'LUMIN URUGUAY' FOREST PLANTATIONS ON DEGRADED GRASSLANDS UNDER EXTENSIVE GRAZING

Document Prepared by Carbosur

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Table of Contents

1 Summary of Project Benefits 3
1.1 Unique Project Benefits 3
1.2 Standardized Benefit Metrics 4
2 General 8
2.1 Project Description 8
2.2 Project Implementation Status 15
2.3 Stakeholder Engagement 21
2.4 Management Capacity 33
2.5 Legal Status and Property Rights 36
3 CLIMATE 38
3.1 Monitoring GHG Emission Reductions and Removals 38
3.2 Quantification of GHG Emission Reductions and Removals 56
3.3 Optional Criterion: Climate Change Adaptation Benefits 63
4 Community 64
4.1 Net Positive Community Impacts 64
4.2 Other Stakeholder Impacts 71
4.3 Community Impact Monitoring 71
4.4 Optional Criterion: Exceptional Community Benefits 73
5 Biodiversity 74
5.1 Net Positive Biodiversity Impacts 74
5.2 Offsite Biodiversity Impacts 81
5.3 Biodiversity Impact Monitoring 82
5.4 Optional Criterion: Exceptional Biodiversity Benefits 88
6 Additional Project Implementation Information 88
7 Additonal project Impact Information 88
Appendicies 89
7.1 Appendix 1: New Project Areas and Stakeholders 89
7.2 Appendix 2: Project Risks Table 90
7.3 Appendix 3: Additional Information 91

1 SUMMARY OF PROJECT BENEFITS

This section highlights some of this project's important benefits. Section 1.1 (Unique Project Benefits) should be aligned with a project's causal model and is specific to this project. Section 1.2 (Standardized Benefit Metrics) is the same quantifiable information for all CCB projects. This section does not replace the development of a project-specific causal model or the monitoring and reporting of all associated project-specific impacts (positive and negative) in Sections 2-5 of this document.

1.1 Unique Project Benefits

Outcome or Impact	Achievements during the Monitoring Period	Section Reference	Achievements during the Project Lifetime
1) Improve local production conditions and ecological environment, enhance the quality of life, create a good investment and environmental development and play a leading role in forestry sector	Local production conditions have been improved with the introduction of a new activity (forestry) that generates more income per unit of land, compared to baseline scenario. Currently, 230 direct and indirect workers are employed by LUMIN/EUCAPINE project.	3-5	Idem
2) Provide experience of forest planting and forest management in degraded grasslands	Forest activity in the area (and in Uruguay) has recently started. The project aims to improve labor conditions and increase workers technical capacity. At present, 330 workers have been trained in forest operational activities	3-5	Idem
3) Improve the ecological environment of the planted areas and the native forests surrounding the forest plantations	Biodiversity monitoring is a key element in LUMIN/EUCAPINE project. Results have shown that project sites are being categorized with high biodiversity value, according to standardized methodologies.	5	Idem
4) Create net positive benefits to the community and stakeholders of the project compared with the baseline scenario.	Communities are being benefited with the project activity from multiple point of views. Local businesses have increased direct and indirectly because of project activity (hotel, restaurants, garages, etc.) Compared with baseline scenario, there are 667 people expected to have improved their livelihoods or income generated as a result of project activities	4	Idem

1.2 Standardized Benefit Metrics

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
GHG emission reductions & removals	Net estimated emission removals in the project area, measured against the without-project scenario	4,940,273 tCO2		6,498,272 tCO_2
	Net estimated emission reductions in the project area, measured against the without-project scenario	N/A		N/A
Forest[1] cover	For REDD[2] projects: Number of hectares of reduced forest loss in the project area measured against the without-project scenario	N/A		N/A
	For ARR[3] projects: Number of hectares of forest cover increased in the project area measured against the without-project scenario	18,988 ha		18,988 ha
Improved land management	Number of hectares of existing production forest land in which IFM[4] practices have occurred as a result of the project's activities, measured against the without-project scenario	N/A		N/A
	Number of hectares of non-forest land in which improved land management has occurred as a result of the project's activities, measured against the without-project scenario	N/A		N/A
Training	Total number of community members who have improved skills and/or	330		330

[1] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)
[2] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)
[3] Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)
[4] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood and fuelwood (*VCS Program Definitions*)

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	knowledge resulting from training provided as part of project activities			
	Number of female community members who have improved skills and/or knowledge resulting from training provided as part of project activities of project activities	68		68
Employment	Total number of people employed in of project activities,[5] expressed as number of full time employees[6]	230		230
	Number of women employed in project activities, expressed as number of full time employees	18		18
Livelihoods	Total number of people with improved livelihoods[7] or income generated as a result of project activities	667		667
	Number of women with improved livelihoods or income generated as a result of project activities	178		178
Health	Total number of people for whom health services were improved as a result of project activities, measured against the without-project scenario	667		667
	Number of women for whom health services were improved as a result of project activities, measured against the without-project scenario	178		178

[5] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.
[6] Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])
[7] Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. *The Sustainable Livelihood Approach to Poverty Reduction*. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Education	Total number of people for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	240		240
	Number of women and girls for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	120		120
Water	Total number of people who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	N/A. However, forestry practices applied in LUMIN/EUCAPINE project are the latest available technology and practices that prevents the laminar erosion or diminishes the leakage of fertilizers, preventing the translocation of sediments or nutrients into the water courses, which are used as drinkable water.		
	Number of women who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	N/A		

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Well-being	Total number of community members whose well-being[8] was improved as a result of project activities	63,320		63,320
	Number of women whose well-being was improved as a result of project activities	33,916		33,916
Biodiversity conservation	Change in the number of hectares significantly better managed by the project for biodiversity conservation,[9] measured against the without-project scenario	44,854		44,854
	Number of globally Critically Endangered or Endangered species[10] benefiting from reduced threats as a result of project activities,[11] measured against the without-project scenario	27		27

[8] Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Health, Education, Water, etc.), but could also include other benefits such as empowerment of community groups, strengthened legal rights to resources, conservation of access to areas of cultural significance, etc.
[9] Biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation.
[10] Per IUCN's Red List of Threatened Species
[11] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 GENERAL

2.1 Project Description

2.1.1 Implementation Description

The main objectives of the project activity are the responsible wood production, conservation of natural resources, land restoration and carbon sequestration through afforestation. All practices follow FSC® forest management standard for responsible forest management, while enhancing biodiversity conservation by increasing the connectivity of forests and different ecosystems, generating income and job opportunities for local communities in rural areas of the centre-east region of Uruguay.

The project comprises a total of 18,988 hectares of land previously under extensive grazing by beef cattle, on which forest plantations for obtaining high-value, long-lived timber products and for sequestering large amounts of carbon dioxide from the atmosphere were established. The total area affected by the project is 44,854 hectares, if we include buffer zones, grasslands and native forests.

The forests were based mainly on *Eucalyptus grandis* and, to a lesser extent, on *Eucalyptus dunnii* and *Pinus taeda* plantations in rotations of 16 to 22 years, with pruning (at a minimum height of 9 m) and two to three thinning operations, to obtain knotless large diameter logs suitable for sawing and plywood production. Most of the plantations have already been carried out and the forests will be replanted after clear cutting. The first Lumin/Eucapine forest plantations in the Central-East region were carried out in 2006. The practices will be compatible with the FSC® standard for responsible forest management. Planted forests will remove carbon dioxide from the atmosphere and store it in different carbon pools (aboveground and underground biomass, soil organic carbon, waste and dead wood).

The baseline study determined that continuation of extensive grazing is the most likely use of the land. Additionality is demonstrated through the fact that the expected internal rate of return of the proposed project activity without considering carbon finance is lower than the benchmark internal rate of return for this type of investment in Uruguay. The inclusion of new project areas in this monitoring event is considered in its corresponding section.

The potential non-permanence of stored carbon was considered by the non-permanence risk analysis and buffer determination, and by the fact that a significant fraction of the sequestered carbon will be stored in long-lived products which will not be accounted.

As it was demonstrated during validation, the project implementation does not and did not cause any displacement of activities. The only activity in the project area prior to the start date is extensive grazing by beef cattle, which continues to occur after project start. This can be audited by the verification team during on site visit. It was also stated and validated in the PD that there was no need for a leakage management plan neither for leakage mitigation options. The information regarding aspects related to the non permanence risks of the project, it is presented as a separate document called “Non Permanence Risk Report”.

The project will result in a significant contribution to sustainable development of Uruguay, mainly through: i) increased employment ii) an increase in the quality of employment iii) rural development (decentralization); iv) increased gross value of production; v) improved fiscal balance; vi) biodiversity preservation and vii) improvement and preservation of soil quality.

The total GHG emission reductions or removals generated in this monitoring period is shown in Table 1.

Table 1: Year that the emissions reduction took place (Vintage).

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2013	0	742.516	0	742.516
2014	0	906.465	0	906.465
2015	0	760.944	0	760.944
2016	0	849.680	0	849.680
2017	0	805.362	0	805.362
2018	0	453.544	0	453.544
2019	0	131.382	0	131.382
2020	0	290.380	0	290.380
Total	0	4.940.273	0	4.940.273

2.1.2 Project Category and Activity Type

This is an ARR project. The project is not a grouped project.

2.1.3 Project Proponent(s)

Organization name	LUMIN/EUCAPINE SRL
Contact person	Alvaro Molinari
Title	Civil Engineer, General Manager
Address	Roque Graseras 694, Montevideo-Uruguay
Telephone	(+598) 27124429
Email	Isabel.lozabalbuena@lumin.com

2.1.4 Other Entities Involved in the Project

All activities related to forest investments, marketing and management of LUMIN/EUCAPINE are implemented by its own management team.

Carbosur has a contractual agreement with LUMIN/EUCAPINE for the development and management of the carbon component of the project. It is not a project proponent.

Organization name	Carbosur
Role in the project	Development and management of the carbon component of the project. It is not a project proponent
Contact person	Alvaro Perez del Castillo
Title	Forest Engineer- Director
Address	Costa Rica 1566
Telephone	+598 26056231
Email	info@carbosur.com.uy

Pike Consultora Forestal (Pike&Co.) has a contractual agreement with LUMIN/EUCAPINE for performing plot measurements. It is not a project proponent.

Organization name	Pike Consultora Forestal SRL
Role in the project	Forest Inventories and Carbon Stock Calculations
Contact person	Alvaro Perez del Castillo
Title	Forest Engineer- Director
Address	Costa Rica 1566
Telephone	+598 26056234
Email	info@pike.com.uy

2.1.5 Project Start Date (G1.9)

The project start date is February 22nd, 2006, when the activities leading to the generation of GHG emission removals (preparing land for planting) were first implemented.

2.1.6 Project Crediting Period (G1.9)

Project crediting period will be of 60 years, from 24th April 2006 to 24th April 2066

2.1.7 Project Location

The project is located in the east of Uruguay, in the departments of Cerro Largo and Treinta y Tres. It comprises several sites, which are classified in 4 regions: ´Centurion´, ´Octava CL´, ´Ruta 7´ and ´Ruta 8´; based on their geographic location. The areas are homogeneous in terms of soil type, climate, land use history and socio-economic conditions. The following map (Figure 1) shows the exact location of the project, and the cadastral units owned by LUMIN/EUCAPINE., where the project is located.

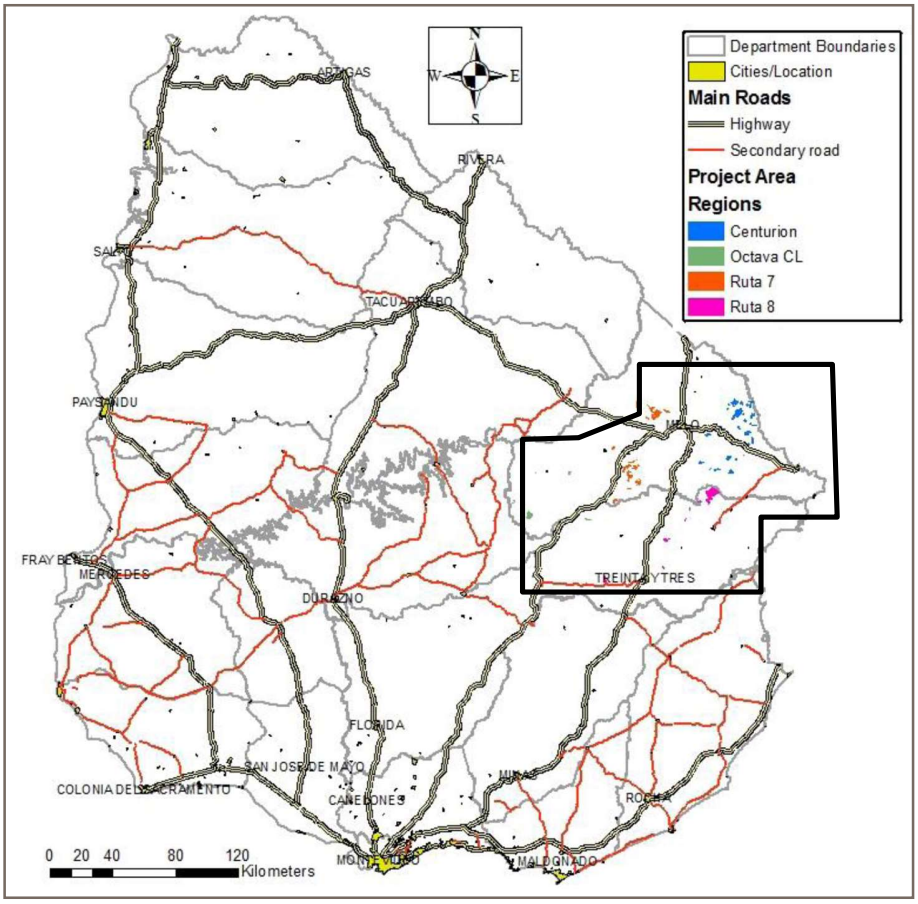

Figure 1. Map of Uruguay showing the location of the areas included in the proposed project activity (black frame).

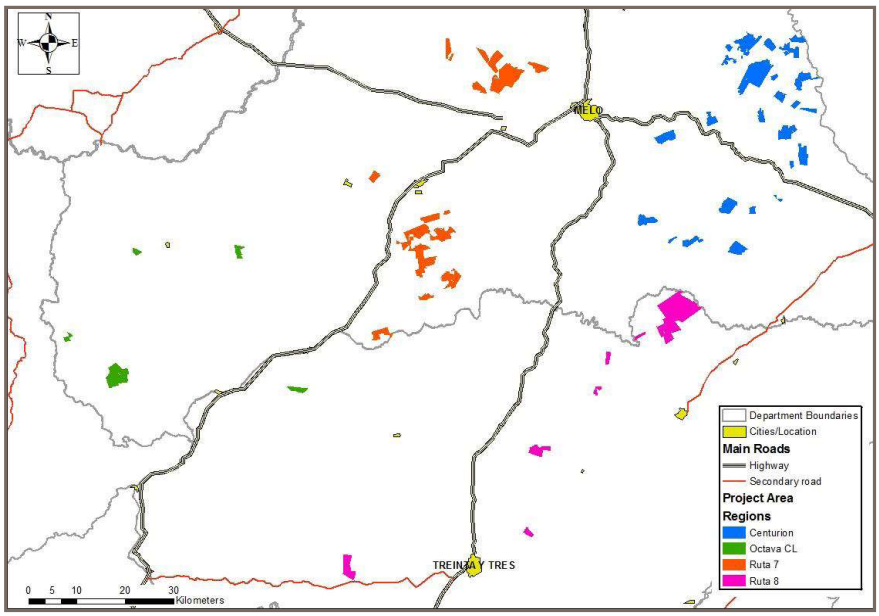

Figure 2. Map indicating the four project regions divided in four different colors.

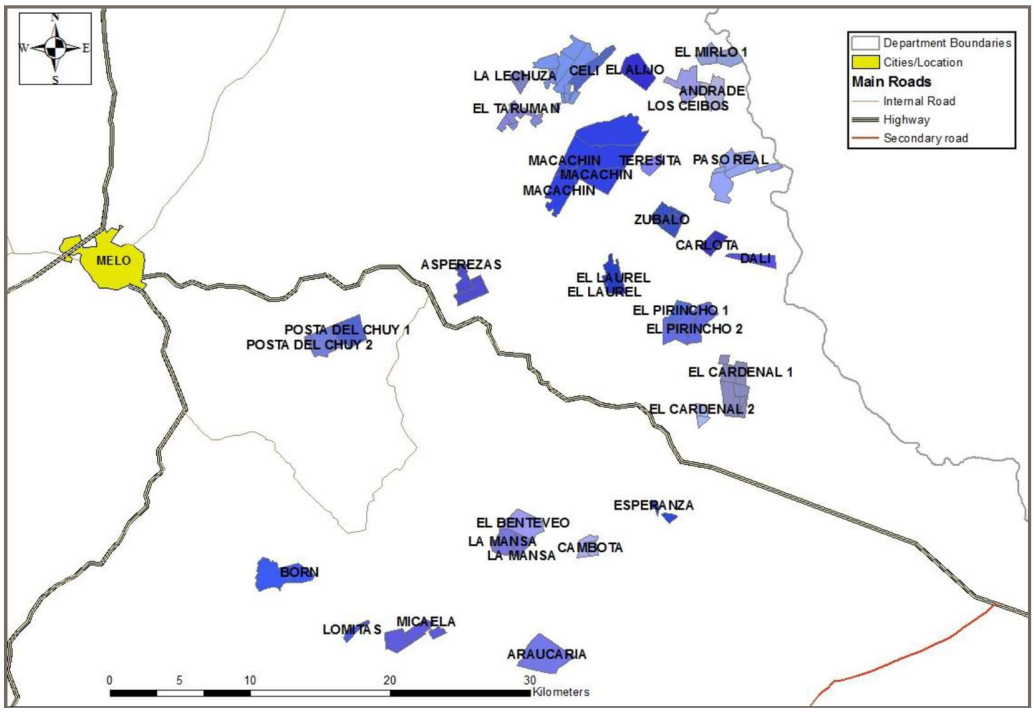

Figure 3. Location of properties which make up the ´Centurión´ region.

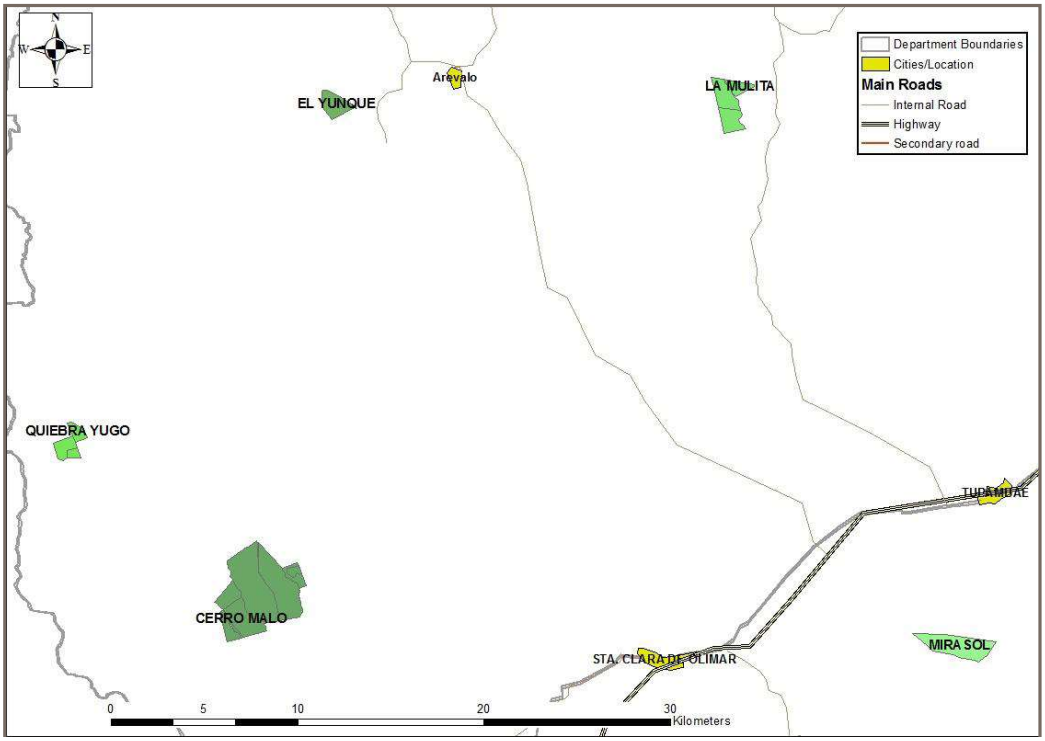

Figure 4. Location of properties which make up the ´Octava CL´ region.

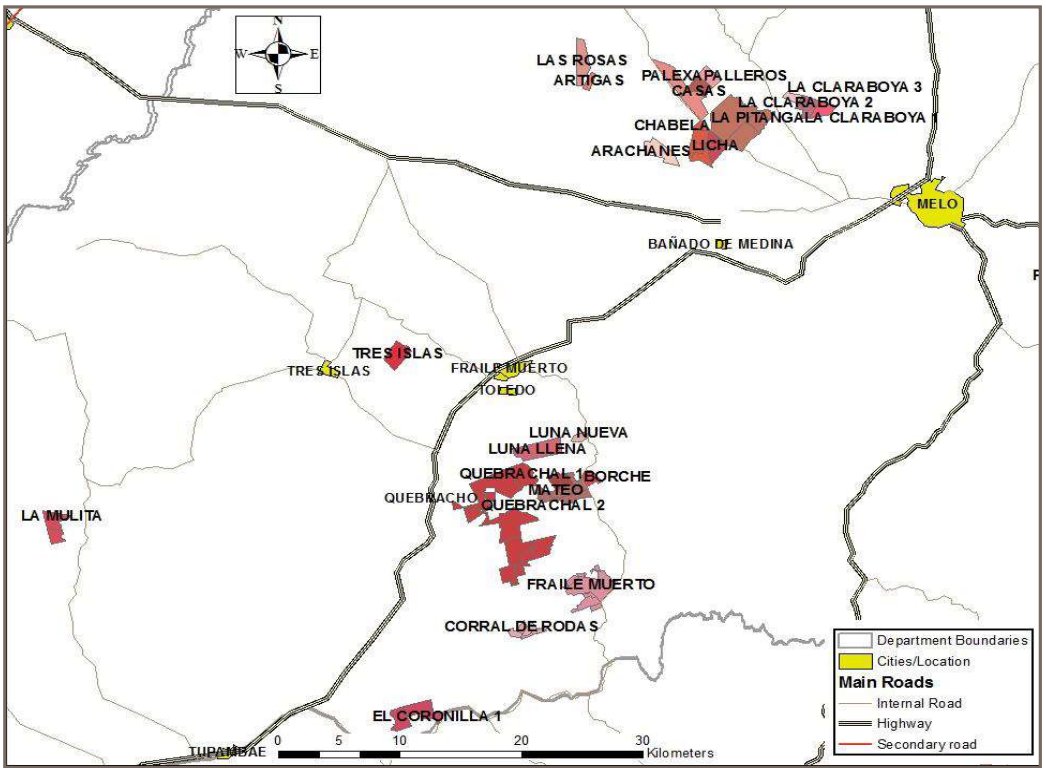

Figure 5. Location of properties which make up the ´Ruta 7´ region.

