0
8-2016	Cumare	Referente S.A.S.	2015198	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	110,000	na	234,658.00	COP	25,812,380.00	110,000	na	Plantacion eucalipto	Contratistas Forestales	Plantacion urugrandis 1300 arboles	19201601	6,798.22	0
8-2016	Cumare	Grupo VALT S.A.S.	2016102	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	220,000	na	241,902.00	COP	53,218,440.00	220,000	na	Plantacion eucalipto	Contratistas Forestales	Plantacion de euca pella	19201601	18,139.84	0
8-2016	Cumare	Referente S.A.S.	2016102	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	2,000	na	267,542.00	COP	535,084.00	2,000	na	Plantacion eucalipto	Contratistas Forestales	Plantacion en serrana	19201601	182.38	0
9-2016	Cumare	Referente S.A.S.	2015801	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	146,000	na	242,220.00	COP	35,364,120.00	146,000	na	Plantacion eucalipto	Contratistas Forestales		19201601	12,279.42	0
9-2016	Cumare	Referente S.A.S.	2015198	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	140,000	na	206,845.00	COP	28,958,300.00	140,000	na	Plantacion eucalipto	Contratistas Forestales		19201601	10,055.14	0
9-2016	Cumare	Referente S.A.S.	2016102	co_Silvcola	Establecimiento de Plantaciones	Plantacion Semilla	Colombia	El Porvenir	001	19201601	Primavera 19	2016	01	Cierre	160,000	na	241,902.00	COP	38,704,320.00	160,000	na	Plantacion eucalipto	Contratistas Forestales		19201601	13,439.23	0

ANNEX 11. EXTERNAL EVIDENCE

In this annex we will detail all the external evidence provided

- Incedios Meta.xlsx
- Plan de Manejo FSC – Campo Forestal
- Operations Procedures Manual
- SIPRA-UPRA Legend Coverage 2010-2012 Level 3
- Environmental Education Report 2016-2017
- Estrategia social 2015-2016-2017-2018-2019-2020
- Reporte Proyectos Productivos 2018-2019-2020
- Public summary of environmental and social monitoring 2016-2017-2018-2019-2020
- REFORESTADORA CUMARE SAS Management Summary 2014-2015-2016-2017-2018-2019-2020
- Deed of sale El Porvenir
- El Porvenir soils technical report
- Incio – Proclima - Proclima is a registration program and carbon credits verification and validation in Colombia. With this document we show that Cumare has not submitted any GHG quantification project in Proclima
- Growth Responses of Eucalyptus pellita F.Muell Pla
- EcoRegistry – Registered - Carbon market platform in Colombia. Eco registry seeks the reliability of the voluntary carbon market. With this document we show that Cumare has not presented any GHG quantification project in EcoRegistry
- COLCX – Retiros.xlsx - GHG mitigation project registration platform. With this document we show that Cumare has not presented any GHG quantification project in COLCX
- ArtigoPublicado - Quantification of Forestry and Carbonization Waste
- 2017 PROFOR Commercial plantations in Colombia Synthesis Quality
- Comparison of models – Volumen.xlsx
- Social Strategy CF.docx
- Characterization_of_the_orinoquia
- Carbon stocks - VCS Grouped project 26112021
- VCS-Non-Permanence-Risk 26112021_final
- ANÁLISIS DE NO CONVERSIÓN DE BOSQUE NATIVO_El Porvenir-2021”
- GIS Data Base