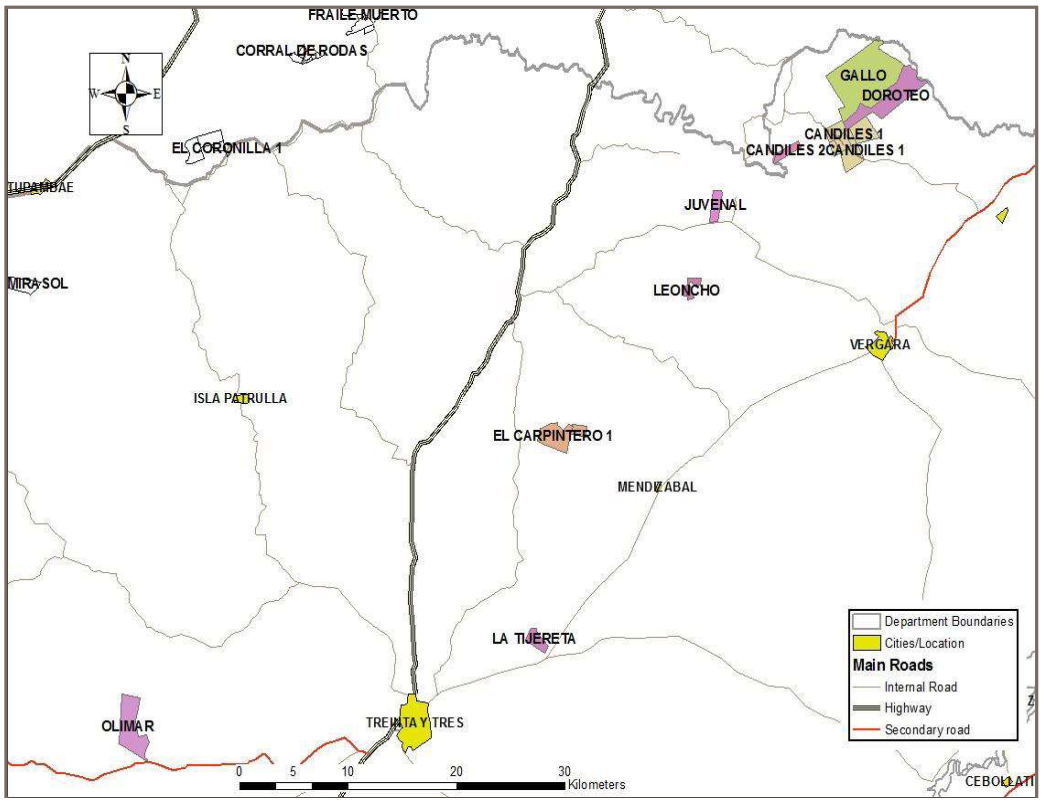

Figure 6. Location of properties which make up the ´Ruta 8´ region.

Regarding geographic location of different properties, a .kmz file was with the location was uploaded in Verra´s site.

Table 2. Project boundaries by region and species.

Region	*E. grandis (ha)*	*E. dunnii (ha)*	*P. taeda (ha)*	Total area (ha)
Centurión	5.885	746	678	7.310
Octava CL	5.065	657	818	6.540
Ruta 7	3.599	211	361	4.170
Ruta 8	554	122	292	968
Total area (ha)	15.103	1.735	2.149	18.988

Project boundaries were identified using a GPS and aerial photography, and have been laid on a geographic information system. The information provided during verification is the same information showed in the validation, there were no boundaries modifications in these 5 months after project registration. No visible landmarks are established on the field, the limits are on plantations edges defined by tillage during land preparation and plantation.

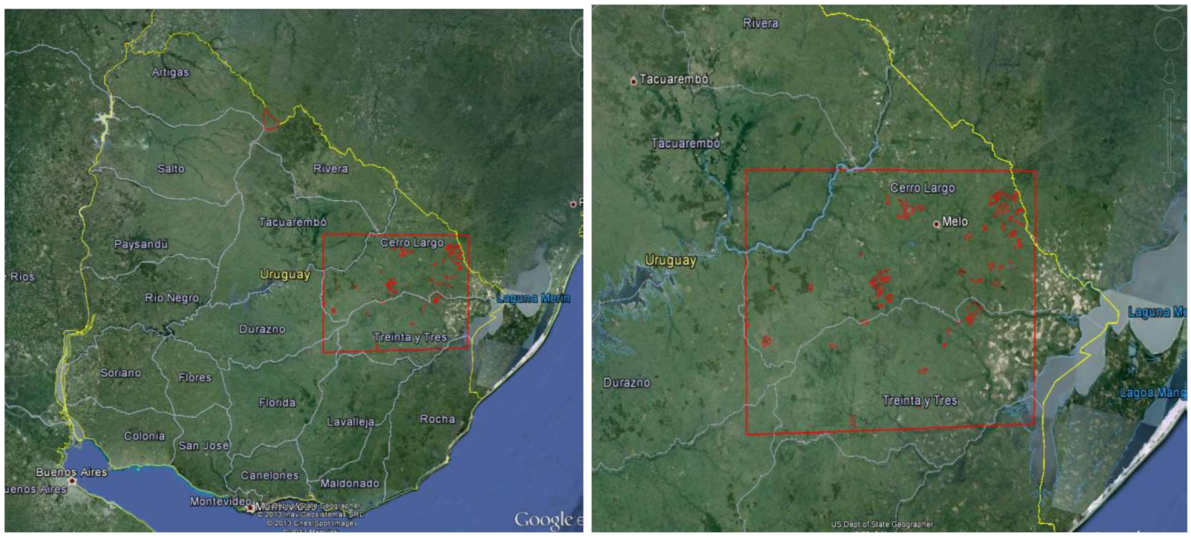

Figure 7. **´LUMIN´ project boundaries.**

2.1.8 Title and Reference of Methodology

The consolidated CDM methodology AR-ACM0001 “Afforestation and reforestation of degraded land” (version 05.2.0, EB 65) was applied.

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

Version 01 of “Combined tool to identify the baseline scenario and demonstrate the additionality in A/R CDM project activities”;

Version 01 of “Tool for testing significance of GHG emissions in A/R CDM project activities”;

Version 04.0.0 of “Estimation of non-CO2 GHG emissions from burning of biomass attributable to a A/R CDM project activity” (*) (Validated and registered as Version 4.0.0)

Version 01 of “Tool for the identification of degraded or degrading lands for consideration in implementing CDM A/R project activities”;

Version 02.0.0 of "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activity". (*) (Validated and registered as Version 2.0.0)

Version 03.0.0 of "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activity". (*) (Validated and registered as Version 3.0.0)

Version 01 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 of "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities";

2.1.9 Other Programs (G5.9)

'LUMIN/EUCAPINE' Forest Plantations on degraded grasslands under extensive grazing is not participating in other GHG Programs other than CCB and VCS.

2.1.10 Sustainable Development

The project contributes to achieve national sustainable development through the removal of carbon dioxide from the atmosphere, generation of job positions, promotion of biodiversity enhancement and improving the trade balance.

Uruguayan government has approved its first Nationally Determined Contribution by Executive Decree number 310 in November 3rd, 2017, in the framework of the Paris Agreement. It stablishes a conservative goal to maintain 100% of the native forest area of year 2012, forest plantation net area under management of year 2015 and shade and shelter forest plantation of year 2012. In a more optimistic scenario, with conditional on additional specific means of implementation, the government´s goal is to increase 5% in the native forest area of year 2012 and 25% in the shade and shelter forest plantations area of year 2012, including silvopastural systems. LUMIN/EUCAPINE project will contribute to achieve the government's goal by the continuation of the project.

The Government has also signed for the Sustainable Development Goals. LUMIN/EUCAPINE is contributing to accomplish several of the SDG for example SDG N°15 "Land Ecosystmes".

2.2 Project Implementation Status

2.2.1 Implementation Schedule (G1.9)

The LUMIN/EUCAPINE project in the East region of Uruguay (former ´Weyerhaeuser Uruguay S.A.´ project) has recently completed its 14th year. Around 90% of the total planted area was implanted between 2006 and 2012, and smaller areas were planted between 2014 and 2020.

Date	Milestone(s) in the project's development and implementation
2005-2006	Started the baseline survey
2005-2006	The Project Design for Afforestation Operation was finished
2006	First forest projects were presented to Forest Directorate and EIA were presented to Environmental office

2006	First forest plantations were established over degraded grasslands
2007-2012	LUMIN/EUCAPINE continued presenting forest projects to Forest Directorate and EIA to Environmental office
2012-2019	Annual Biodiversity survey reports of the project was completed
2013	VCS Carbon sequestration project was validated and verified
2012-2020	Project was PEFC Certified
2020	Total area of the project became FSC Certified
2006-2020	Annual Community activities were performed
2008-2020	Intensive silvicultural activities started (pruning and, thinning)
2015-2020	First commercial thinning was implemented
2017	Weyerhaeuser Uruguay SA sold its assets to EUCAPINE SRL
February 2021	CCB Validation and second verification process (2013-2020) started

2.2.2 Methodology Deviations

There are no methodologies deviations.

2.2.3 Minor Changes to Project Description (Rules 3.5.6)

One change that occurred was the renaming of the project. Initially it was “Weyerhaeuser SA” and, since September 2017, because Weyerhaeuser sold the assets, the company name changed to Eucapine SRL and locally known as “Lumin”.

Between the VCS validation and verification process done in 2012 and this CCB validation & verification process, some changes occurred in the LUMIN/EUCAPINE project total area. The final project area changed from a total of 18.191 hectares to a total of 18.988 hectares. The two main reasons for these changes were:

- LUMIN/EUCAPINE continued performing forest plantations between 2013 and 2020, including new forests over degraded grasslands (1,275 ha) and reforestations over harvested areas (1,731 ha). These new planted and replanted areas are 3,006 hectares (Table 3)
- A total area of 1,731.4 hectares where harvested and replanted between 2013 and 2020. Over these areas, replantation was performed during the following spring. In most of these areas. same species were replanted, and only over small areas the planted specie was changed (but always planting *E. grandis. E. dunnii or Pinus spp*.).
- As new high-definition satellite images or aerial photos became available, effective planted areas was re-calculated over those images. Table 4 shows the variation of net planted area between 2013 and 2020 from stratum with area difference higher than 30 hectares.

Table 3: New planted areas over degraded grasslands perform by LUMIN/EUCAPINE between 2013 and 2020

Planted Year	E grandis	Edunnii	P taeda	Total general
2014	222			222
2015	17			17
2016	370		35	405
2017	419			419
2018	310			310
2019	248			248
2020	1.336	25	24	1.386
Total general	2.923	25	59	3.006

Table 4: Effective planted area estimation—Area variation between 2013 and 2020 from stratum with area difference higher than 30 hectares

Stratum	VCS Verification 2013	VCS Verification 2021	Difference (ha)
CenturionE grandis2007	950,5	919,2	-31,3
CenturionE grandis2010	1532,0	1392,4	-139,6
CenturionP taeda2009	112,4	64,1	-48,3
Octava CLP taeda2010	257,7	187,5	-70,2
Ruta 7E grandis2006	684,7	644,0	-40,7
Ruta 7E grandis2008	613,8	490,4	-123,3
Ruta 7E grandis2009	542,8	498,3	-44,4
Ruta 7E grandis2010	802,2	717,1	-85,1
Ruta 7P taeda2006	387,7	338,0	-49,7
Ruta 7P taeda2010	132,7	93,9	-38,8
Ruta 8E grandis2007	792,0	716,2	-75,8
Ruta 8E grandis2010	997,1	964,1	-33,1

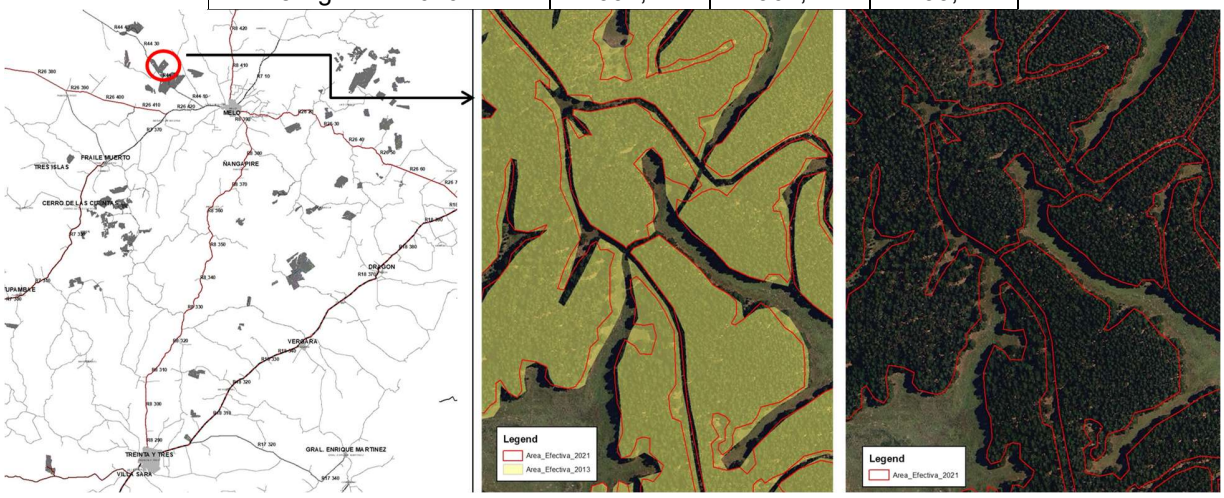

Figure 8. 2020 new net area estimation based on new high-definition satellite images.

2.2.4 Project Description Deviations (Rules 3.5.7 – 3.5.10)

There are no project descriptions deviations applied during this monitoring period.

2.2.5 Grouped Projects

LUMIN/EUCAPINE forest plantations on degraded grasslands under extensive grazing is a single GHG Project.

2.2.6 Risks to the Project (G1.10)

Identify Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed and designed to mitigate the risk
Fire	The risk of fires in commercial forests plantations in Uruguay is very low due to reduced population density and a very humid climate. Normally forest fires in Uruguay only occur in summer in the coastal areas of the South and Southeast of the country, associated with the tourism activity. In spite of prevention activities, fires can happen. In that case, equipment and staff (own and contracted) is ready and trained for firefighting.	In compliance with national regulations, LUMIN/EUCAPINE has implemented an extensive plan to prevent forest fires. There are many preventive activities such as: i) establishment of a network of firebreaks surrounding forests blocks with an area not larger than 50 ha; ii) the introduction of cattle in early stages of the forestation for maintaining pastures short and green, thus reducing the volumes of fuel; iii) permanent surveillance of the project area, particularly at times of medium to high risk of fire; iv) burning as possible technique for cleaning fields is particularly excluded; vi) warning signs with risk of fire are placed next to forest sites; vii) transit of non-authorized hunters, hikers or campers is forbidden; viii) fire extinguishers must set in vehicles (including tractors) that circulate in the property; viii) PAIF program to detect and prevent fires during summer was implemented since 2013[12]
Diseases and Insects	There could be diseases and insects that may damage the planted trees, but the diseases and insects will be prevented by routine overseeing.	Upon routine overseeing, the diseases will be treated immediately by biological control once occurred. The chemical pesticides are allowed to be used only if

[12] PAIF: http://www.spf.com.uy/institucional-actividades-incendios-forestales

		there is a serious pest problem erupted in the project area, and the pesticides will be used in accordance with the National Pesticides Policy and FSC standard
Wind	Another risk is related to an eventual increase in felling off or damage to trees by windstorms. Intensive thinning of eucalypt plantations is known to increase the risk of wind damages due to the opening of wide spaces within the forest that may channel the wind and increase its speed, aggravated by the vulnerability of tall trees. There is no information on an eventual increase in this vulnerability in thinned stands with very tall trees such as those with ages 20 or more, but there have been some cases of plantations losses due to strong windstorms	High density initial plantation. Thinned density never below 150 trees per hectare
Frost	Night frosts occur during the winter (from mid-May to early October), with an average of 30 days with frost per year, with temperatures seldom falling below –5 ºC.	Those areas imposing restrictions to tree growth or with high vulnerability to frost were excluded; soils occupying low areas were excluded because of risk of frost. Pine or E. dunnii were planted in lower areas to prevent frost damage.

Uruguay is one of the countries in the world with lowest risks of natural disasters. This small nation home to few, if any, natural disasters. There is occasional flooding, but not the sort of thing that makes international headlines for its massive destruction. There are no earthquakes, hurricanes, volcanic activity, etc. There are also no nuclear plants in the country.

2.2.7 Benefit Permanence (G1.11)

Creation of employment is one of the main social benefits of the project. Typically, an extensive livestock production system employs 1.4 persons every 1,000 ha. LUMIN/EUCAPINE project expected to multiply that figure by more than 10. The project is currently employing 230 directs workers, resulting in a ratio of 12.1 people every 1,000ha., overpassing the expected result. The number of employees has been much higher than this number in the past, during implementation status with plantation work. In the future more people will be employed for other activities such as harvesting. As it is described in the PD, the project is expected to last 100 years because a lifetime needs to be specified, otherwise a longer period should be selected. Once a forest plantation is established in Uruguay is very difficult to revert to other activity. The forest business is growing, and forest related products is one of the principals exported goods in Uruguay. The creation of jobs will be maintained after project lifetime. Total number of people with improved livelihoods or income generated as a result of project activities is estimated to be 667, including direct workers and different stakeholders affected by the project.

Beyond an increased number of jobs, the project is expected to contribute to the development of the region and the country pursuant the priorities defined by Uruguayan government (promotion of small family businesses, increase in exports, eradication of rural poverty, incorporation of technology, increased nationally added value, development of new productive chains and geographic decentralization of development) as follows.

'LUMIN/EUCAPINE' project activity has generated several job opportunities. Most employees are hired by contractors. Most of the outsourced contractor companies currently working with LUMIN/EUCAPINE, are registered in Uruguay as "PYMES" (small and medium sized companies), mostly family companies.

The entire production of LUMIN/EUCAPINE project (wood, meat and carbon credits) will have the international market as the final destination.

The main contribution of LUMIN/EUCAPINE project activity to the reduction of rural poverty will be through the generation of high quality and stable employment, in a region of Uruguay with elevated levels of poverty. A study by Carámbula and Piñeiro (2006)[13], demonstrate that forestry projects oriented to the production of high value timber, generates high positive impacts in the eradication of poverty in rural areas and reverting the process of internal migration to big cities. Another study by CPA Ferrere (https://www.cpaferrere.com/en/) done in 2017, informed that the total number of direct employees per hectare in forestry is 32 employees every 1000 hectares, while in beef production, the number of employees every 1000 hectares is 6[14].

The project incorporates the best available and affordable technology for optimizing wood productivity and quality through the selection of seeds, site preparation, plantation, weed and pest control, forest management and wood harvesting and logistics, and achieving sustainability objectives. LUMIN/EUCAPINE has a program for applied research, continuously testing various practices in order to achieve continuous improvement over time and collaborates with other companies and public institutions in this regard. This increase in knowledge exceeds the project activity as is contributing to the forest sector.

LUMIN/EUCAPINE project is producing timber that can be used for high-value products. As discussed above, currently there are no wood industries located within a reachable distance from the project site. However, the presence of LUMIN/EUCAPINE and of other similar initiatives in the area which have already secured (Posco Uruguay) or are also seeking carbon finance (GFP, Guanare, AF, and others) may induce in the future the establishment of industries in the region.

In addition, the forest management adopted by LUMIN/EUCAPINE would increase the amount of carbon sequestered by trees, thus increasing the carbon embedded value in wood products and soil organic carbon. Something that will last more than the project lifetime.

As it was mentioned above, LUMIN/EUCAPINE project will bring about a number of socio-economic benefits that will mostly impact on its surrounding area, which is currently one of the less developed ones in the country. This would create a development pole away from Montevideo and other areas which concentrate most of the economic activity in the country. This development is translated in more businesses being established in the area, that will continue existing for several years, independently from LUMIN/EUCAPINE lifecycle.

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[13] Carámbula, M. y Piñeiro, D. La Forestación En Uruguay: Cambio Demográfico y Empleo en Tres Localidades

[14] http://www.spf.com.uy/data/paginas/Informe_Impacto_Cadena_Forestal_CPA_Ferrere_22-11-17.pdf

In the fields where LUMIN/EUCAPINE operates, environmental assessments and impact surveys are carried out by a team of experts. Based on the results obtained in these studies, management and monitoring plans have been developed for the restoration of natural systems which may have been affected by previous practices (agricultural, farming, forestry or other activities), the conservation of natural resources and values in the influence areas (flora, fauna, soils and hydric resources) and the prevention or mitigation of environmental impact caused by forestry operations.

Monitoring tasks include, in particular, regular assessments of the effects of forestry operations on the soil, pollution and ecosystems. On the other hand, studies of the fauna are being carried out with the purpose of determining the effect of these operations in the species composition and distribution in the country and the possibility of controlling harmful species such as the wild boar.

A wide range of ecosystems can be found in several parts of the country, from different types of native forests, wetlands, grasslands, stony fields, among others. LUMIN/EUCAPINE carries out a characterization of the environment in each of the facilities locations and assesses the environmental features, flora and fauna, and defines the conservation areas and the necessary measures for their protection.

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

The VCS Project Description and previous monitoring report has been published in the VCS website. The full CCB project documentation will be published also in VCS and CCB´s website for public comments, as well as the project summary in Spanish version. Local communities and other stakeholders can easily access it from the website.

Also, the full project documentation will be published on LUMIN/EUCAPINE website for public comments.

All the Environmental Impact Assessment that LUMIN/EUCAPINE presented to MVOTMA/DINAMA, are published on DINAMA´s website (http://mvotma.gub.uy/participacion-ciudadana-ambiente/manifiestos-de-ambiente).

2.3.2 Dissemination of Summary Project Documents (G3.1)

Along with the project implementation, the project documentation will be published on VCS and CCB website for all stakeholders, so that they can obtain the detailed project information and development progress. Also, the summary of project description in local language will also be disseminated to local communities through local government, as long as the summary of monitoring reports during each verification.

Also, the full project documentation will be published on LUMIN/EUCAPINE website for public comments, together with specific brochures describing the project characteristics and benefits.

2.3.3 Informational Meetings with Stakeholders (G3.1)

A group of LUMIN/EUCAPINE supervisors and managers analyzed different stakeholders (localities, towns, cities), developing a complete list of stakeholders, identifying and prioritizing according to existing criteria. Based on this analysis, different actions strategies were developed.

Part of the actions taken includes the visit, once a year or as demanded, of LUMIN/EUCAPINE employees to neighbors living close to the project area. During these visits, LUMIN/EUCAPINE employees complete the form shown in **Figure 9**

LUMIN

Fecha de creación: 15032013
Fecha de actualización: 23042020

Formulario para entrevistar vecinos

Nombre del empleado: _____ Departamento: _____

Localidad: _____ Predio de influencia: _____

Nombre del Vecino/parte interesada	
Nombre del capataz o empleado entrevistado	
Nombre del Predio	
Teléfono de contacto	
Actividad principal del predio	
¿Trabajó en alguna tarea relacionada a la forestación? Cual?	
¿Alguna de esas tareas fue vinculada con LUMIN?	
¿Es pastoreante o apicultor en algún predio de LUMIN?	
¿Reconoce algún valor cultural, histórico o paisajístico en la zona?	
¿En estos años ha tenido algún problema o dificultad con la actividad forestal? Cual?	
¿Sabe usted que LUMIN identifica y controla a los camiones de su operativa (Fleet control)?	
¿Existe alguna actividad que LUMIN realice en la zona que le genere algún problema? Cual	
¿Tiene conocimiento que las empresas forestales colaboran con la Intendencia Departamental para el mantenimiento de los caminos vecinales?	
¿Sabe que LUMIN tiene una pagina web donde puede encontrar información acerca del manejo de sus bosques (Resumen Publico) y plantear sus dudas o consultas? www.lumin.com	

Figure 9. Form to be completed during visits to neighbors

Also, during these visits, stakeholders can tell us about any complaints and claims", they have. If so we include into our "External communication matrix" for follow up. shown in **Figure 10**. The information is collected, processed and recorded in LUMIN/EUCAPINE.

Registro de Comunicación-SGA-REG-4.4-3a Version 3

LUMIN

MATRIZ DE REGISTRO DE COMUNICACIÓN, APROBACIÓN Y EVALUACIÓN DE PROGRAMAS DE APOYO A LA COMUNIDAD

Fecha	Tipo de Comunicación	Solicitante	Información de Contacto	Categoría	Descripción	Comentarios	Beneficiario y personas afectadas	Importe final (USD)	Alcance Geográfico	Aprobación/ No Aprobación/Pendiente	Resultado	Metas/ Motivos	Impacto a LUMIN e Imagen Corporativa
Feb-19	Solicitud	IDT	Dr. Carlos Arezo Posada (Director Gral. De Educación y Cultura)		Solicitan colaboracion para obtener donaciones de sistemas informaticos para ser destinados a las bibliotecas departamentales.		2000	6000	Tacuarembó	Aprobado	Se donan 12 laptops p/cubrir todas la bibliotesca departamentales. Se hace comunicado oficial en conjunto con la IDT p/informar sobre dicha colaboracion.		
Feb-19	Solicitud	Asociacion de Retirados de Fuerzas Armadas y Policiales de Tacuarembó	Julio Ocaño (Presidente) 4 632 4184		Solicitan donacion de un paquete de tableros para poder realizar arreglos en la sede.		100	250	Tacuarembó	Aprobado	Se dona 1 fardo de 1/2 tablero		
Mar-19	Solicitud	Leonardo Cabillon (LUMIN)	Leonardo Cabillon		Participara en el Sudamericano de Remo que se realiza en Paraguay y piden alguna colaboración.		2	200	Cerro Largo	Aprobado			
Mar-19	Solicitud	Organización AGUITA			Solicitan visita guiada a algunos de nuestros predios.		20	0	Tacuarembó	Aprobado	Se da visita guida por Andrés Berruti al predio Buena Vista.		
Mar-19	Agradecimiento	Escuela N° 27 de Sierras de Rios			Agradecen los servicios prestados por la empresa en el cortado de pasto del predio escolar para el comienzo de clases.		30	200	Cerro Largo	Aprobado			
Apr-19	Donación	Escuela Tecnica Superior UTU			Se hace entrega a dicha institución cables informaticos para su utilidad		20	0	Tacuarembó	Aprobado	Ana Silva hace limpieza en sala de servidor sacando cables en desuso lo cuales se entregan en forma de donción.		

Matriz 2009 - 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020

Figure 10: Stakeholders and communities' external communication matrix form

Stakeholder consultation takes place minimum once a year at the same time of the FSC Certification annual audit. Topics of these consultations include any concerns, complaints or suggestions stakeholders may have. These consultations include every small town close to the area of the project. Remember that native communities do not exist in Uruguay, so the focus of these consultations are in small towns and neighbors' farmers.

2.3.4 Community Costs, Risks, and Benefits (G3.2)

Information about potential costs, risks and benefits to communities is not applicable to this project. As it is described in PD section 2.1.5. local communities in Uruguay are not entirely depending on forest, they reside in populated centers with multiple businesses. Communities are not asked to participate directly with the project. Projects' potential risks, costs and benefits are, for example, indirectly transmitted to communities through the increase of labor demand for particular activities (forest implantation). In other words, communities can perceive projects costs, risks, and benefits in an indirect way, through market.

2.3.5 Information to Stakeholder on Verification Process (G3.3)

National legislation in Uruguay does not obligate to projects owners with activity in the VCS or CCB Standard to communicate about the validation or verification process to any stakeholders, not even to national or regional government.

However, the company decides to actively communicate about this process, so any stakeholder can be informed and comment about it. The description of the validation and verification process was informed in detail to all staff member of the company through internal communication.

2.3.6 Site Visit Information and Opportunities to Communicate with Auditor (G3.3)

The local stakeholders will be informed in advance of the VVB visit, regarding the validation and verification process. As long as the audit plan has been settled, the project owner will arrange a stakeholder meeting with auditor during the site visit. Invitation will be done using appropriate means of communication, all the stakeholders will be informed via phone, mail or WhatsApp regarding the project process and the auditor´s visit. Stakeholders shown in **Table 5** will be contacted in Cerro Largo and Treinta y Tres department.

Table 5. List of stakeholders to be contacted in Cerro Largo.

LISTA	Organismo / Organización	Contacto / Nombre	Departamento
Asociación Empresarial	SPF	Miguel Helou	Nacional
Asociación Empresarial	SPF	Gabriela Malvarez	Nacional
Asociación Rural	Sociedad Agropecuaria de Cerro Largo	Jose Fernandez	Cerro Largo
Consultor Forestal	Alvaro Perez del Castillo	Carbosur	Nacional
Consultor Forestal		Ing Agr Andres Berrutti	Nacional
Consultor Forestal		Mary Carmen rosas	Nacional
Consultor Forestal		José Ignacio Antúnez	Nacional
Consultor Forestal		Lic Raul Lombardi	Nacional
Consultor Forestal	Carolina Ferreira	Carolina Ferreira	Nacional

Consultor Forestal	Ines Bocage	Ines Bocage	Cerro Largo
Contratista Forestal	Pradera del Puma S.A.	John Olivera	Nacional
Contratista Forestal	Bisio	Rodolfo Martinez	Nacional
Contratista Forestal	Verde Claro S.A.	Guillermo Hernandez	Nacional
Contratista Forestal	Delruba	Marcelo Abero	Nacional
Contratista Forestal	Francisco Davila	Francisco Davila	Nacional
Contratista Forestal	Marabi	Mario Medina	Nacional
Contratista Forestal	Agromedina	Agustin Medina	Nacional
Contratista Forestal	Cooperativa Agraria Forestal de Arevalo	Sandra Almiron	Cerro Largo
Empresa Forestal	Forestal Oriental	Ivan Grela	Cerro largo
Empresa Forestal	Forestal Oriental	Lorena Viazzi	Cerro largo
Empresa Forestal	Agroempresa Forestal	Miguel Oñate	Nacional
Empresa Forestal	Agroempresa Forestal	Andres Brizolara	Nacional
Empresa Forestal	FAS	Nelson Ledesma	Nacional
Empresa Forestal	Montes del Plata	Horacio Giordano	Nacional
Gobierno Municipal	Alcaldía	Gaston Nahuar	Cerro Largo
Gobierno Municipal	Alcaldía	Victor Noda	Cerro Largo
Gobierno Nacional	Gobierno Nacional	Alfredo Fratti	Cerro Largo
Gobierno Nacional	Gobierno Nacional	Willman Caballero	Cerro Largo
Gobierno Nacional	Gobierno Nacional	Christian Morel	Cerro Largo
Ministerio	MIDES - Oficina Territorial	Gervasio Rodriguez	Cerro Largo
ONG	Museo sin Fronteras	Antonio Boero	Nacional
ONG	Asociacion Patriada por la Historia	Dr. Ricardo Sienra	Nacional
ONG	AGUITA	Daniel Arbelo	Nacional
ONG	COENDU	Mauricio Alvarez	Cerro Largo
ONG	COVE12	Elena Sosa	Cerro Largo
ONG	COVE12	Beatriz Hernandez	Cerro Largo
ONG	Unión Internacional para la Conservación de la Naturaleza	Rosanna Berrini	Nacional
ONG	CMAP (Comision Mundial Areas Protegidas)	Carolina Sans	Nacional
ONG	Amigos del Patrimonio Historico	Carlos Duera	Cerro Largo
ONG	COPAHDIM	Mary Maciel Borba	Cerro Largo
ONG	OSTM	Jose Bica	Nacional
Organismo Internacional	ONU Mujeres	Teresa Perez del Castillo	Nacional
Vecino Este	Sebastian Hampe	Sebastian Hampe	Cerro Largo

Stakeholders shown in **Table 6** will be contacted in Treinta y Tres department

Table 6. List of stakeholders to be contacted in Treinta y Tres department.

LISTA	Organismo / Organización	Contacto / Nombre	Departamento
Asociación Empresarial	SPF	Miguel Helou	Nacional
Asociación Empresarial	SPF	Gabriela Malvarez	Nacional
Consultor Forestal	Alvaro Perez del Castillo	Carbosur	Nacional
Consultor Forestal		Ing Agr Andres Berrutti	Nacional
Consultor Forestal		Mary Carmen rosas	Nacional
Consultor Forestal		José Ignacio Antúnez	Nacional
Consultor Forestal		Lic Raul Lombardi	Nacional
Consultor Forestal	Carolina Ferreira	Carolina Ferreira	Nacional
Contratista Forestal	Pradera del Puma S.A.	John Olivera	Nacional
Contratista Forestal	Silvia Marques	Silvia Marques	Nacional
Contratista Forestal	Bisio	Rodolfo Martinez	Nacional
Contratista Forestal	Verde Claro S.A.	Guillermo Hernandez	Nacional
Contratista Forestal	Delruba	Marcelo Abero	Nacional
Contratista Forestal	Francisco Davila	Francisco Davila	Nacional
Contratista Forestal	Marabi	Mario Medina	Nacional
Contratista Forestal	Agromedina	Agustin Medina	Nacional
Empresa Forestal	Agroempresa Forestal	Miguel Oñate	Nacional
Empresa Forestal	Agroempresa Forestal	Andres Brizolara	Nacional
Empresa Forestal	FAS	Nelson Ledesma	Nacional
Empresa Forestal	Montes del Plata	Horacio Giordano	Nacional
Gobierno Municipal	Alcaldía	Fidencio Gonzalez	Treinta y Tres
Gobierno Nacional	Gobierno Nacional	Sertio Mier	Treinta y Tres
Gobierno Nacional	Gobierno Nacional	Dardo Sanchez	Treinta y Tres
ONG	Asociacion Patriada por la Historia	Dr. Ricardo Sienra	Nacional
ONG	AGUITA	Daniel Arbelo	Nacional
ONG	Unión Internacional para la Conservación de la Naturaleza	Rosanna Berrini	Nacional
ONG	CMAP (Comision Mundial Areas Protegidas)	Carolina Sans	Nacional
ONG	OSTM	Jose Bica	Nacional
Organismo Internacional	ONU Mujeres	Teresa Perez del Castillo	Nacional

2.3.7 Stakeholder Consultation (G3.4)

As it is explained above, stakeholder's participation in the project is done though formal and informal channels. There are some types of stakeholders -such as forest contractors' enterprises, beef cattle breeders or rural communities- that can be impacted (positively or negatively) by the project. Forest contractors' enterprises hire personal from the surrounding areas, beef cattle breeders are sometimes previous landowners living in the area.

It must be noted that all the forestry plantations were done based on the National Forestry (Law No. 15.939 of December 1987). LUMIN/EUCAPINE forest plantations are done entirely on private land. An Environmental Impact Assessment is requested by public authorities before establishing the forest. These EIA´s were presented in the DINAMA web page for public consultations. Any person, company, or entity from the project area or not, had the opportunity to comment and influence the project design.

In addition, all the planted areas must attend local regulations on maximum size of plantations, distance to water streams, neighbors' fences, power lines, etc. established by national regulation (public sector´ stakeholder).

The stakeholder group that influences project design are the beef cattle breeder and rural communities. This stakeholder is normally the previous landowner that after forest implementation continues breeding cattle in the non-forested areas. The interaction between cattle and forest is so mutually beneficial that LUMIN/EUCAPINE and cattle breeders communicate about the design of projects in order to synergistically grow.

Despite all, the project developer has a "External Relations Policy" that allows developing and maintaining appropriate levels of dialogue and participation with the environment in which LUMIN/EUCAPINE operates, in a sustainable basis throughout the different stages of the LUMIN project. Also, the "Protocol for external relations" is a key document that establishes the roles and tasks of each stakeholder in the process of relation of LUMIN/EUCAPINE with the community.

The "external relations policy" was created in 2012 and its latest update is from October 2017. The document includes the goals, expectations, roles and responsibilities and how the policy aligns with corporate values. On the other hand, the "external relationship process" includes more information than the policy, particularly establishing the internal responsibilities regarding the relationship of the company with the environment.

2.3.8 Continued Consultation and Adaptive Management (G3.4)

As already shown in previous chapter, there are permanently open channels to communicate with the project developer. As it is described in previous section of this report, stakeholders can raise their comments or suggestions and the "complaints and claims in the "Neighbors visit form" (**Figure 9**) if some complaints were informed these will be addresses in "External Communication matrix" form ((**Figure 10**). The project owner will check the forms regularly and collect all the comments received.

In the "Operational Manual for Forest Management", which is available to all LUMIN/EUCAPINE employees, contractors, cattle breeders, specifies in chapter 5, the following items related to the relationship with the communities and communication:

LUMIN has a policy of keeping the "door open" to local community actors so that they can always present their requests, projects and complaints to the company.

- The company manages these requests and claims through the Matrix for the Registration of Communication, Approval and Evaluation of Community Support Programs.
- Once the external communication is received, it is answered as soon as possible, after analysis by LUMIN team.
- Communications from the community can be received by phone, by letter to any of the regional offices or through our website, www.lumin.com
- Communications to the community are through information brochures, authorized spokespersons, annual reports, and an information bulletin available at the regional offices.

As part of the active planned communication process between stakeholders and project proponent LUMIN/EUCAPINE will update its web site to continue with the communication and the consultation between the project proponent and stakeholders.

Also, as already did, an annual field trip will be performed exclusively to contact different stakeholders to engage them, discuss possible improvements, consult on their opinion regarding the design of the project and discuss adaptative management. An example of the report made after these field trips was delivered to VVB.

Finally, because LUMIN/EUCAPINE is FSC Certified, annual audits will be performed with meetings with local communities and other stakeholders.

2.3.9 Stakeholder Consultation Channels (G3.5)

Part of the communication with communities consist in verbal communication from the company´ workers towards them. LUMIN/EUCAPINE workers are permanently present in the project area and they communicate with communities and stakeholders.

LUMIN/EUCAPINE has also implemented a mechanism to prevent complaints. It consists in analyzing the impact of future actions that will be taken by LUMIN/EUCAPINE. For example, harvesting of a certain area will increase the truck circulation in a public road, generating modifications to the regular activity of the zone. LUMIN/EUCAPINE staff anticipates to this situation visiting the neighbors that could be affected, explaining the activities that will be implemented and leaving a contact telephone to contact them in case of need.

2.3.10 Stakeholder Participation in Decision-Making and Implementation (G3.6)

LUMIN/EUCAPINE has open channels to enable the effective participation of all communities. The “complain form” and “visit to neighbor form” (see chapter 2.3.3) is a way for communication to communities. These channels are open to any culture and gender.

2.3.11 Anti-Discrimination Assurance (G3.7)

The project owner should obey Labor Law of the Republica Oriental del Uruguay with anti-discrimination assurance.

LUMIN/EUCAPINE has a Forest Management General Manual where it is clearly explained that discrimination attitudes are totally forbidden: *“any type of discrimination must be avoided in any instance by reason of gender, race, religion, political or other orientation”.*

LUMIN/EUCAPINE has been working on the gender equality approach, seeking coherence between the internal actions of the company with its collaborators and contractor companies, as well as the work with the institutions LUMIN supports, public policies and the community in which LUMIN develops its activities.

LUMIN/EUCAPINE has signed in 2018 the Principles of Women's Empowerment (WEPs), a joint initiative of the United Nations Global Compact and UN Women, that are implemented in Uruguay through the Win-Win program. The program promotes and provides companies with the tools to promote gender equality in all areas and in their communities. In 2019, LUMIN has received the ¨Talent has no gender award, promoted by Inter-American Development Bank, the European Union and UN Women. The Evaluation Committee noted that this award is a recognition of the good practices and progression implemented by LUMIN in the field of gender equality and associated practices. They also considered it essential to share the company's experience regarding the promotion of gender equality in the workplace with the business community and society in general.

2.3.12 Grievances (G3.8)

The project owner has appointed a staff member to record and collect all communications included conflicts and dissatisfaction between LUMIN/EUCAPINE and local communities/neighbors.

As part of the “Communication process in the Operational Forest Management, there is a specific item from LUMIN/EUCAPINE called “Conflicts Resolution”. This document clearly explains how LUMIN/EUCAPINE procced once they receive or detect a conflict with any third party:

Conflicts, environmental complaints, or health and safety, that involve claims and/or eventual compensation will be received by any means of communication, analyzed internally and resolved with the support of the law firm.

Conflicts involving claims of possession or right of use on the properties owned or managed by LUMIN are resolved and recorded with the support of the law firm that advises the company. In the event that the assets in question are compromised, the forestry operations that may be the direct cause of the dispute will be suspended until it has been resolved, including the possibility of compensation to local people in the event of loss or damage affecting your legal and customary rights, property, resources or livelihoods.

The General Manager will designate a person responsible for collecting and processing the information regarding all the complaints received by the company, who will keep record of them and their resolution status.

Also, since 2005, LUMIN/EUCAPINE implemented an integrated management system that includes a digital management system to manage Corrective Actions Requests, raised by LUMIN/EUCAPINE employees by request of any affected stakeholder (see detailed SAC System description in this report)

2.3.13 Worker Training (G3.9)

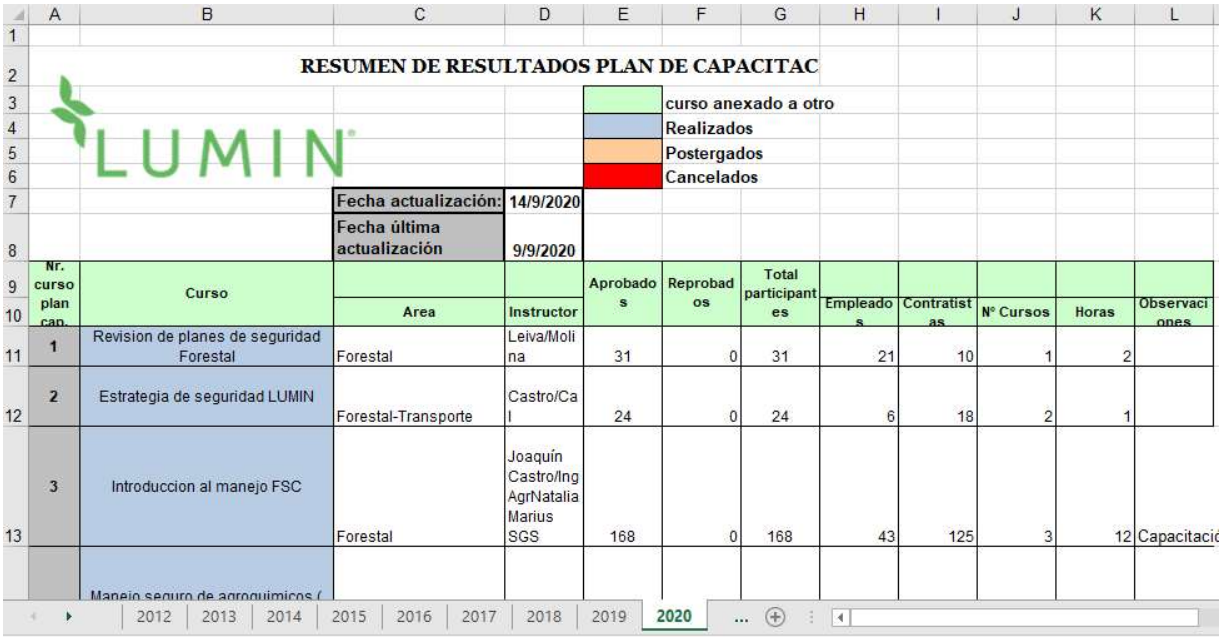
The project owner and group of experts provide technical advice and technical training to project staff and personal from forest contractors companies. These companies usually contract people from the surrounding areas, belonging to the neighbor communities to the project area.

All the workers will be train in order to perform the activities with adherence to the Principles & Criteria of the Forest Stewardship Council ® (FSC®) for forest management and chain of custody.

More than 230 employees (direct employees and contractors) are working in LUMIN/EUCAPINE project. All these employees are included in the company´s “Annual Capacitation Plan”, that includes the following training courses:

- Induction for new contractors: Orientation and training activities to inform and establish the LUMIN/EUCAPINE management guidelines to those responsible for the contractor companies and their health and safety services
- General induction 1: LUMIN/EUCAPINE Management Policy; Continuous improvement; FSC Principles & Criteria; Occupational Health and Safety; Care of the environment; Social Responsibility, Labor Rights and Duties.
- Safety and continuous improvement
- Legal and management requirements
- LUMIN/EUCAPINE Integrated Management System
- Specific training in Operative 1: Train all phytosanitary workers on how to obtain the "phytosanitary Card" (all operators of contractors and LUMIN/EUCAPINE direct employees that carry out the activity of applying chemical products).
- Specific training in Operative 2: Chainsaw documentation
- Specific training in Operative 3: Chainsaw security
- Specific training in Operative 4: Defensive Driving for vehicles 4x4
- Health and First Aid
- Investigation of incidents to LUMIN/EUCAPINE supervisors
- Ergonomics
- Fire control
- Language
- Induction to Chain of Custody

The Annual Training Plan and training lessons are recorded in an Excel file with information about the name of the course, lecturer, number of attendants that approved (and failed) and the total number of people trained, among other information. The complete list of courses in numerous topics (even biodiversity, FSC, etc.) since 2012 is available for the VVB if necessary. However, the following figure illustrates the content of the training lessons.



RESUMEN DE RESULTADOS PLAN DE CAPACITAC

LUMIN

curso anexado a otro
Realizados
Postergados
Cancelados

Fecha actualización:	14/9/2020
Fecha última actualización	9/9/2020

Nr. curso plan cap.	Curso	Area	Instructor	Aprobados	Reprobados	Total participantes	Empleados	Contratistas	Nº Cursos	Horas	Observaciones
1	Revision de planes de seguridad Forestal	Forestal	Leiva/Molina	31	0	31	21	10	1	2	
2	Estrategia de seguridad LUMIN	Forestal-Transporte	Castro/Cal	24	0	24	6	18	2	1	
3	Introduccion al manejo FSC	Forestal	Joaquín Castro/Ing AgrNatalia Marius SGS	168	0	168	43	125	3	12	Capacitaci
	Manejo seguro de agroquimicos (										

2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | ...

Figure 11. Excel file with training courses

2.3.14 Community Employment Opportunities (G3.10)

The project will have impact in a big area located in the Center east region of Uruguay. All the people in the communities (including women, minorities and poor people) will be involved directly or indirectly with the project.

All people from the region will be given an equal opportunity to fill all work positions if the job requirements are met.

According to the records corresponding to the years 2017 - 2018 (available on LUMIN/EUCAPINE web platform), during the implementation of the project, LUMIN/EUCAPINE contracted for forestry activities (plantation, harvest, sawmills and road works), an average of 14 companies per year, which translates into a labor of around 230 workers per year. For the period 2006-2016 total number was higher and it is estimated in 400 employees per year.

From the total number of contractors working for LUMIN/EUCAPINE, it is estimated than around 60% of these contractors are living in the project area of influence.

There are some forest activities where more subtle or dainty movements are needed or where more meticulous work is demanded, which is the case of the work at nurseries or the harvesting with ultra-sophisticated harvesters. In such cases, women could be better qualified for the task. It is expected that women from the community can participate in such type of activities, or others.

Since 2014, the company has a system to digitize and centralize the information of subcontracted companies, where all the data provided is available, based on the number of operators per company, which allows the documentation of the activity, as well as the training history carried out by the Operators, both by the contracting companies and by LUMIN/EUCAPINE.

Regarding the policies undertaken by the project proponent to prevent implicit bias, discrimination, and sexual harassment, the project is under the Uruguayan laws, that includes:

- Discrimination Law (Law N° 16.045- Igualdad de Trato)
- Sexual harassment Law (Law N° 18.561- Acoso Sexual)

The best way in Uruguay to perform an annual control to be sure that the project complies with all the Uruguayan laws is to be FSC Certified. Through the annual audits, FSC controls that the project complies with the Uruguayan laws.
To ensure that all contractors and LUMIN/EUCAPINE workers have a full knowledge of the applicable laws, the LUMIN/EUCAPINE human resources, and lawyers consultant team prepares annual updates detailed documents with all the Uruguayan laws that may affect the activity, and specifics seminars are implemented when majors changes occurs.
Also, LUMIN/EUCAPINE human resources team can, through the documentary control of contractors, execute the control and audits of the contractor companies that works on the fields. Those Controls include the legal requirements of the outsourcing law (18,251) and the FSC standards as they are certified companies. The documents to be controlled are the following: payments to BPS, DGI (taxes), operator's registration in BPS, income of operators in MTSS, salary receipts for each operator, valid health certificate, personal safety equipment, training to work safely, delivery of work clothes according to each activity labor sector, etc.

Also, LUMIN/EUCAPINE human resources team prepared the file "Derechos de los trabajadores y Condiciones de Empleo" (Workers' Rights and Conditions of Employment document) that contractors must follow because it is FSC certified. The document is annually updated and distributed to contractors.

2.3.15 Relevant Laws and Regulations Related to Worker's Rights (G3.11)

Forestry in the country has its own regulation for labor conditions (Decree 372/99), on top of a large number of norms which affect any activity. This decree was developed with the active participation of the forest producers, and basically defines several rules for safety, health and living conditions of forest workers.

Another important regulation relates with the minimum wage regime. In Uruguay, the law promotes the appointment of sectoral three-party committees[15] (government, workers and companies) to discuss worker categories and minimum wages applicable to each category. The agreements reached by these committees are mandatory for all the companies in the corresponding sector. Historically, rural activities were not included in these committees, and minimum wages were fixed by decrees. In 2005, the forest companies, the forest workers and the government reached the first ever agreement for a minimum wage regime in a rural activity.

Forest industry workers are organized in a specific union. SOIMA, and OSTM (Uruguay's Wood Industries Workers Union).

As of 2014, the Union is presented as one of the strongest in the country and has negotiated significant improvements in wage conditions.

These agreements set minimum wages by category, with semi-annual adjustments based on inflation and dollar variations. Employees work 48 hours a week, with a maximum of eight-hour per day, (excepting if the hours worked on Saturdays are distributed from Mondays to Fridays). In this case the hours worked per day can be extended to nine and a half hours.

[15] These committees are called "Consejos de Salarios" in Spanish.

There is a national legislation aimed at the enforcement of safety and health standards, which is controlled by the Ministry of Labor.

Since 2005, LUMIN/EUCAPINE implemented an integrated management system that includes a digital management system to manage Corrective Actions Requests.

The Corrective Action System (SAC) allows LUMIN/EUCAPINE in its internal functioning, to have a centralized control and monitoring system to improve management in all stages and activities (operational, safety, environmental, social).

Each time a Non-Conformity is detected, the person must record it in the system through a form with the following information:

Actualización anterior: 4/10/2017
Si el logo central no es de color verde es copia no controlada
Fecha de actualización: 14/09/2018

Formulario SG 001

➢ **Informe de Incidente Ambiental** ☐

➢ **Informe No Conformidad** **Operativa** ☐ **Seguridad** ☐ **Ambiental** ☐

Original: Gerente área / Encargado Seg / SG ***Copia 1:*** *Empleado / Contratista*
Copia 2: *Archivo del área*

A: _____ ***Fecha Informe:*** _____

Reportado por: _____ ***Fecha Incidente:*** _____

Lugar del Incidente / No conformidad _____

1) Descripción del Incidente / Impacto / No Conformidad:
_____
_____
_____
_____
_____
Area afectada por el incidente: _____

2) Notificación (de corresponder)

Empleado/Contratista /Terceros	Persona notificada	Fecha	Firma

3) Qué acción es necesaria o fue realizada para corregir el problema? *(marcar según corresponda)*
_____
_____
_____
_____

4) De qué forma se prevendrá su reocurrencia?
_____
_____
_____
_____

Reporta / Firma _____

---------- A ser llenado por Gerente de área / Encargado SG o Seg correspondiente ---------

5) Acción Correctiva necesaria? Marcar con "X"

NO	SI	Nro. SAC:

Once the form is completed, LUMIN employee notifies the owner of the contractor company and the foreman and charge the report in "Formularios SQL" for follow up. Once the CAR has provided a solution to the issue detected (for example, spillage of hydraulic fluid in a harvesting activity) LUMIN employee must close it in the system.

2.3.16 Occupational Safety Assessment (G3.12)

LUMIN/EUCAPINE consider the Safety and Health of the people, and of everyone directly or indirectly related to the activities, to be of the utmost importance. The company has implemented a system, coordinated by prevention technicians, oriented to the care of occupational safety, well-being and health risks of the personnel who works in the field. The system encompasses everyone, each and every one of the employees and contractors are committed to take care of their own safety as well as their co-workers'. Safety management is treated as a continuous self-improvement process which materializes in a systematic process of risks identification, assessment and control which requires the participation of everyone, reason why it is mandatory.

According to national legislation, the employer has the obligation to register in the Social Security Bank ("Banco de Previsión Social" - BPS) and Ministry of Labor and Social Security. By this, the employee assures health assistance for every member of the family.

Safety training and dissemination

LUMIN/EUCAPINE make strong emphasis on the training and awareness rising of the personnel and the people living in the area where we develop our activities. A continuous follow-up of the work conditions and facilities is performed in all the sites where the company operates. Continuous training and teaching is done and the exchange of experience among contractors is promoted. All observations and incident records are processed systematically in order to obtain statistics which allow the detection of issues which require special attention. If there are accidents, a relevant investigation is carried out to reduce future risks. In order to improve this control, LUMIN/EUCAPINE started to implement a new software for its Management System. The objective is clear: self-protection; the company wants every individual involved to embrace safety measures as a VALUE. Therefore, families and communities are included in the orientations, because we believe that safety starts "at home".

The project owner implemented health and safety practices to protect workers from occupational safety and health hazards. These practices shall, proportionate to scale, intensity and risk* of management activities, meet or exceed the recommendations of the ILO Code of Practice on Safety and Health in Forestry Work

2.4 Management Capacity

2.4.1 Required Technical Skills (G4.2)

LUMIN/EUCAPINE is internally well structured, with experienced staff in the area of forest investments, forest management and trade of timber. Internal organization chart and other information are made available for the validating team.

LUMIN/EUCAPINE is a leading provider of forestry services, which specializes in the production and marketing of raw materials. It's based on three pillars: commercial activity, logistics and forestry production. At present, as a result of this professional reliability and fulfilment of commitments which has been built by

the partners over many years, LUMIN/EUCAPINE is considered to be a trustworthy provider, one with which it is safe to enter into long and medium-term commercial agreements.

Carbosur has a contractual agreement with LUMIN/EUCAPINE for the development and management of the carbon component of the project. It is not a project proponent.

2.4.2 Management Team Experience (G4.2)

The project owner has many years in management of projects of conservation of natural resources, with which it has developed capacities to interact with different types of actors, as a result of which it has established cooperation agreements with local governments, companies, producer organizations and native communities. It has also developed a system applicable to environmental projects, which has effective tools and methodologies to have effective control over the interventions carried out.

LUMIN/EUCAPINE manages its forest plantations integrated with other land uses, optimizing the management of natural resources responsibly according to the following policy principles:

- An economically, environmentally and socially integrated management for the achievement of the company's productive aims in a sustainable manner and with long term horizons.
- Adherence to the Principles & Criteria of the Forest Stewardship Council ® (FSC ®) for forest management and chain of custody, avoiding at any circumstance the management of wood from controversial origins.
- Good management of forestry resources, supported by the continuous study of the scientific breakthroughs, the experience in the country and the application of the best practices.
- Observation of national and international regulations in force, as well as the provisions established by the certification standards adopted by the company periodically verifying such compliance through inspections and audits.
- Supporting our employees in what regards to their professional and personal growth as we believe them to be essential for the development of the company encouraging teamwork, personal and professional development of each member, in an environment of respect, non-discrimination, trust, commitment, transparency and ethics.
- Promote health, safety and welfare of all employees through a proactive, systematic and effective management based on an adequate identification, assessment and control of risks.
- Implement trainings workshops focused on informing, raising awareness, promoting involvement and engagement of all employees in the basics of this policy.
- Preservation of natural resources and values, seeking the recuperation of degraded systems, the conservation of ecosystems' functions and the protection of areas and species of special interest. Preservation of cultural values and the respect for local communities' interests.
- Promote positive stakeholder relations, good neighborliness, open communication, transparency, dialogue, respect for the diverse interests of communities. Encourage

cooperation through projects related to the local development of the communities where we interact through educational and recreational activities and prioritizing the hiring of local staff.

- All our employees, representatives, advisors and consultants, regardless where they are located, are prohibited by law and policy of LUMIN/EUCAPINE to offer or receive, pledge, payable or receivable, directly or indirectly, money or anything else value to any person, or entity (eg representatives of political parties, public and / or private companies -contractors-services institutions, other) to obtain or retain undue, own or benefits company.

People who represent LUMIN/EUCAPINE have a responsibility to visibly show our commitment to this policy and any documents the develop or complement for its effective implementation.

2.4.3 Project Management Partnerships/Team Development (G4.2)

For areas that LUMIN/EUCAPINE additional support to meets its goals, third party exports are hired. As an example, since 2012, LUMIN/EUCAPINE has been involved in several publications related to the fauna and flora of our country. In that year the first field manual sponsored by the company was published and later new publications were added, in addition to a brief manual on the wild boar. Its last edition was jointly published with the authors Raúl Lombardi and Giancarlo Geymonat, the Ministry of Tourism, DINAMA and UTE with the name "Fauna and Flora of the Forests of Uruguay".

Other example is the Economist Carolina Ferreira, that advise LUMIN/EUCAPINE in social and economic developments and analysis in rural areas and local communities. The following figure is an example of the reports that the Economist elaborates as part of the monitoring plan.

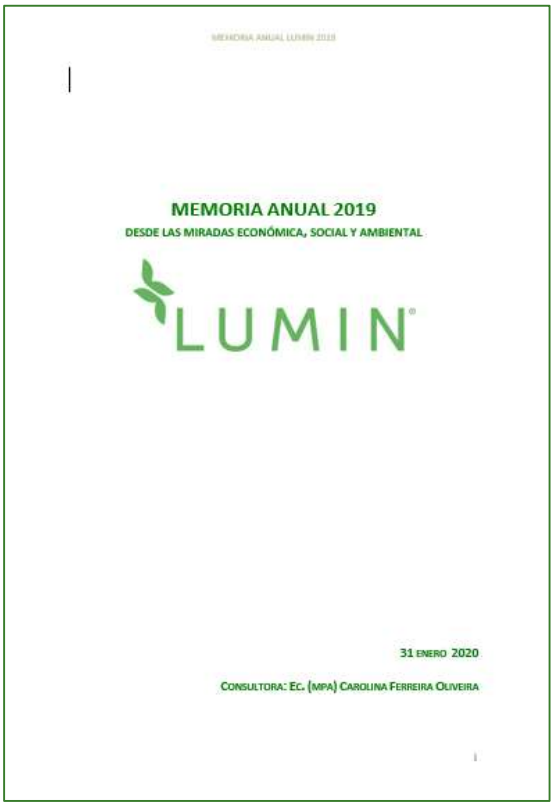


Figure 12. Annual economic, social and environmental report

2.4.4 Financial Health of Implementing Organization(s) (G4.3)

The project developer (LUMIN/EUCAPINE SRL) is legally registered company in Uruguay, and according to the public information listed in National Enterprise Credit Information Publicity System, none of them were involved in nor complicit in any form of corruption such as bribery, embezzlement, fraud, favoritism, cronyism, nepotism, extortion, and collusion.

Project has secured more than 80% of funding needed to cover the total cash out before the project reaches breakeven. Total cost of purchased land and plantation costs represented more that 80% over the accumulated cash out in LUMIN/EUCAPINE afforestation cash flows. Spreadsheet with cash flow analysis was available during validation process. The most reliable and substantial demonstration are LUMIN/EUCAPINE´s financial statements, in which it can be seen that the company has an enormous capital in assets (land and standing trees), demonstrating that funding for LUMIN/EUCAPINE project has already been secured, in other words the funding needed to implement LUMIN/EUCAPINE project has already been available and has already been executed. LUMIN/EUCAPINE is in good financial health.

2.4.5 Avoidance of Corruption and Other Unethical Behavior (G4.3)

As legally registered companies, the project owner and other involved entities have the obligation to comply with relevant regulations, including anti-corruption law. The annual audit by the government makes sure that it operates with full compliance with Uruguay law and regulations.

LUMIN/EUCAPINE has a specific Ethic code where it is clearly explained that corruption and other unethical behaviors are totally forbidden. This ethnic code is permanently uploaded in LUMIN´s web site (www.lumin.com)

2.4.6 Commercially Sensitive Information (Rules 3.5.13 – 3.5.14)

None of the project documents will be considered as commercially sensitive information, and all the documentations are available to any stakeholders.

2.5 Legal Status and Property Rights

2.5.1 Recognition of Property Rights (G5.1)

All the land is privately owned by LUMIN/EUCAPINE. Since these lands are all legal forestry land, the ownership is clear, and there is no dispute over land ownership in the project site.

2.5.2 Free, Prior and Informed Consent (G5.2)

Prior to the project initiation, all of the project land was owned by LUMIN/EUCAPINE. To make sure the successful development of the project, the project owner which had the ownership of forest land had presented all the requested documentation to government authorities. So, the project will not encroach uninvited on private property, community property or government property.

2.5.3 Property Right Protection (G5.3)

Prior to the project implementation, the project area was degraded grasslands where farmers (private owners) used these lands for extensive beef production. Private owner’s voluntary sold the lands to project owner, therefore the project activities will not lead to involuntary removal or relocation of property rights holders from their lands or territories, and does no force rights holder to relocate activities important to their culture or livelihood.

Due to its history, there are no natives to Uruguay. Only a new stream of people who have recognized themselves as descendants of indigenous communities, but who currently reside in urban settlements.

Roque Roldán's estimate for a paper for the Inter-American Development Bank, presented in Fortaleza in March 2002 based on ILO data, estimated its total number at only 524 (0.02% of the Uruguayan population) even though it is a subject of debate among different historians, the historical reports of the different auditing houses that certify in Uruguay indicate that there is no indigenous population according to the definitions of FSC.

2.5.4 Identification of Illegal Activity (G5.4)

The forests are nursed by project staff regularly as a result of the implementation of the project, so there will not be illegal activities or deforestation of native forests inside LUMIN/EUCAPINE farms or surrounding the project boundaries. The project benefits are gained from legal activities. Therefore, the project's climate, community and biodiversity impacts will not be affected by illegal activities. LUMIN/EUCAPINE has also a written plan of prevention of illegal activities, that assure what our operational team need to do to prevent or in case some illegal activities take place.

2.5.5 Ongoing Disputes (G5.5)

Because the project owner signed legal purchase agreements on all the land, the forest land was developed reasonably and legally., so there is neither ongoing or unresolved conflicts or disputes over rights to lands, territories and resources nor any disputes that were resolved and recorded during the last twenty years.

2.5.6 National and Local Laws (G5.6)

The project activity complies with the National law and binding regulations, since forest investment has been approved by the General Forestry Directorate (entity of the Ministry of Agriculture, Livestock and Fishery) and the National Environment Directorate (entity of the Ministry of Housing, Territorial Planning and the Environment). The former ensures that the project activity complies with National Law N° 15.939 and all binding decrees and decisions[16], while the second granted the environmental authorization.

[16] http://www.mgap.gub.uy/portal/hgxpp001.aspx?7,20,417,O,S,0,,

3 CLIMATE

3.1 Monitoring GHG Emission Reductions and Removals

3.1.1 Data and Parameters Available at Validation

LUMIN/EUCAPINE project has recently completed its thirteenth. First areas were planted in 2006, and the last ones in 2020. The forests had one thinning at the age of 2 years. As stated above, the second thinning started to be done at age of 7 to 10 years. Most of the second thinning were already performed at the time the second monitoring event was done. Regarding pruning procedures there were normally implemented at ages of 2-, 3- and 4-years plantations (3, 5 and 7-9 meters of height, as stated above).

As has been stated in PD, the methodology requires the assessment of sources of leakage due to activity displacement (conversion from grazing land to forestry). 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" led to the conclusion that this source can be neglected. The application of the "Guidelines on conditions under which increase in GHG emissions related to displacement of pre-project grazing activities in A/R CDM project activity is insignificant", which is one of the applicability conditions of the tool, resulted in the conclusion that the project will not cause any displacement of the activity occurring before project implementation. Therefore, leakage is assumed to be zero.

The information regarding aspects related to the non permanence risks of the project, it is presented as a separate document called "Non Permanence Risk Report".

Data Unit / 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
Purpose of the data:	N/A
Any comment:	Satellite images are the most important tool used for measuring geographical variables or parameters: project boundaries and predefined stratum boundaries, forest area, area of disturbances (fires, droughts, harvesting, etc.). All information collected will be immediately integrated to the GIS. Also, GPS are used to check areas or project boundaries.

Data Unit / 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:	IPCC default values (e.g. Table 3A.1.10 of IPCC GPG-LULUCF 2003)
Value applied:	From 1.15 to 3.4, depending on the tree age
Purpose of the data:	N/A
Any comment:	BEFs in IPCC reports and national forest inventories are usually applicable to closed canopy forests. If applied to individual trees growing in open field.

Data Unit / 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 0.5 t C t^{-1} d.m.
Value applied:	0.5
Purpose of the data:	N/A
Any comment:	N/A

Data Unit / Parameter:	D_j
Data unit:	t d.m. m^{-3}
Description:	Basic wood density for species or group of species j
Source of data:	IPCC 2003. Table 3A.1.9-1 Basic wood densities of stem wood; Technical Note N° 8
Value applied:	0.46; 0.482 and 0.44 for *E. grandis*, *E. dunnii* y *P. taeda* respectively.
Purpose of the data:	N/A
Any comment:	N/A

Data Unit / 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"
Value applied:	0.30 to 0.31 depending on an equation which used the aboveground biomass as an input (specific values are presented in the ex-post carbon estimations) $$R = \frac{exp[-1.085 + 0.9256 \times ln(A)]}{A}$$
Purpose of the data:	N/A
Any comment:	The equation used to obtain R is in chapter 5.2 of this Monitoring Report.

Data Unit / 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:	Local Growth Models
Value applied:	N/A
Purpose of the data:	Value used to determine the project ex – ante carbon sequestration
Any comment:	In case of ex ante calculation, growth was estimated based on average growth according to specific site conditions presented in the project site. Local growth models were used for ex-ante estimation to describe the yield curve and determine the Long-Term Average of available carbon credits. Local growth models will not be used for ex-post estimation which were based on field measurements: DBH and height.

Data Unit / Parameter:	Bark volume
Data unit:	m^3/ha
Description:	Bark volume of trees of species
Source of data:	Methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs"
Value applied:	15% of total stem volume
Purpose of the data:	N/A

Any comment:	The bark volume is a variable used in the ex-ante calculation. During field measurement, the volume of trees is estimated with bark when diameters are measured over bark.

Data Unit / Parameter:	$f_{IN,i}$
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:	0.7
Purpose of the data:	N/A
Any comment:	N/A

Data Unit / 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:	88
Purpose of the data:	N/A
Any comment:	The ex-ante calculation for SOC change is the same calculation as in the verification, corrected by the modified total areas.

Data Unit / Parameter:	$f_{MG,i}$
Data unit:	Dimensionless
Description:	Relative stock change factor for baseline management regime in stratum i of the areas of land.
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:	0.95
Purpose of the data:	N/A
Any comment:	The ex-ante calculation for SOC change is the same calculation as in the verification, corrected by the modified total areas.

Data Unit / Parameter:	$f_{LU,i}$
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
Purpose of the data:	N/A
Any comment:	The ex-ante calculation for SOC change is the same calculation as in the verification, corrected by the modified total areas.

Parameter:	$f_{IN,i}$
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:	0.7
Purpose of the data:	Used to estimate the carbon sequestration in soils
Any comment:	The ex-ante calculation for SOC change is the same calculation as in the verification, corrected by the modified total areas.

Data Unit / 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:	8% of carbon stock in trees biomass
Purpose of the data:	N/A
Any comment:	N/A

Data Unit / 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:	4% of carbon stock in trees biomass
Purpose of the data:	N/A
Any comment:	N/A

3.1.2 Data and Parameters Monitored

Data Unit / Parameter:	A_i
Data unit:	Ha
Description:	Area of stratum i
Source of data:	Monitoring of strata and stand boundaries was done using a Geographical Information System (GIS) with HD satellite images.
Description of measurement methods and procedures to be applied:	Strata area were measured based on cartography documents, related with GIS.
Frequency of monitoring/recording	Every time the project boundaries are modified. when disturbances events take place, the project participants shall re-built the stratum and add the area of the project under disturbance in the GIS.
Value monitored:	18,988 ha

Monitoring equipment:	Garmin GPS- ArcMap
QA/QC procedures to be applied:	N/A
Calculation method:	N/A
Comments:	As stated in the PD LUMIN/EUCAPINE continuously monitors the area of the forest plantations. The value was used in equations N° 3, 12 y 24 of the Methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (Version 03.0.0), Equations N° 7 and 13 of the Methodological tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities" (Version 02.0.0)

Data Unit / Parameter:	DBH
Data unit:	Cm
Description:	Diameter at Breast Height of tree
Source of data:	Field measurements
Description of measurement methods and procedures to be applied:	DBH is measured at 1.3 m above ground, over the bark. In case of stem deformation at this level, measurement was done over the deformation once the stem took its normal shape, with the purpose of being conservative. DBH was measured in all trees within the plots.
Frequency of monitoring/recording	Every tree within sample plots
Value monitored:	3,904 values in 60 strata in 236 plots
Monitoring equipment:	This image corresponds to the used caliper, model "Mantax Blue" of Haglof, Sweden. 
QA/QC procedures to be applied:	A quality control procedure consisted in staff member periodical training. The staff members were trained to make DBH measurements without errors: using firstly a measuring tape (to determine exactly where 1, 3 meters height is located in their own bodies). Afterwards, they

	measured DBH in front of experts and member´s staff to achieve procedures consistency. Quality assurance of DBH measurement was done through statistical analysis with other plots (see chapter 2.2 Project Description Deviations). This is also useful to demonstrate that sample plots, on which carbon stock is measured, were not treated differently from the rest of the forests (for instance treated with irrigation or fertilizers). Instruments were checked and tested before starting the verification process. Items checked: -Correct visualization if numbers in the calliper. -The straightness of the calliper and the lack of mechanical problems. The calliper length is not a problem since it is impossible the equipment stretches. *Bark that is not stick to the stem was removed before measuring.* Measurement was done once per tree, in one position pointing to the center of the plot with the caliper´s blade.
Calculation method:	N/A
Comments:	The trees are considered to be inside the plot if more than 50% of DBH is inside the plot. Diameters were measured by taking one measure, always pointing the instrument´s shaft in direction to the middle of the plot. Parameter used indirectly in Equation N° 1 of the Methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (Version 03.0.0); for calculation of basal area and then volume.

Data Unit / Parameter:	H
Data unit:	m
Description:	Height of trees within sample plot
Source of data:	Field measurement
Description of measurement methods and procedures to be applied:	Tree height was measured in all the trees included in the plot.

	The measurement was done according to the following procedure: Identification of the individual tree to measure. Height was measured at the same level (independently that the measuring equipment corrects the value according to the slope). The expert always tried to be situated at a certain distance to the tree equivalent to the height of the tree.
Frequency of monitoring/recording	Every tree within sample plots
Value monitored:	3,904 values in 60 strata in 236 plots
Monitoring equipment:	Clinometer. See the following figure of the type of clinometer used during the monitoring events to measure tree heights. This image represents an electronic clinometer of Haglof, Sweden. 
QA/QC procedures to be applied:	When referring to this electronic device, it is recommended to check the correct visualization of the display. The clinometer was always kept in safe places in order to avoid display rupture. The equipment was always full charge of batteries and back up batteries were always available in case of emergency. Make control measurements using all involved equipment (human error should be minimized at minimum with well training and cross-checked control measurement activities).
Calculation method:	N/A
Comments:	Parameter used indirectly in Equation N° 1 of the Methodological tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" (Version 03.0.0); for volume calculation. In this project there were measured the heights of every tree, because measuring was taken into account for Continuous Forest Inventory (Inventario Forestal Continuo - IFC).

Data Unit / Parameter:	D_n
Data unit:	Cm
Description:	Diameter of the n^{th} piece of lying dead wood intersecting a transect line
Source of data:	N/A
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording	N/A
Value monitored:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Calculation method:	The estimation of dead wood (standing dead wood, lying dead wood and stump) was done using a conservative default-factor method stated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R DM project activities", a percentage of carbon stock in tree biomass (8% according to the Temperate biome)
Comments:	N/A

Data Unit / Parameter:	$DWR_{LI, p, i}$
Data unit:	Dimensionless
Description:	Dry-to-wet weight ratio of the litter sub-sample collected from plots
Source of data:	
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording	N/A
Value monitored:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Calculation method:	N/A

Comments:	The variable was classified in the PD as a variable to be monitored. However, given the simplicity and costly-effective mechanism to determine dead wood based on a conservative default value, it was decided not to monitor the variable.

Data Unit / Parameter:	N
Data unit:	Dimensionless
Description:	Total number of wood pieces intersecting the transect
Source of data:	N/A
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording	N/A
Value monitored:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Calculation method:	N/A
Comments:	The variable was classified in the PD as a variable to be monitored. However, given the simplicity and costly-effective mechanism to determine dead wood based on a conservative default value, it was decided not to monitor the variable

Data Unit / Parameter:	Ap,i
Data unit:	m^2
Description:	Area of sampling plot
Source of data:	Field measurement
Description of measurement methods and procedures to be applied:	The center of the plot was marked with the assistance of a GPS. One staff member stayed at the center of the plot taking notes of the diameters and heights measured while the other expert of the team walked inside the plot measuring them. Both experts were always connected with a measuring tape, and every tree measured was previously checked in order to determine if the distance to the center was minor to the radius of the plot (12.62 m radius of a circular plot of 500m^2). Size

	of the plots depends on the pre-estimated trees density. For this monitoring period, plot sizes were: Plot Size (m2) / N Plot 300 / 36 500 / 196 1000 / 4 Total / 236
Frequency of monitoring/recording	Every plot measured in LUMIN/EUCAPINE, 236 in total.
Value monitored:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	In order to avoid over and under-estimations, every tree was considered inside the plot when the radius of the plot overpassed the 50% of the diameter of every tree.
Calculation method:	Example for 500m2 plot: $500m^2 = r^2(12.62).\pi$
Comments:	Sample plots are permanent and circular. The plots were laid down in a shapefile, positioned systematically with a random start. The location of the plots within the forest plantation was done with a GPS. The area of each plot is not a variable but a fixed value, but must be measured by its radius in order to determine the variable "number of trees within the plot".

Data Unit / Parameter:	$B_{LI\_WET,p,i}$
Data unit:	Kg
Description:	Wet weight of the composite litter sample
Source of data:	N/A
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording	N/A
Value monitored:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Calculation method:	N/A
Comments:	The variable was classified in the PD as a variable to be monitored. However, given the simplicity and costly-

	effective mechanism to determine litter based on a conservative default value, it was decided not to monitor the variable.

3.1.3 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 methodology AR-ACM 0001 “Afforestation and reforestation of degraded lands” (version 05.2.0, EB 65). The PD was registered mentioning the version 5.1.1 of the referred methodology but the applicable version is the one stated above.

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. 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.

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

Monitoring events were developed in the period of time comprised between January 2020 and December 2020. The reason why the measuring events were done in such extended period of time was that they were made at the same time that the continuous forest inventory: ”Inventario Forestal Continuo” (IFC), that this company performed yearly to LUMIN.

Sampling design and stratification

Project boundaries were defined at the beginning of project activity and will be updated along the crediting period, since boundaries may vary or new strata may be created after disturbances effects (pests, droughts, fire) or by updated high resolution satellite images that became available. Geographic coordinates are established, recorded and archived. A Geographic Information System was implemented for the validation and is updated for verification. All the geographical information will be available for the verification team.

With the purpose of developing the monitoring plan, LUMIN was stratified into 60 strata. Stratification was done considering region; age class (plantation date); and species planted (*E. dunnii, E. grandis, E. tereticornis* and *P. taeda)*.

The plots allocation is registered in a GIS and GPS to easily be located.

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. An Arc-Map software was used to randomly locate the sampling plots (location is systematic, with random start). The map with the location of the sampling plots was loaded on the GPS receptors used by forest inventory crews, so that they can reach the plots accurately. An example of the software output for two contiguous strata is shown in Figure **13**.

The following table shows the number of plots calculated ex-ante and ex-post by strata.

Table 7. Number of plots per stratum.

N° Stratum	Stratum Code	Species	N°plots per stratum estimated in PD Equation 4 (Absolute numbers)	Measured Field Plots
1	Centurion-Edunnii-2008	Edunnii	3,0	5,00
2	Centurion-Edunnii-2009	Edunnii	2,0	3,00
3	Centurion-Edunnii-2010	Edunnii	2,0	2,00
4	Centurion-E grandis-2007	E grandis	9,0	14,00
5	Centurion-E grandis-2008	E grandis	17,0	17,00
6	Centurion-E grandis-2009	E grandis	8,0	9,00
7	Centurion-E grandis-2010	E grandis	14,0	14,00
8	Centurion-E grandis-2011	E grandis	2,0	2,00
9	Centurion-E grandis-2012	E grandis	2,0	2,00
10	Centurion-P taeda-2007	P taeda	2,0	2,00
11	Centurion-P taeda-2008	P taeda	2,0	2,00
12	Centurion-P taeda-2009	P taeda	2,00	2,00
13	Centurion-P taeda-2010	P taeda	2,00	2,00
14	Octava-Edunnii-2008	Edunnii	2,00	2,00
15	Octava-E grandis-2010	E grandis	2,00	2,00
16	Octava-E grandis-2011	E grandis	2,00	2,00
17	Octava-P taeda-2010	P taeda	2,00	2,00
18	Octava-P taeda-2009	P taeda	2,00	2,00
19	Ruta 7-Edunnii-2007	Edunnii	2,00	3,00
20	Ruta 7-Edunnii-2008	Edunnii	2,00	2,00
21	Ruta 7-Edunnii-2009	Edunnii	2,00	3,00
22	Ruta 7-Edunnii-2010	Edunnii	2,00	2,00
23	Ruta 7-E grandis-2006	E grandis	6,00	6,00
24	Ruta 7-E grandis-2007	E grandis	11,00	19,00
25	Ruta 7-E grandis-2008	E grandis	6,00	7,00
26	Ruta 7-E grandis-2009	E grandis	6,00	6,00
27	Ruta 7-E grandis-2010	E grandis	8,00	9,00
28	Ruta 7-E grandis-2011	E grandis	2,00	2,00
29	Ruta 7-P taeda-2006	P taeda	2,00	2,00
30	Ruta 7-P taeda-2007	P taeda	2,00	2,00
31	Ruta 7-P taeda-2008	P taeda	2,00	2,00
32	Ruta 7-P taeda-2010	P taeda	2,00	2,00
33	Ruta 8-Edunnii-2007	Edunnii	2,00	2,00
34	Ruta 8-Edunnii-2008	Edunnii	2,00	2,00
35	Ruta 8-Edunnii-2009	Edunnii	2,00	2,00
36	Ruta 8-Edunnii-2010	Edunnii	2,00	2,00
37	Ruta 8-Edunnii-2012	Edunnii	2,00	2,00

38	Ruta 8-E grandis-2007	E grandis	7,00	10,00
39	Ruta 8-E grandis-2008	E grandis	2,00	4,00
40	Ruta 8-E grandis-2009	E grandis	9,00	9,00
41	Ruta 8-E grandis-2010	E grandis	9,00	11,00
42	Ruta 8-E grandis-2011	E grandis	3,00	3,00
43	Ruta 8-E grandis-2012	E grandis	2,00	2,00
44	Ruta 8-P taeda-2007	P taeda	2,00	2,00
45	Ruta 8-P taeda-2008	P taeda	2,00	2,00
46	Centurion-E grandis-2014	E grandis	2,00	2,00
47	Centurion-E grandis-2015	E grandis	2,00	2,00
48	Ruta 7-E grandis-2014	E grandis	2,00	2,00
49	Ruta 7-E grandis-2016	E grandis	2,00	2,00
50	Ruta 7-E grandis-2017	E grandis	2,00	2,00
51	Ruta 7-E grandis-2018	E grandis	2,00	2,00
52	Ruta 7-P taeda-2016	P taeda	2,00	2,00
53	Octava-E grandis-2019	E grandis	2,00	2,00
54	Centurion-Edunnii-2020	Edunnii	2,00	2,00
55	Centurion-E grandis-2020	E grandis	2,00	2,00
56	Centurion-P taeda-2020	P taeda	2,00	2,00
57	Ruta 7-E grandis-2020	E grandis	2,00	2,00
58	Ruta 7-P taeda-2020	P taeda	2,00	2,00
59	Ruta 8-E grandis-2020	E grandis	2,00	2,00
60	Ruta 8-P taeda-2020	P taeda	2,00	2,00

Total			208	236

As shown in Table 7, the number of plots finally measured during the field work was higher than the number calculated ex-ante. The reason of this increment was that if the ex-ante calculated number of plots per strata was 1, an additional plot was included.

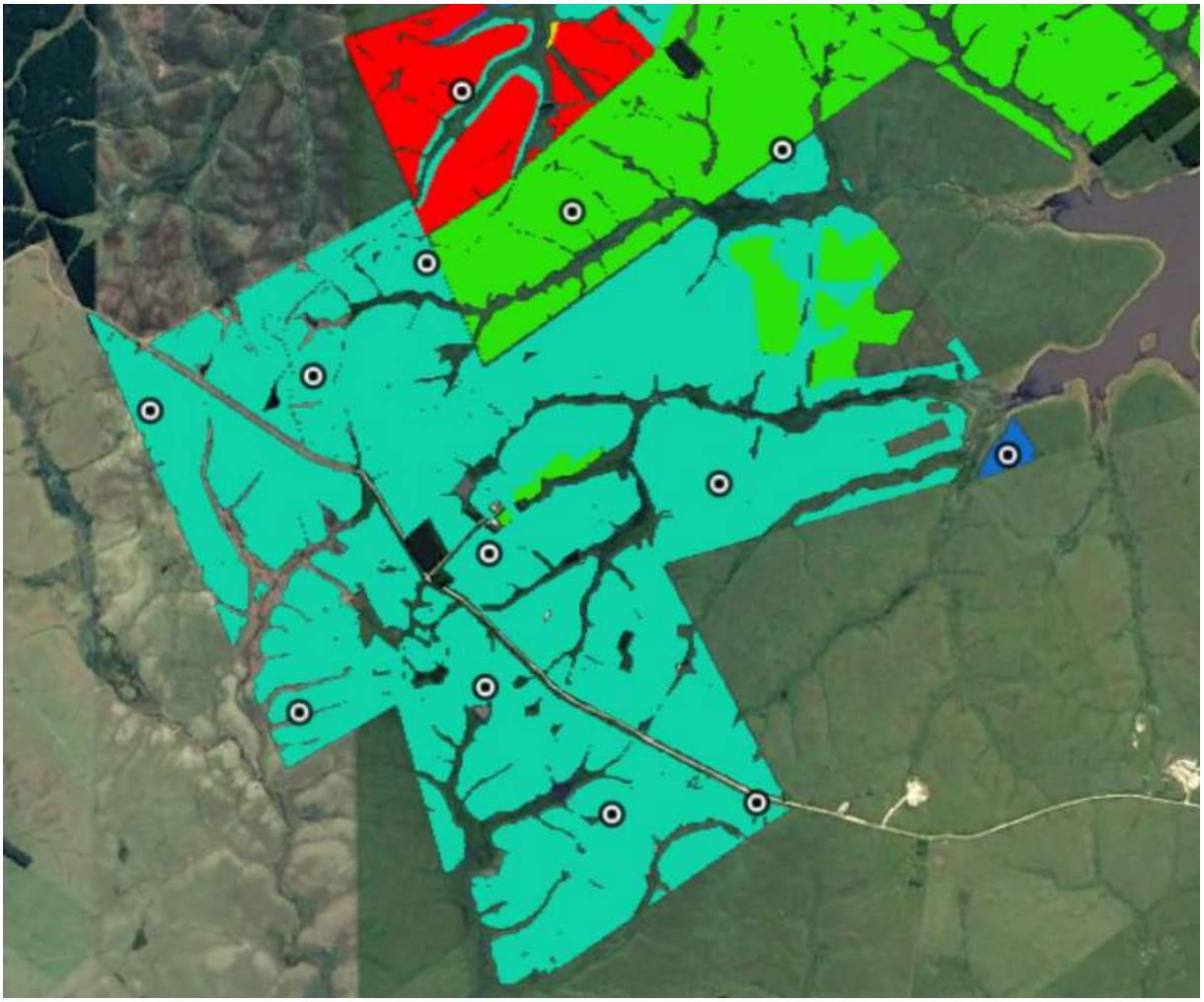


Figure 13. Example of location of permanent sampling plots.

Each carbon pool was measured following the methodology procedures and IPCC Good Practice Guidance for LULUCF (2003). Carbon stocks in above and below 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. 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), biomass expansion factor (BEF) and root-to-shoot ratio (R). Default carbon fraction (CF) value was used in order to estimate the carbon stock.

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

To collect field data, staff members used tablets with the Optimber Forest Mobile Software (https://optimber.com.br/forest-mobile/) or similar.

The project will manage the sampling uncertainties evaluating and trying to reduce the type of errors.

Managing 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. 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.

QA/QC plan includes a number of activities aiming at achieving accuracy and precision of data, and transparency of procedures, such as:

- -development of Standard Operating Procedures for field measurements, clearly defining all staff responsibilities and raising awareness about the importance of each tasks for producing reliable results;
- -proper training of field measuring teams;
- -periodical check and maintenance of measuring instruments; all mechanical, optical and electronic instruments will be periodically checked by qualified personnel. In addition, consistency on field data will be permanently monitored, in order to detect any malfunctioning.
- -perform area measurements using different methods (e.g., aerial photograph, cadastral data, satellite images, ground measurements), and check for accuracy and consistency.
- To collect field data, staff used tablets with the Optimber Forest Mobile Software or similar.
- -development of electronic worksheets for data processing; special software may be designed for the monitoring process, with graphical capabilities and data consistency checking functions.
- -fully document and archive field and processed data, as well as all procedures used; to ensure data preservation, all relevant data, data analyses, static factors, photos, images, GIS output and other data shall be stored in electronic and paper format.
- -establish procedures to ensure representativeness of Sample Plots (SPs) (i.e., to avoid biased estimates due to differential management of SPs); The allocation of samples in the field will be systematic with random start, so, the differences between population and sample mean and variance will tend to neutralized, as the sample fraction is wide enough; identification of plots in the field should be coded and apparent only to the monitoring team; periodical checks will be performed on simple measurements (e.g., DBH) outside SPs, in order to correlate these values with plot measurements;
- -development of algometric equations and emission/C-stock-change factors; project-specific equations and stock change factors would minimize errors, as compared to the use of default factors.
- -check project data with benchmarks; this will help detecting possible inconsistencies in data collection or processing.

Operational and management structure

The monitoring was coordinated by the property manager and implemented by a qualified contractor. One staff member of LUMIN was identified as the focal point.

Entity applying monitoring plan

Company: Eucapine S.R.L

Address: Roque Graseras 694

City: Montevideo

Zip code: 13.000

Country: Uruguay

Phone: (00598) 27124429

Monitoring events and initial data processing were developed by the consultant Carbosur and Pike&Co.

Entity applying monitoring event in 2012-2012 and in 2013-2018 (together with EUCAPINE):

Company: ´Pike & Co. Consultora Forestal´

Phone: +598 2 6056234

www.pikeconsultora.com.uy

Figure 14: Measuring events on LUMIN/EUCAPINE´s plantations.

3.1.4 Dissemination of Monitoring Plan and Results (CL4.2)

Along with the project implementation, the project documentation will be published on VCS and CCB website for all stakeholders, so that they can obtain the detailed project information and development progress. Also, the summary of project description in local language will also be disseminated to local communities through local government, as long as the summary of monitoring reports during each verification.

Also, the full project documentation will be published on LUMIN/EUCAPINE website for public comments, together with specific brochures describing the project characteristics and benefits.

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

Since continuation of an activity 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.

3.2.2 Project Emissions

LUMIN/EUCAPINE project activity does not have GHG emissions. However, this chapter refers to the removals of GHG performed by this project activity.

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 CO_2-e:

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

Where:

C_{AR-CDM}	Net anthropogenic GHG removals by sinks; t CO_2-e.
$\triangle C_{ACTUAL}$	Actual net GHG removals by sinks; t CO_2-e.
$\triangle C_{BSL}$	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:

$$\triangle C_{ACTUAL} = \triangle C_P - GHG_E$$

Where:

$\triangle C_{ACTUAL}$	Actual net greenhouse gas removals by sinks; t CO_2-e.
$\triangle C_P$	Sum of the changes in above-ground and below-ground tree biomass, dead wood, litter and soil organic carbon stocks in the project scenario; t CO_2-e.
GHG_E	Increase in GHG emissions as a result of the implementation of the proposed A/R CDM project activity within the project boundary; t CO_2-e.

The following formula described in the methodology is used in order to estimate GHG emission:

$$GHG_E = \sum_{t=1}^{t*} GHG_{E,t}$$

Where:

GHG_E	Increase in GHG emissions as a result of the implementation of the proposed A/R CDM project activity within the project boundary; t CO_2-e.
$GHG_{E,t}$	Increase in non-CO_2 emissions due to biomass burning of existing vegetation as part of site preparation in year t; t CO2-e.
t	1,2,3,……..,t* years elapsed since the start of the A/R CDM project activity.

The tool for "Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity" 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. For ex-ante estimation, all pools were accounted. Following is presented the equation for the estimation of ΔC_P. Calculations are described below.

$$\triangle c_P = \triangle c_{TREE} + \triangle c_{DW} + \triangle c_{LI} + \triangle c_{SOC}$$

Where:

$\triangle c_P$	Change in carbon stock in all selected carbon pools in the project scenario, t CO2-e.
$\triangle c_{TREE}$	Change in carbon stock in tree biomass in project, 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.
$\triangle c_{DW}$	Change in carbon stock in dead wood biomass in project, 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.
$\triangle c_{LI}$	Change in carbon stock in litter biomass in project, 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.
$\triangle c_{SOC}$	Change in carbon stock in SOC in project, 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.

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 3.2 of the Monitoring Report. Estimations are archived as part of the project verification and will be available for the verification team.

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. As this is the first monitoring report the carbon values in every pool is the final result, the starting point of the crediting period is zero carbon.

As in ex-ante estimations, the following equations were used in order to estimate above and below ground biomass ex-post measurements:

$$B_{TREEj,p,i,t} = V_{TREEj,p,i,t} * D_J * BEF_{2,J} * (1 + R_J)$$

Where:

$B_{TREE,j,p,i,t}$ Biomass of trees of species j in sample plot p of stratum i at late 2012 – early 2013.

$V_{TREEj,p,i,t}$ Stem volume of tree species using field measurements of tree parameters (DBH and height), default values (tree shape factor) and complemented with worksheets data processing (interpolation of not-measured heights); m^3.

The applied equation for volume estimation is no other formula than the cylinder volume equation corrected by a taper value:

$$V_{TREE} = \text{Basal area} \times \text{height} \times \text{TSF}$$

Where:

$$Basal\ area = \frac{\pi \times DBH^2}{4}$$

Being DBH Diameter at Breast Height and TSF the tree shape factor value.

According to the methodology, for ex-post estimation, the volume equation used must be demonstrated to be appropriate for the purpose of estimation of tree biomass by applying the tool "Demonstrating appropriateness of volume equations for estimation of aboveground tree biomass in A/R CDM project activities". The appropriateness of the equations is demonstrated through the satisfaction of the following conditions, in the sense that the formula is very generic and applicable in any case:

- The equation is used both in the national forestry inventory and the national GHG inventory of Uruguay, and
- The equation has been used in commercial forestry sector in Uruguay for 10 years or more.

The tree shape factor (TSF) used is 0.5 (the same generic value for all species that the project comprises) and the appropriateness of it was demonstrated during validation, it is a parameter available at validation and is not monitored. It is neither mentioned in the methodology as a monitored parameter.

However, it is preferred to demonstrate the appropriateness of this value with some other documents that support it[17].

D_J Basic wood density of tree species j. The species j corresponds to the species used in this project: *Pinus taeda*., with a basic density of 44 t.d.m./m^3; *Eucalyptus grandis* with a basic density of 46 t.d.m./m^3*; Eucalyptus dunnii* with a basic density of 482 t.d.m./m^3 and *E. tereticornis* with a basic density of 560 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 for *Pinus pinaster* in IPCC LULUCF Good Practice Guidance (2003), Table 3A.1.9-1 (http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp3/Anx_3A_1_Data_Tables.pdf).

As also established in the validation report, the applied value is also mid-range in values for loblolly pine wood density published by Oregon State.

$BEF_{2,J}$ Biomass expansion factor for conversion of stem biomass to above-ground tree biomass, for tree species j; dimensionless. The BEF2 is to be used in connection to growing stock biomass data and not with increment data, as described in chapter 3.2 of the GPG for LULUCF (2003)). The value was also available

[17] "Proyecto Regional de alternativas para la inversión forestal", Cap. VI, cuadro 6.7 (http://www.oas.org/dsd/publications/Unit/oea20s/ch08.htm)

at validation and not monitored, it ranged from 3.4 (for young forest) to 1.15 (mature forests) and the exact values applied for different plantation dates are reported in the final worksheet for carbon stock calculation.

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

$$R = \frac{exp[-1.085+0.9256\times ln(A)]}{A}.$$

Where A is aboveground biomass content (t.d.m./ha). The aboveground biomass was calculated per year of plantation and different values were obtained. See

Finally, the carbon stock in tree biomass within the project boundary is estimated as follows:

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

Where:

C_{TREE} Carbon stock in tree biomass within the project boundary; t CO2-e.
B_{TREE} Biomass of trees within the project boundaries.
CF_{TREE} Carbon fraction of tree biomass; 0.5 t C td.m-3.

Soil organic carbon

Estimations of soil organic carbon (SOC) stocks were done in accordance to 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 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 of this tool -as demonstrated in validation- since the areas of land to which the tool is applied do not fall into wetland category, do not contain organic soils and are not subject to any of the land management practices and application of inputs listed in the tool.

Litter remains on site and is not removed and soil disturbance is in accordance with appropriate conservation practices, limited to site preparation and not repeated within 20 years.

Table 8: Parameters used for estimation of Soil Organic Carbon (SOC).

Parameter	Symbol	Value	Source (SOC estimation tool, V01.1.0)
Reference SOC (tC/ha)	$SOC_{REF,i}$	88	Table 3 HAC soils, warm temperate
Land use factor	$f_{LU,i}$	1	Table 6 All permanent grassland
Management factor	$f_{MG,i}$	0.95	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 ($SOC_{INICIAL,i}$) is estimated by multiplying the factors in Table 11 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 LUMIN/EUCAPINE project. The following methodological formula is used for calculating the annual change in SOC stock:

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

Where:

$dSOC_{t,i}$ 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.

$SOC_{INICIAL,i}$ 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 to the A/R CDM project activity, in stratum I of the areas of land; tC/ha.

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 8% and 4% of carbon stock in tree biomass for dead wood and litter respectively.

3.2.3 Leakage

As it has been stated in PD document, the methodology requires the assessment of sources of leakage due to activity displacement (conversion from grazing land to forestry). 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" led to the conclusion that this source can be neglected. The application of the "Guidelines on conditions under which increase in GHG emissions related to displacement of pre-project grazing activities in A/R CDM project activity is insignificant", which is one of the applicability conditions of the tool, resulted in the conclusion that the project will not cause any displacement of the activity occurring before project implementation. The project accomplishes the following conditions:

(a) The total area expected to be displaced is more than 5% of the entire A/R CDM project activity or more than 50 ha, and the n – a ha (where "n" is the area in ha expected to be displaced and "a" is 5% of the total project area or 50 ha) are displaced to:

i. Areas of land that can be identified as degraded or degrading.

ii. Existing grasslands with the carrying capacity that allows for accommodation of the displaced animals during the entire period of displacement.

(b) The total area to be displaced corresponds to the total area of the project 18.988 ha, meaning that the grazing area displaced is 100% and also more than 50 ha, then the value "n" – "a" is 18.988 – (5% of 18,988= 949) = 18,039 ha. This area, used for grazing cattle, can be identified as degraded.

(i) The grazing cattle displaced by LUMIN/EUCAPINE project will be to neighbor areas. One of the main explanations are that the project areas are not located in only one farm but in 6 different areas (as seen in

figure 1. It was already demonstrated that the project areas are degraded or degrading, and because the grazing animals are moved to neighbor zones (to control during on-site validation visit), the same conditions apply to this specific soil.

(ii) Moreover, the animals will be displaced only for 1 to 2 years and lately returned to the same site. The silvicultural management practice does not permit the animals to be grazing at the same time with the small trees, to avoid any physical damages. When the trees are big enough 1 or 2 years, the animals are reintroduced. During the period when the animals are displaced, the grasslands to where they go have the carrying capacity, and most farms in the project area (64%) are dedicated to beef cattle production. In Uruguay 80% of the land is dedicated to grazing animals.

(c) The total number of animals expected to be displaced is more than 40 LSU, and the n – 40 LSU (where "n" is the total number of animals, expressed in LSU, which are expected to be displaced) are displaced to:

i. Areas of land that can identify as degraded or degrading

ii. Existing grasslands with the carrying capacity that allows for accommodation of the displaced animals during the entire period of displacement

iii. Slaughterhouses

Option (i) and (ii) were already demonstrated above. Option (iii) is also valid for the case of LUMIN/EUCAPINE project. This is a common practice in the cattle beef production in Uruguay.

Most of the supporting evidence for the above paragraph demonstration can be obtained through the observation of the Uruguayan farms and it´s cattle production system during on-site validation.

Beyond all, we believe 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" is not necessary. The application of the "Guidelines on conditions under which increase in GHG emissions related to displacement of pre-project grazing activities in A/R CDM project activity is insignificant", which was superseded by the previously mentioned tool, resulted in the conclusion that the project will not cause any displacement of the activity occurring before project implementation.

Beef cattle breeding (cow-calf) was the dominant activity in the pre-project land (Eastern hilly areas of Uruguay). Cattle were based on a breeding herd where heifers are mostly placed with bulls at the age of 3 years. Sales include culling cows to be fattened, surplus heifers, and calves (at weaning). Average production is 33 kg per ha per year[19].

Considering the area subject to be afforested represents only 45-50% of the total area owned by the project participant (lowlands, biological corridors, roads, rocky areas, settlements, among others, complete the rest of the land use), the displacement of grazing activity can be considered neglected because:

- Uruguayan grazing activity is completely associated with forestry. A larger amount of cattle, more than what is usual, is put within the project area during some months to substantially reduce the amount of above ground biomass minimizing the use of glyphosate (herbicides for site preparation) during site preparation for the forest establishment.
- During site preparation and for a maximum of two years after forest establishment, cattle is put apart in similar areas (commonly in neighbors farms) to prevent cattle from harming the small trees. During the period in which cattle loss the winger part of leather, it is very common the animal uses fences or trees to scratch. After these two years cattle is reintroduced and managed in a

silvopastural system with trees (both activities complement each other). The impact of cattle displacement is reduced to two years over thirty-year rotation.

- The total area under project activity was not afforested in the same year. The impact of this staggered plantation plan substantially reduces the eventual grazing displacement, cattle that must be moved to other areas can be put in farms that were not afforested or in areas that has more than two years with forestry owned by LUMIN/EUCAPINE.
- Silvopastural production is conducted during twenty-eight years of the thirty-year rotation period. Silvopasture combines trees with forage and livestock production. The trees are managed for high-value sawlogs and, at the same time, provide shade and shelter for livestock and forage, reducing stress and increasing forage production.

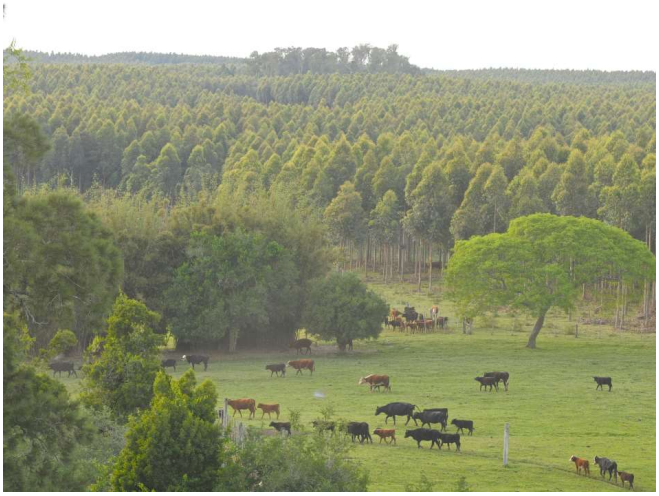


Figure 15. Silvopastural system in Uruguay.

- During one and a half year –maximum two –cattle is put in existing grasslands with the carrying capacity that allows for accommodation of the displaced animals during this period of displacement. These are areas with no forest (80% of Uruguayan surface is pasture) meaning that deforestation never occurs when introducing cattle in farms. And these areas can be identified as degraded.

Existing cattle in the pre-project situation may either stay within project boundaries or in an area controlled by project participant or be sold to the market (calves and surplus heifers are normally sold in the market for fattening on other grazing areas, while cows, heifers and a reduced number of bulls are sold to slaughterhouses). It is LUMIN/EUCAPINE's policy that landowners can continue with their activities for a certain period after the purchase of the land, so that they have time to reduce the population of their cattle. In some cases, they may even stay in the land.

3.2.4 Net GHG Emission Reductions and Removals

Per vintage, net GHG Emission Reductions and Removals (tCO2) are distributed in the following way:

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2013	0	742.516	0	742.516
2014	0	906.465	0	906.465
2015	0	760.944	0	760.944
2016	0	849.680	0	849.680
2017	0	805.362	0	805.362
2018	0	453.544	0	453.544
2019	0	131.382	0	131.382
2020	0	290.380	0	290.380
Total	0	4.940.273	0	4.940.273

3.3 Optional Criterion: Climate Change Adaptation Benefits

N/A

3.3.1 Activities and/or processes implemented for Adaptation (GL1.3)

N/A

4 COMMUNITY

4.1 Net Positive Community Impacts

4.1.1 Community Impacts (CM2.1)

Community Group	Local towns and cities
Impact	Job positions generation
Type of Benefit/Cost/Risk	Creation of employment is one of the main direct social benefits of the project, as an actual impact (not predicted). Typically, an extensive livestock production system employs 1.4 to 4.4 persons every 1,000 ha. LUMIN/EUCAPINE project is expected to multiply that figure by more than 8-10 times. Beyond an increased number of jobs, the project is expected to contribute to the development of the region and the country pursuant the priorities defined by Uruguayan government (promotion of small family businesses, increase in exports, eradication of rural poverty, incorporation of technology, increased nationally added value, development of new productive chains and geographic decentralization of development) Local production conditions have been improved with the introduction of a new activity (forestry) that generates more income per unit of land, compared to baseline scenario. Currently, 230 direct and indirect workers are employed by LUMIN/EUCAPINE project.
Change in Well-being	Change in workers well-being is considered as their improve in the quality of their lives. Workers in the forestry sector experience better working conditions than in other sectors.

Community Group	Local towns and cities
Impact	Promotion of small family businesses
Type of Benefit/Cost/Risk	As it was mentioned above, 'LUMIN/EUCAPINE' project activity will generate several job opportunities, creating nearly 230 job positions when the sustainable production be reached. The vast majority of employees will be hired by contractors. The majority of the outsourced contractor companies currently working with LUMIN/EUCAPINE, are registered in Uruguay as "PYMES" (small and medium sized enterprises - SME), mostly family companies. Also, it is expected that most of the small and medium enterprises meanwhile providing services for the forestry sector, will continue their own development, increasing capital, acquiring machinery and technology, and generating new jobs in the region. Another positive aspect that is expected in the development of the productive chain associated with the forestry sector is the

	generation of a work culture that allows greater formalization of companies and also greater stability in jobs. At the same time, it is expected that the aspects related to occupational safety will increase considerably. LUMIN/EUCAPINE has been playing since 2018 a leadership role in the implementation of measures that address and improve the gender and equity perspective in the workplace inside and outside the organization, actively participating in UN women and getting involved in improvement processes proposed by UN Women. Nearly 230 job positions when the sustainable production be reached.
Change in Well-being	Workers in the forest sector and their family, usually lives in the areas of influence of the project. Thus, their work through SME, benefits the entire community.

Community Group	Local towns and cities
Impact	Reduction of rural poverty
Type of Benefit/Cost/Risk	The main contribution of Lumin/Eucapine project activity to reduce rural poverty will be through employment formalization and the generation of high quality and stable employment, in a region of Uruguay with elevated levels of poverty. A study by Carámbula and Piñeiro (2006)[18], demonstrate that forestry projects oriented to the production of high value timber, generates high positive impacts in the eradication of poverty in rural areas and reverting the process of internal migration to big cities. It may also allow settlement in small towns, with less dispersed and isolated rural territory, providing better access to services such as health and education. More recent studies (see footnote 14) demonstrate the labor intensity in forest areas is higher than previous land use cattle grazing.
Change in Well-being	Workers in the forest sector and their family, usually lives in the areas of influence of the project. Thus, their work through SME benefits the entire community, generating indirect job position and contributing to reduce unemployment and rural poverty.

Community Group	Forestry workers (local communities and forestry workers of the project)
Impact	Increase in their abilities with the incorporation of technology
Type of Benefit/Cost/Risk	The project incorporates the best available and affordable technology for optimizing wood productivity and quality through

[18] Carámbula, M. y Piñeiro, D. La Forestación En Uruguay: Cambio Demográfico y Empleo en Tres Localidades

	the selection of seeds, site preparation, plantation, weed and pest control, forest management and wood harvesting and logistics, and achieving sustainability objectives. LUMIN/EUCAPINE has a program for applied research, continuously testing various practices in order to achieve continuous improvement over time and collaborates with other companies and public institutions in this regard. It could be also a plus the importance of generating local capacities over the years, most of the local enterprises will acquire and learn work methodology and international reference procedures, incorporating know-how and experiences in various topics associated with forestry production. 330 people of community members who have improved skills and/or knowledge resulting from training provided as part of project activities.
Change in Well-being	Trained workers can have a better well-being due to the knowledge and abilities acquired. Also, they have more job opportunities.

Community Group	Uruguayan society
Impact	Increased nationally added value to forestry products
Type of Benefit/Cost/Risk	LUMIN/EUCAPINE project will produce timber that can be used for high-value products. As discussed above, currently there are no wood industries located within a reachable distance from the project site. However, the presence of LUMIN/EUCAPINE and of other similar initiatives in the area are also seeking carbon finance (GFP, Guanaré and others) may induce in the future the establishment of industries in the region. And even in the case that no industries are developed, the saw logs and veneer logs produced by LUMIN/EUCAPINE in the East region can be transported to its plywood mill in Tacuarembó or could be exported through Montevideo harbor at prices which will be higher than those that could be obtained by selling pulpwood, which is the traditional wood product exported from Uruguay. This sustainable high-quality wood, can be a substitute of native forests logs that are illegally harvested in others parts of the world. In addition, the forest management adopted by LUMIN/EUCAPINE would increase the amount of carbon sequestered by trees, thus increasing the carbon embedded value in wood products
Change in Well-being	N/A

Community Group	Uruguayan society
Impact	Development of new productive value chains
Type of Benefit/Cost/Risk	Even though LUMIN/EUCAPINE owns a plywood mill in the North region of Uruguay (City of Tacuarembó), as of December 2020 the company has no plans to not invest in a new industry in the east region. Nevertheless, as mentioned above, LUMIN/EUCAPINE forest plantation may contribute to promote the establishment of industrial investments in the area.
Change in Well-being	N/A

Community Group	Uruguayan society
Impact	Development of new productive value chains
Type of Benefit/Cost/Risk	Even though LUMIN/EUCAPINE owns a plywood mill in the North region of Uruguay (City of Tacuarembó), as of December 2020 the company has no plans to not invest in a new industry in the east region. Nevertheless, as mentioned above, LUMIN/EUCAPINE forest plantation may contribute to promote the establishment of industrial investments in the area.
Change in Well-being	N/A

Community Group	Uruguayan society
Impact	Geographic decentralization of development
Type of Benefit/Cost/Risk	LUMIN/EUCAPINE project will bring about a number of socio-economic benefits that will mostly impact on its surrounding area, which is currently one of the less developed ones in the country. This would create a development pole away from Montevideo and other areas which concentrate most of the economic activity in the country.
Change in Well-being	N/A

Community Group	Local communities
Impact	Improve of local community's well-being
Type of Benefit/Cost/Risk	LUMIN/EUCAPINE has implemented a program to support and assist local communities, public schools, public entities (firefighters, police) or any stakeholders with problematics solvable by LUMIN/EUCAPINE, with donations of various types. From materials goods (firewood, tools, school supplies) to staff time (educational presentations in schools) and sometimes cash, LUMIN/EUCAPINE is committed to promote and enhance the

	well-being of the community. A complete and detailed list of donations is available for VVB during validation. Also, as already mentioned in this report, LUMIN is actively participating in UN women and getting involved in improvement processes proposed by UN Women.
Change in Well-being	N/A

4.1.2 Negative Community Impact Mitigation (CM2.2)

Describe activities and/or processes implemented to mitigate any negative well-being impacts on community groups and for maintenance or enhancement of high conservation value (HCV) attributes identified in the project description. Explain how such actions are consistent with the precautionary principle.

The project owner has appointed a staff member to record and collect all communications included conflicts and dissatisfaction between LUMIN/EUCAPINE and local communities/neighbors.

As part of the "Communication process in the Operational Forest Management", there is a specific item from LUMIN/EUCAPINE called "Conflicts Resolution". This document clearly explains how LUMIN/EUCAPINE procced once they receive or detect a conflict with any third party.

Conflicts, environmental complaints, or health and safety, that involve claims and/or eventual compensation will be received by any means of communication, analyzed internally and resolved with the support of the law firm.

Conflicts involving claims of possession or right of use on the properties owned or managed by LUMIN are resolved and recorded with the support of the law firm that advises the company. In the event that the assets in question are compromised, the forestry operations that may be the direct cause of the dispute will be suspended until it has been resolved, including the possibility of compensation to local people in the event of loss or damage affecting your legal and customary rights, property, resources or livelihoods.

The General Manager will designate a person responsible for collecting and processing the information regarding all the complaints received by the company, who will keep record of them and their resolution status.

Also, since 2005, LUMIN/EUCAPINE implemented an integrated management system that includes a digital management system to manage Corrective Actions Requests, raised by LUMIN/EUCAPINE employees by request of any affected stakeholder.

With regard to rural roads, some difficulties may arise in the state of some roads due to the circulation of larger trucks during harvest times. LUMIN/EUCAPINE staff anticipates to this situation visiting the neighbors that could be affected, explaining the activities that will be implemented and leaving a contact telephone to contact them in case of need.

Regarding the internal mobility of the population, although migration from the rural to urban areas is caused by multi-causal aspects, it must be taken into account that due to the acquisition of land by forestry companies, some residents could choose to live in more populated localities.

4.1.3 Net Positive Community Well-Being (CM2.3, GL1.4)

The main source of income for communities associated with the agriculture in the project area is beef cattle breeding (cow-calves). The production methods have been applied for the last 300 years (extensive

production) and is affected by natural disasters such as droughts, floods. Overall, agricultural production is low. The project will benefit communities economically and socially.

1) Income improvement: during the project period, the net income generated by the project includes generation of employment and increasing labor income

2) Job creation: The project will provide permanent, temporary, direct and indirect employment opportunities. Most of the work will be done by local farmers involved in the project.

3) Enhance social cohesion: project developer will form a closer interaction channel, which will strengthen communication between communities, local/national governments and forestry contractors' companies.

4) Technical training: people from communities hired to develop forest activities will be technically trained.

5) Productive integration: there are numerous local productive activities that can work in a complementary way with forestry, such as grazing cattle, sheep and horses, apiculture, agricultural crops, and even the preservation of natural areas for environmental conservation.

6) Access to services: the greater increase in activity in these localities, as well as the potential establishment of workers in non-isolated areas, can facilitate better access to health, education and mobility services at the local level.

4.1.4 Protection of High Conservation Values (CM2.4)

None of the HCV related to community well-being will be negatively affected by the project because almost all HCV are not located in the rural areas, but in towns, negligible being affected by the project activity.

There are two HCV, "Quebrada de los Cuervos" and "Paso Centurion y Sierra de Rios" that are part of the National System for Conservation Areas (SNAP) with strict conservationist rules for the protected area and buffer zone. LUMIN/EUCAPINE project is not generating a negative impact in the Quebrada de los Cuervos and Paso Centurion y Sierra de Rios areas and is an active stakeholder as part of the community, participating in discussion, and different topic of the Management plans of the areas.

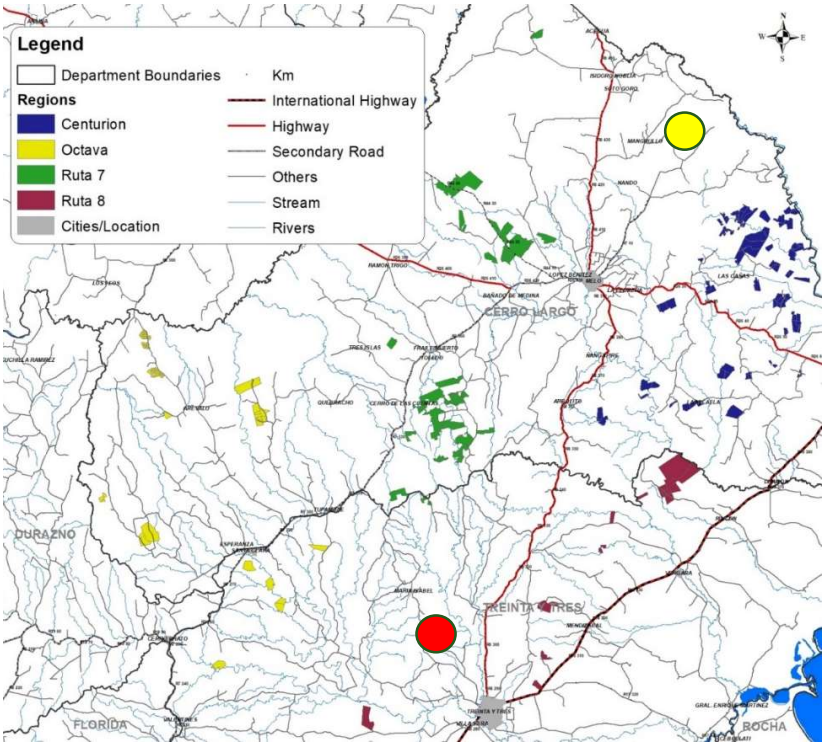


Figure 16. Location of Quebrada de los Cuervos (red dot) and Paso Centurión (yellow dot)

"Gallo-Doroteo", "Macachin" and "Paso real" farms is part of the project area and is also a private HCV defined by LUMIN/EUCAPINE and approved by local communities (with public consultation in 2020). FSC standard has a standardized procedure that needs to be followed in order to categorize an area as HCV. The procedure includes doing a public consultation, inviting all potential affected communities. The area was successfully categorized as HCV in 2020 and permanent biodiversity monitoring is conducted in the site. See biodiversity section of this report. The report "Characterization of habitats and wildlife monitoring" for the HCV Gallo-Doroteo, Macachin and Paso real farm conclude over the last years, that there are no changes in the HCV, which is in a good state of preservation, as well as their buffer zones (se chapter 5.1.1). Studies of the same characteristics were carried out in other LUMIN/EUCAPINE properties, and no negative changes were observed with respect to previous monitoring. The study included a list of flora and fauna species (amphibians, mammals, birds). according to international conservation lists (IUCN, CITES) and according to the database of biological invasions in Uruguay (InBUy). The categories were aligned in accordance with the categorization of IUCN and CITES. The SNAP species (priority species for the conservation of the SNAP-"Sistema Nacional de Areas Protegidas") were taken into account. Specialists are hired to survey and monitor flora and fauna in the project sites. Those environments/species of interest for conservation and representative areas are selected, as is the case of native forest. Social advisors, and LUMIN/EUCAPINE employees in their interviews with local social actors are consulted about potential sites of value for conservation. The answers are evaluated by the technicians of the company for their consideration. It was verified in the revised documentation "Sites of high conservation value" according to interviewees during 2013 and 2020.

4.2 Other Stakeholder Impacts

4.2.1 Mitigation of Negative Impacts on Other Stakeholders (CM3.2)

The project activities will contribute to other stakeholders, improving socio-economic conditions, by bringing decentralized development and generating job opportunities.

Regarding the main actors and other stakeholders with whom the forestry sector can relate, it is expected that it will be linked with different government actors both at national and local level, civil associations, educational and research entities, private sector, among others. It would also be important that forestry companies could be integrated into the local communities' spaces in those localities that have them.

No severe impacts have been identified on other stakeholders.

Although LUMIN maintains close relations with neighbors and producers in the area, there are some local voices or NGOs linked to the environmental sector that question some aspects of the forestry sector. LUMIN, both through annual reports and specific reports, as well as visits to territories, maintains fluid contact with the communities, seeking to inform both harvest plans and the different monitoring that ensure environmental quality and the sustainable management of their production.

4.2.2 Net Impacts on Other Stakeholders (CM3.3)

As there has not been identified negative impacts, there is no need to demonstrate they have not had a net negative impact on the well-being of other stakeholders.

4.3 Community Impact Monitoring

4.3.1 Community Monitoring Plan (CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

One of the main objectives of LUMIN is to implement a corporate policy of Social Responsibility that allows developing and maintaining appropriate levels of communication and participation with the communities in which it operates. This implies analyzing its link with the communities in which LUMIN carries out its forestry and industrial activities; permanent support to local institutions both at the governmental level and civil associations.

Thus, when LUMIN defines its role within social action, it positions itself as one more actor in the community, and this is reflected in its approach to the firm's Corporate Social Responsibility actions. In relation to these activities, with a sustainable development approach, LUMIN has a Corporate Social Responsibility Committee to handle activities and coordinate the company's CSR plan and policy. The CSR committee brings together representatives of the forestry, industrial and administrative divisions in order to have a balanced and objective view of the needs of the communities where they operate and the most efficient way to have a transformative impact for the affected public.

Procedures, mechanisms and instruments have been established to organize the area and make decisions. Support requests must be submitted in writing specifying the details and characteristics of the request, as well as the applicant's data. The request is analyzed by the CSR team and once the response to be provided is defined, the decision made is communicated in writing.

In this sense, the company continued to support activities linked to the communities and with an impact on their local development in certain areas such as i. Health, wellness and care, ii. Education and Culture, iii. Infrastructure and City; as well as cross-cutting themes such as gender and disability

LUMIN/EUCAPINE has a "Social Monitoring and Management Plan" elaborated to monitor social impact of the project to communities and vice versa. The objective of this document is to describe how the company works to achieve a harmonious integration with local communities in the areas of influence of the activities, trying to avoid or minimize the possible impacts that may generate the activity of the company and seeking an active participation in objectives related to the welfare of the neighbors and local development.

The responsibility for the application of this Plan lies with the General Management of LUMIN/EUCAPINE, with delegated functions in company personnel and external advisors, if needed. Full "Social Monitoring and Management Plan" as well as the "Annual report" (including social monitoring) document will be available for VVB during validation and verification.

The project monitoring plan is based on the "theory of change approach", which supposes the improvement of a list of assumptions about the possible impacts of the project activity. Measurable indicator is established for the evaluation of the community impact of the project. The indicators presented in the monitoring plan will be evaluated periodically, as indicated in the table below.

Indicator	***Significance element***	***Registry***	***Frequency***	***Activity or service***	***Responsable area***
Impactos sociales de las operaciones	Analysis of the socioeconomic conditions of the LUMIN area of influence	External consultant report	Every five years	Management system	Management system
	Origin of the workforce	OVAL system external audit report	Monthly/Annual	All within Forest Operations	Forest Operations
	Contractor's performance against the terms and conditions of the contract	Audit forms	Monthly	All within Forest Operations	Forest Operations, Oval
		Contractor ranking	Annual		
		Operational control worksheets	Monthly		
	Community Relations	Neighbors survey form	Every time there is a high impact operation	All within Forest Operations	Forest Operations
		Annual memory	Annual	Management system	CSR team
		External communication matrix	Annual	All within Forest Operations	CSR team

Table 9. Social indicators monitored by LUMIN/EUCAPINE

Apart from these objective indicators, a set of subjective indicators will be collected from stakeholders present in the project area of influence.

Semi-directed interviews with local stakeholders are conducted during periodic social monitoring visits to the areas of influence. Positive and negative impacts of forestry activity are questioned.

This allows the company to understand how the activity contributes or interferes with satisfying the priority needs of the community for its development, according to the opinion of qualified informants who live or work in the area for a long time.

The opinions of the interviewees in areas of influence in reference to the positive and negative impacts of forestry activity will be recorded in a table. This information allows will allow LUMIN/EUCAPINE to select and define the socio-environmental indicators that can be followed up in the coming periods in order to verify the contribution to the development of the communities, as well as the impact on natural ecosystems.

The complete monitoring report results are available for VVB team during validation and/or verification.

4.3.2 Monitoring Plan Dissemination (CM4.3)

The monitoring plan and results of every verification are published on LUMIN/EUCAPINE website which can be consulted by stakeholders at https://www.lumin.com/institucional. Also, a contact person with phone numbers is published.

4.4 Optional Criterion: Exceptional Community Benefits

4.4.1 Short-term and Long-term Community Benefits (GL2.2)

N/A

4.4.2 Marginalized and/or Vulnerable Community Groups (GL2.4)

N/A

4.4.3 Net Impacts on Women (GL2.5)

N/A

4.4.4 Benefit Sharing Mechanisms (GL2.6)

N/A

4.4.5 Governance and Implementation Structures (GL2.8)

N/A

4.4.6 Smallholders/Community Members Capacity Development (GL2.9)

N/A

5 BIODIVERSITY

5.1 Net Positive Biodiversity Impacts

5.1.1 Biodiversity Changes (B2.1)

The tables below describe all the changes in biodiversity resulting from project activities under the with-project scenario in the project zone during this monitoring period.

Change in Biodiversity	Increase in plant species
Monitored Change	Net actual positive direct impact that occurs as the result of project activities that have resulted in an increase in the number of native vegetational species in the project area.
Justification of Change	The factor contributing to the change is that forest plantation and native forest act as biological corridors. Methods and assumptions used to estimate or document the change are described in the Management and Monitoring Plan in the HCV areas. The results can be seen in the text below.

Change in Biodiversity	Increase in fauna species
Monitored Change	Forest plantation and native forest act as biological corridors, avoiding isolation or genetic drift. The implementation and maintenance of buffer zones between forest plantations and native forests of more than 20 meters, allow the development and, in some cases, the improvement of pastures. These pastures are habitat and biological corridors for many RAE fauna species
Justification of Change	The factor contributing to the change is that forest plantation and native forest act as biological corridors. Methods and assumptions used to estimate or document the change are described in the Management and Monitoring Plan in the HCV areas. The results can be seen in the text below.

In the following tables, there is a list of different indicators in different farms, demonstrating the improvement in the flora and fauna in the project area.

	2013	2014	2015	2016	2017	2018	2019	2020
D (Indice de Margalef)	21,92	18,7	19	19,1	18,3	19,2	18,4	18,4
S1 Riqueza estimada (aves) /10	14,8	13	15	13,8	14,1	14,6	14,1	12,4
Riqueza obs. (Verteb.exc.peces) /10	14,5	11,9	11,8	11,7	11,8	13,8	11,8	13,5
En peligro, amenazadas, casi amenazadas, CITES I	12	10	6	6	9	7	10	9
Poco comunes, escasas y raras	30	25	18	23	23	23	25	25
índice de Shannon X 10	46,453	45,364	43,442	42,493	42,459	42,763	42,222	43,055
EPC				18	21	19	21	18

Table 10. Biodiversity indicators for Gallo-Doroteo Farm

	2012	2013	2014	2015	2016	2017	2018	2019
D (Indice de Margalef)	19	19,3	19,2	17,4	16,8	17,5	17,7	16,8
H´ (Indice de Shannon)X10						41,8190624	41,938302	42,117511
S1 Riqueza estimada (aves) /10	12,7	12,5	13,1	14	11,9	14,1	13,2	11,5
Riqueza obs. (Verteb.exc.peces) /10	12,4	11,4	12	11	10,4	12,5	12	11,5
Amenazadas y casi amenazadas	10	15	13	7	5	8	9	7
Poco comunes, escasas y raras	25	30	30	22	22	25	30	27
EPC						20	18	17

Table 11. Biodiversity indicators for Macachin Farm

	2013	2014	2015	2016	2017	2018	2019	2020
D (Indice de Margalef)	19	19,3	17,1	19,2	19,9	18,8	17	16,3
H´ (Indice de Shannon)X10						41,3707257	41,5016178	41,426895
S1 Riqueza estimada (aves) /10	12,7	12,5	11	12,3	14,1	13,6	12	10,1
Riqueza obs. (Verteb.exc.peces) /10	12,4	11,4	9,7	11,8	12,5	11,6	10,6	11,3
En peligro, Amenazadas y casi amenazadas	10	15	11	11	12	7	9	12
Poco comunes, escasas y raras	25	30	23	25	32	24	29	25
EPC						17	19	22

Table 12. Biodiversity indicators for Paso Real Farm

The Management and Monitoring Plan of the HCV areas, as well as the Monitoring Report document for the three HCV areas is available for the auditors during the validation and verification period.

In all the wildlife studies conducted by LUMIN/EUCAPINE, strict pasture species have been detected in forest lands, coinciding with the forest plantation lands that present protected areas and buffer areas correctly established and managed.

5.1.2 Mitigation Actions (B2.3)

There are several activities that are implemented to avoid negative impacts on biodiversity and to maintain and enhance the HCV attributes. In the following table these actions are listed.

Negative Offsite Impact	Mitigation Measure(s)
High density of cattle that derives in grasslands degradation	Proper management includes control in livestock density (units per ha) with a livestock management plan agreed with tenants. Indicator of the animal load, monitored with the cattle stock in the project area.
The invasion of the native forest towards the plantation and vice versa	Buffer zones are established or re-established between forest plantation and native forests. This grasslands buffers zones must be equal or bigger than 20 meters. Indicator of the exotic species invasion, monitored with the template SG-001, annually monitored with forest operations area.

5.1.3 Net Positive Biodiversity Impacts (B2.2, GL1.4)

Demonstrate that the project's net impacts on biodiversity in the project zone are positive compared with conditions under the without-project land use scenario.

First, due to previous land use (long-term extensive livestock production), ecological structure of most project sites was relatively homogenous, with low biodiversity. Lumin/Eucapine implemented afforestation activities with scientific and reasonable configuration method, with no burning and slash. The row site preparation will protect the existing vegetation as much as possible. Therefore, the implementation of this project will not decrease biodiversity of project sites

Second, because ecotones and buffer areas are very important areas from the point of view of biodiversity and its conservation. In them, and during annual monitoring, the biggest number of fauna species are registered in relation inside each farm. At the same time, they act as biological corridors, avoiding isolation or genetic drift. The implementation and maintenance of buffer zones between forest plantations and native forests of more than 20 meters, allow the development and, in some cases, the improvement of pastures. These pastures, connected with other environments are habitat and generate biological corridors for many RAE fauna species

In all the biodiversity surveys conducted by Lumin/Eucapine, strict pasture species have been detected in forest lands, coinciding with the forest plantation lands that present protected areas and buffer areas correctly established and managed.

Third, scientific and rational afforestation projects can adjust the hydrological cycle, reduce drought and flood risk; promote soil nutrient cycle, improve local micro-climate and others ecological environments.

5.1.4 High Conservation Values Protected (B2.4)

A wide range of ecosystems can be found in several parts of the project area, from different types of native forests, wetlands, grasslands, stony fields, among others. LUMIN/EUCAPINE carries out a characterization of the environment in each of the facilities locations and assesses the environmental features, flora and fauna, and defines the conservation areas and the necessary measures for their protection. LUMIN/EUCAPINE has identified the following sites as HCV, Paso Real, Macachin and Gallo Doreteo.

Paso Real, it is located in the department of Cerro Largo, 47 kilometers east of the city of Melo. It is located at the coordinates S 32 ° 17´33´´ and W 53 ° 41´19´´. They are accessed from route 26. Hydrologically, the "Paso Real" property is limited to the east by the Yaguarón River and crossed in a north-south direction by the Sarandí stream, with its tributaries Cañada de la Palma and Cañada del Rodeo.

This property has corridors of arboreal and shrub vegetation bordering rivers, streams and ravines and wide areas of grasslands and ecotones. In specific places, there are lagoons bordered by baths, caraguatales and pajonales of little extension.

The native forests present in the "Paso Real" acquire characteristics of a primary forest in some places, with subtropical characteristics, presenting typical species with large size, such as Francisco Álvarez (*Luehea divaricata*) and Laureles (*Nectandra megapotamica, Ocotea acutifolia*) and others from the middle and smaller stratum, characteristics of the north of the country such as the Camboatá (*Cupania vernalis*) or the Camboatá Blanco (Matayba elaeagnoides).

The "Macachín" property is located in the department of Cerro Largo, 10 kilometers north of the town of Las Cañas, at the coordinates S 32 ° 17'43´´ and W 53 ° 48´01´´ and you can access from route 26. Hydrologically, the "Macachín" property is bounded to the north by the Sarandí stream, which receives the

contribution of streams (Arroyo del Sauce), ravines (Zanja del Lavadero and Vertiente de las Barrancas) and sangradores that cross the property and are part of the slopes of the Cuchilla de Cerro Largo, a member of the Cuchilla Grande. To the south, the studied property is bounded by the De Las Cañas stream.

The boundaries of the property present a dominant matrix of meadows with corridors of arboreal and shrubby vegetation bordering rivers, streams and ravines, with wide areas of park-like ecotones.

These native forests are integrated into the prairies on their external margin, forming ecotones with typical species such as Blanquillo (*Sebastiania brasiliensis*), Cat's Claw (*Acacia bonariensis*) or Monte Cedrón (*Aloysia gratissima*). In low areas some humid grasslands (*Panicum prionitis*), ceibales (*Erythrina crista-galli*) and grasslands (*Scirpus giganteus*) are formed.

In specific places, there are lagoons bordered by baths, “caraguatales” and “pajonales” of little extension.

The Gallo-Doroteo farm is located in the eastern region of the national territory, in the department of Treinta y Tres with an undulating landscape. The dominant matrix is the prairie with corridors of native arboreal and shrub vegetation in the vicinity of the water courses, generating gallery forests in particular on the banks of the Tacuarí river and tributaries.

The Tacuarí River has extensive and dense riparian vegetation that forms a continuous riparian forest with canopy heights close to 12 m. where the most abundant species present are Blanquillo (*Sebastiania schottiana*), Mataojo (Pouteria salicifolia), Aruera (*Lithraea brasiliensis*) and Canelón (*Myrsine sp*.). There are also sectors of the forest with old specimens with a stem regime, especially some species such as Blanquillo (Sebastiania schottiana) and Laurel (Ocotea acutifolia). On the inner margin of the forest, growing close to the water, there are Creole Willows (Salix humboldtiana) and Sarandíes (Phyllantus sellowianus).

The characterization of the HCVs related to biodiversity in the project zone has concluded that there are no negative effects because the project activity.

5.1.5 Invasive Species (B2.5)

No known invasive species have been introduced into any area affected by the project and the population of any invasive species has not increased as a result of the project.

Uruguay is a party to the Convention on Biological Diversity (CBD) (LAW 16.480 / 1993) recognizes that IAS are the second cause of biodiversity loss, posing a threat to the integrity and function of ecosystems and therefore for human welfare.

LUMIN/EUCAPINE has implemented a procedure for the identification and control of invasive alien species in their sities that ensures minimizing the negative impact on biodiversity due to their presence. In the area where the project is developed, the impact of gorse (Ulex europaeus) is important, and the control strategy is properly implemented.

5.1.6 Impacts of Non-native Species (B2.6)

Species	*Eucalyptus grandis*
Justification of Use	They ensure an adequate productivity level and a market access for the products to be obtained, which would not be possible if other species were used. The project will produce high quality wood suitable for plywood and saw wood production. To produce these type of logs, intensive silvicultural management is implemented (pruning up to 9 meters and thinning), which means intensive and specialized workforce
Adverse Effect	As a general measure, the project will voluntarily adopt the application of the National Code of Good Forest Practices. Likewise, an environmental management system will be implemented with a focus on continuous improvement, following the FSC (Forest Stewardship Council) standard. Based on the environmental impact studies carried out, a significant negative environmental impact is not expected as a consequence of the implementation of the project activities and the use of E. grandis. The project is classified in Category A in DINAMA (lower impact). Natural regeneration (mainly in buffer zones and lowlands) will be controlled. After pruning and thinning, drainage zones will be controlled, and no pruning/thinning residues will be allowed in these areas.

Species	*Eucalyptus dunnii*
Justification of Use	This species will be planted in lower areas where E. grandis can be affected by frost damage Similarly to E. grandis, E. dunnii ensure an adequate productivity level and a market access for the products to be obtained, which would not be possible if other species were used. The project will produce high quality wood suitable for plywood and saw wood production. To produce these type of logs, intensive silvicultural management is implemented (pruning up to 9 meters and thinning), which means intensive and specialized workforce
Adverse Effect	As a general measure, the project will voluntarily adopt the application of the National Code of Good Forest Practices. Likewise, an environmental management system will be implemented with a focus on continuous improvement, following the FSC (Forest Stewardship Council) standard. Based on the environmental impact studies carried out, a significant negative environmental impact is not expected as a consequence of the implementation of the project activities and the use of E. dunnii. The project is classified in Category A in DINAMA (lower impact)

	Natural regeneration (mainly in buffer zones and lowlands) Will be controlled After pruning and thinning, drainage zones will be controlled and no pruning/thinning residues will be allowed in these areas

Species	*Pinus spp*
Justification of Use	They ensure an adequate productivity level and a market access for the products to be obtained, which would not be possible if other species were used. The project will produce high quality wood suitable for plywood and saw wood production. To produce these type of logs, intensive silvicultural management is implemented (pruning up to 9 meters and thinning), which means intensive and specialized workforce
Adverse Effect	As a general measure, the project will voluntarily adopt the application of the National Code of Good Forest Practices. Likewise, an environmental management system will be implemented with a focus on continuous improvement, following the FSC (Forest Stewardship Council) standard. Based on the environmental impact studies carried out, a significant negative environmental impact is not expected as a consequence of the implementation of the project activities and the use of Pinus spp. The project is classified in Category A in DINAMA (lower impact). Natural regeneration (mainly in buffer zones and lowlands) will be controlled. After pruning and thinning, drainage zones will be controlled, and no pruning/thinning residues will be allowed in these areas.

5.1.7 GMO Exclusion (B2.7)

LUMIN/EUCAPINE Project is FSC certified so it has a commitment with FSC criteria. One of them is the prohibition of introduction of genetically modified organisms in forestry operations. The use of GMO´s is annually controlled during the FSC audits.

5.1.8 Inputs Justification (B2.8)

The use of chemicals in LUMIN/EUCAPINE is strictly monitored. Within the monitoring plan, there is an indicator of the environmental impacts of operations and the registration of approved chemicals is done annually, there is also a agrochemical and fuel stock control worksheet, an agrochemical consumption database and Sprayer calibration control worksheet.

The table below to describe the use of any fertilizers, chemical pesticides, and other inputs used for the project.

Name	Herbicides
Justification of Use	Weed control at site preparation
Adverse Effect	No negative adverse effect. The procedures for pesticides use, are guided by the National Code of Good Forest Practices. The management plan and the corresponding procedures indicate the measures for the management of forest plantations. What is related to the use of agrochemicals is included in the Forest Procedure. There is also a form (summary by product) with the list of agrochemicals and the frequency of use updated to 2019. The company has a spreadsheet (Field Expenses) of the pesticides used (name, product, applied amount, active ingredient, dosage, property where it was used and costs). In addition, it delivers this information annually in FSC auditors. FSC has approved the use of every chemical used in the project area, as it can be seen in the certification approval. The pesticides used are on the list of the General Plant Health Division of the MGAP.

Name	Fertilizers
Justification of Use	Promotion of growth at plantation
Adverse Effect	No negative adverse effect. The procedures for pesticides use, are guided by the National Code of Good Forest Practices. The management plan and the corresponding procedures indicate the measures for the management of forest plantations. What is related to the use of agrochemicals is included in the Forest Procedure. There is also a form (summary by product) with the list of agrochemicals and the frequency of use updated to 2019. The company has a spreadsheet (Field Expenses) of the pesticides used (name, product, applied amount, active ingredient, dosage, property where it was used and costs). In addition, it delivers this information annually in FSC auditors. FSC has approved the use of every chemical used in the project area, as it can be seen in the certification approval. The pesticides used are on the list of the General Plant Health Division of the MGAP.

Name	Ant control pesticide
Justification of Use	Chemical control against ants
Adverse Effect	No negative adverse effect.

	The procedures for pesticides use, are guided by the National Code of Good Forest Practices. The management plan and the corresponding procedures indicate the measures for the management of forest plantations. What is related to the use of agrochemicals is included in the Forest Procedure. There is also a form (summary by product) with the list of agrochemicals and the frequency of use updated to 2019. The company has a spreadsheet (Field Expenses) of the pesticides used (name, product, applied amount, active ingredient, dosage, property where it was used and costs). In addition, it delivers this information annually in FSC auditors. FSC has approved the use of every chemical used in the project area, as it can be seen in the certification approval. The pesticides used are on the list of the General Plant Health Division of the MGAP.

5.2 Offsite Biodiversity Impacts

5.2.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Actions (B3.2)

Negative Offsite Impact	Mitigation Measure(s)
Fire make damage into ecosystem patch	Verified the fire prevention plan. Fire fighter crew in place.
Illegal activities, like hunting, native forest cut or without permission camp	Procedure of prevention of illegal activities
High density of cattle - degradation of grasslands and native forest, by shift of livestock from plantation to said natural areas	Proper management. Livestock density control (units per ha). Livestock management plan. Evaluation of pastures within afforestation.
The advance of the native forest towards the plantation, eliminates the buffer areas	Buffer zones are established or re-established between forest plantation and native forests. This grasslands buffers zones must be equal or bigger than 20 meters

5.2.2 Net Offsite Biodiversity Benefits (B3.3)

The project comprises a total area of 18.988 ha with a long history of grazing by beef cattle, activity that have caused soil erosion and land degradation. In LUMIN/EUCAPINE project, forest plantations for obtaining pulp and saw wood and removing carbon dioxide from the atmosphere are being established since 2006, decreasing significantly soil erosion and soil degradation.

Before the implementation of the LUMIN/EUCAPINE project, native fauna or flora studies in the area were never conducted. Extensive beef production companies did not have the habit nor the obligation to carry out this kind of studies, since traditionally the extensive cattle is not certified by international standards (for example, FSC or similar), nor is it controlled by the Ministry of the Environment (DINAMA). After the

LUMIN/EUCAPINE project was implemented, new HCVs areas were defined, and native forests were strictly controlled.

5.3 Biodiversity Impact Monitoring

5.3.1 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

The following criteria will be used for the categorization of forest properties in LUMIN/EUCAPINE, pointing to the greater efficiency in the application of conservation measures and considering human and economic resources availability for their management and monitoring.

1) Presence of SNAP (National System of Protected Areas) or high value areas for HCVA conservation according to the definition originally developed by the FSC for High Conservation Value Forests (BAVCs) in the certification of forest ecosystems.

2) Biogeographic representativeness

3) Representativeness of watersheds.

4) Presence of threatened species of flora or fauna at the international or regional level according to the International Union for the Conservation of Nature.

5) Presence of endangered species of flora or fauna at the international or regional level according to the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES).

6) Connectivity of the areas.

7) Estimated wealth (Chao 1)

8) Special landscape value

9) Effective total area of natural areas

10) If there are still conflicts in the categorization of the areas after the application of these criteria, indexes of similarity between communities can be applied (Greig-Smith)

Based on the aforementioned criteria, the properties selected as representative are surveyed (monitored) in greater depth to clearly determine its habitats values with precise identification of their attributes in order to define conservation plans.

The monitoring studies would be applied over farms with HCVF or HCVF, presence of natural environments or species of particular study interest or farms with high species richness values. These studies involve annual surveys, calculation of diversity indexes, spatial distribution, indicator species, wealth estimation, etc.

The follow-up studies would be applied to the rest of the representative farms. These studies involve biennial or triennial surveys, calculation of species richness, distribution of species and indicator species.

The categorizations made are subject to changes due to the entry of higher priority properties (more representative) or changes in management or anthropogenic activity that may change their condition.

Activities taken to perform the flora and fauna monitoring studies:

1) Prior to the fieldwork, surveys over satellite images (Google Earth) and over available historical information are made. Based on this information, areas of interest, access to them and other logistical aspects are defined.

2) In situ, ground survey (surface data) according to vegetation physiognomy was carried out, with the main landscape zones initially registered by distance photography with a drone.

Subsequently, walking and vehicle trips were made by transects in the natural environments present in the property. The vegetation was characterized by recording the dominant species of each zone, through observation, collection and registration.

In relation to the fauna, walking tours were carried out in the main landscape units, recording the richness and abundance of the tetrapod fauna species. Photographs were taken with digital cameras and Cannon sx50is, Nikon Coolpix L110, of the most representative species.

For the bird survey, binocular 12X25 was also used for walking tours. For the group of birds, we recorded the number of species (richness) and the number of individuals of each (abundance) based on direct sightings and the identification of vocalizations.

For the amphibian survey, surveys were carried out with estimation of abundance by sound record of vocalizations and by active search of individuals. For reptiles, an active search was made under stones, trunks and other cryptozoic shelters.

For mammals, trap cameras were placed, traces, traces and caves were surveyed, and

For the survey of aquatic fauna, the sampling units were distributed based on the results of habitat characterization (landscape ecology) in the study area and the subsequent definition of areas of interest and watershed representativeness. Samples were carried out with emphasis on the geographical sectors of interest that have been previously identified. Each station was located by GPS.

The processing of the data included the elaboration of a list of species and categorization of them according to international conservation lists (IUCN, CITES) and according to the database of biological invasions for Uruguay (InBUy).

Categories were applied in accordance with the categorization of the International Union for the Conservation of Nature (IUCN) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Based on the field information surveyed, the studies corresponding to environmental indicators (indexes and indicator species) were carried out.

Fauna Monitoring Plan

Fauna biodiversity plans are performed in most representative farms belonging to LUMIN/EUCAPINE by using Environmental indicators that describe the impact on the environment.

According to Canter L.W. 1998, environmental indices are useful for:

1) summarize existing environmental data
2) report on the quality of the affected environment
3) assess the vulnerability or susceptibility to contamination of a certain environmental category
4) selectively focus on key environmental factors
5) serve as a basis to predict the impact.

The specific biological diversity of a site depends on the number of species present (Wealth of species) and the number of individuals that make up each of the species (relative abundance).

Margalef's biodiversity index is an estimate of the biodiversity of a community and considers the number of species present (richness) and the number of individuals (abundance). It takes as a base the numerical distribution of the individuals of the different species using the number of existing individuals in the sample analyzed.

The index of Shannon, Shannon-Weaver or Shannon-Wiener is used to measure specific biodiversity. Express uniformity of importance values across all species in the sample. The index reflects the heterogeneity of a community based on two factors: the number of species present and their relative abundance. Conceptually, it is a measure of the degree of uncertainty associated with the random selection of an individual in the community. It measure the average degree of uncertainty by predicting which species an individual chosen at random from a collection will belong to. Their values vary between 0.5 and 5, although their normal value is between 2 and 3. Values below 2 are considered low in diversity and higher than 3 are high in species diversity. It has no upper limit or, in any case, it is given by the logarithm base that is used.

Bearing in mind that the most surprising transformation caused by man is the simplification of natural environments and the reduction of biodiversity, biological diversity indexes (Margalef and Shannon) are used to determine the degree of environmental impact.

As an arbitrary measure of the research team, the values of the Margalef index, higher or equal to 15.0, correspond to a high biological diversity.

The values, below the average in these indices, may be due to:

- Disturbances due to harvesting activities (noise, traffic of vehicles and people, exposure to atmospheric agents, etc.)
- Lack of buffer zones between planted forests and natural environments.
- Lack of connection or biological corridors in natural areas.
- Lack of natural environments that act as feeding or reproduction areas.
- Barrier effect for the movement of species, mainly because of height of planted trees (final stage of forestry before harvest).

Species richness indexes (Chao) are also used to evaluate the real number of species present in each farm studied. Chao 1 is a nonparametric estimator of the number of species in a community based on the number of rare species present in the sample.

The richness of the species distributed in a non-homogeneous way, between the different environments inside the area, would indicate a certain human affectation in the area that would be increasing the number of some particularly sensitive species.

In turn, the distribution of the species is estimated taking into account the levels of specific richness and relative abundance detected in the main landscape units.

So far, in the monitored farms, the structure of the different species present in the area tends to be fairly homogeneous (it is not clearly dominated by any species). That is, all the species observed have a similar high abundance, which indicates a low degree of imbalance. The population differences are not enough for these species to affect the rest of the community. In some properties, high or very high values have been recorded in the biodiversity indexes.

Criteria for the selection of species to determine the biological diversity of a given site:

At the global level, both invertebrate and vertebrate species are used for studies of biological diversity.

In the case of the research team, the Bird Class was chosen, subfilum Vertebrata (Vertebrates) due to:

- Easy direct and / or indirect registration
- Important number of species in our country
- Specific conservation status defined in most species, whether at the national, regional and global levels (DINAMA, IUCN, CITES).
- Can apply as RAE species for international forest standards

Selection of species as indicators ("Indicator species")

An indicator organism is a species selected for its sensitivity or tolerance to the various types of contamination and their effects. In addition, the use of indicator species are useful for diagnosing environmental quality because they have some important characteristics:

- Provide valuable information quickly to take conservation measures in a minimum time available.
- Animals, plants and their quantitative and qualitative relationships are modified to different types of environmental degradation even when they are produced sporadically or discontinuously over time.
- Many species, due to their mobility, absorb and indicate environmental actions of broad or specific foci in a natural area.
- The biological indicators are compatible and can complement with analysis and physical-chemical indicators

Selection criteria

To select indicator species, the role they play in the ecosystem will be taken into account, especially considering those species known to be sensitive to specific actions of the use of resources related to the project in question, species that play a basic role in a given community and species that represent a certain group of species (associations). Taking into account the variety of environments involved in the different farms to be studied, the species to be selected will also depend on the specific ecosystems affected and the degree and type of affectation.

- The analysis of the relative abundances of some species will be useful for the purpose of evaluating changes in the habitat that determine high or low levels in the populations and are manifestations of impacts on a larger scale

For example, some bird species that are not very specialized, find food resources in modified environments, where some specific plant species that provided food to other species of birds specialized in them have disappeared. These last ones (specialists), will see reduced their populations in these areas, while those (generalists) will see them increased sensibly due to lack of competence in the availability of other resources (shelters, water, etc.).

Species populations with reduced margins (stenoic) and broad (eurioic) tolerance for limiting environmental factors (food, shelter, pH and water transparency, etc.) are especially taken into consideration here.

The degree of singularity or isolation is also taken into account, specifically considering those species with low dispersion capacity and low mobility. It is also important the real or potential value from the aesthetic, scientific or economic point of view, its survival expectation and its rarity at the local and global level.

In this sense, the presence of species with the following international status (IUCN) is especially taken into account:

- "Extinct"
- "Extinct in the wild",
- "In critical danger"
- "In danger"
- "Vulnerable"
- "Threatened"

In addition, species with the following status for Uruguay are also considered (Olmos, A. 2009), categorized by:

- "Rare"
- "Scarce"
- "Not Common"

Special consideration is given to those species that DINAMA (National Directorate of the Environment) recommended its inclusion in the list of priority species for conservation.

Other species, that are water quality bioindicators are also taken into account. In this sense, the Fish Class is a group that turns out to be a good tool to determine water quality because:

1) their communities generally comprise a wide variety of species which represent different trophic levels,
2) are well-known organisms of aquatic habitats and
3) are present in small water bodies.

Finally, for the selected species, a habitat assessment can be carried out according to the "Habitat Assessment Procedure" (HEP) proposed by the US Fish and Natural Resources Service, which evaluates the quality and quantity of habitat available for said species.

The fauna monitoring reports are done once a year in LUMIN/EUCAPINE representative farms, where biologists deliver detailed reports like the one shown in figure 17.

Figure 17 Example of fauna monitoring report

Flora Monitoring Plan

The works allowed to increase considerably the knowledge on flora and fauna of the country and especially of the northeast region.

Biologists identified and georeferenced populations of priority species for conservation, SNAP, some of them new for Uruguayan fauna.

The conservation of these species has been possible thanks to the control work done on the environments where they live, through an adequate rational management of them, with a rigorous permanent monitoring.

According to the surveys and subsequent monitoring carried out, properties that have particular attributes stand out and are classified as "Farms with AREAS OF HIGH VALUE OF CONSERVATION (HVC)."

5.3.2 Biodiversity Monitoring Plan Dissemination (B4.3)

Along with the project implementation, the project documentation will be published on VCS and CCB website for all stakeholders, so that they can obtain the detailed project information and development progress. Also, the summary of project description in local language will also be disseminated to local communities through local government, as long as the summary of monitoring reports during each verification.

Also, the full project documentation will be published on LUMIN/EUCAPINE website for public comments, together with specific brochures describing the project characteristics and benefits.

The social and environmental monitoring plan and their results are annually published in LUMIN/EUCAPINE website: https://www.lumin.com/institucional. Considering that internet connection is extremely accessible to any stakeholder, it can be considered that any interested person can access to the information.

5.4 Optional Criterion: Exceptional Biodiversity Benefits

LUMIN/EUCAPINE implemented since 2014 an annual systematic monitoring of water quality, using bioindicators of aquatic fauna (macro-zoobenthos and nekton), and surveying the physico-chemical characteristics of the water and its sediments.

This type of monitoring seeks to identify negative impacts derived from silvicultural operations on sensitive natural resources such as soil and water. Also trying to improve or adapt the techniques with which forestry operations are developed.

CARACTERIZACIÓN DE HÁBITATS Y
MONITOREO DE FAUNA ACUÁTICA
PREDIOS "Gallo-Doroteo" ~ ~ LUMIN
(Depto. Treinta y Tres)

Diapoma terofali

FEBRERO 2020

RESPONSABLES
Lic. Raúl Lombardi
Lic. Giancarlo Geymonat

1

Lombardi, R. ~ Geymonat, G.

5.4.1 Trigger Species Population Trends (GL3.3)

N/A

6 ADDITIONAL PROJECT IMPLEMENTATION INFORMATION

LUMIN/EUCAPINE monitoring report is elaborated at the same time as the Project Description (PD). The project proponent decided to validate and verify the project activity at the same time. This mean that project description is showing the reality of the project implementation. Besides this, the project implementation was done according to how it was initially proposed, previous to starting date.

7 ADDITONAL PROJECT IMPACT INFORMATION

N/A

APPENDICIES

The following appendices may be used if appropriate. Delete the instruction and heading if not used.

7.1 Appendix 1: New Project Areas and Stakeholders

Use this appendix, if necessary, to identify new project areas and stakeholders and fulfil the requirements of Sections 2.2.5 above. Modify the table, if necessary, to suit the project activities, or delete if not used.

Stakeholder *Identify communities and any community groups within them, any cross-cutting community groups, and list other stakeholders.*	Rights, interest, and overall relevance to the project	Demonstrate how they meet the eligibility criteria (G1.14)	Demonstrate how their inclusion does not violate the scalability limits (G1.15)

7.2 Appendix 2: Project Risks Table

Use this appendix, if necessary, to identify project risks and fulfill the requirements of Section 2.2.6 above. Modify the table, if necessary, to suit the project activities, or delete if not used.

Identify Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed to mitigate the risk

7.3 Appendix 3: Additional Information

Use appendices for supporting information. Delete this appendix (title and instructions) where no appendix is required.