

'LUMIN/EUCAPINE' FOREST PLANTATIONS ON DEGRADED GRASSLANDS UNDER EXTENSIVE GRAZING

Document Prepared by Carbosur



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1 SUMMARY OF PROJECT BENEFITS

1.1 Unique Project Benefits

Outcome or Impact Estimated by the End of Project Lifetime	Section Reference
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	3-5
2) Provide experience of forest planting and forest management on degraded grasslands	3-5
3) Improve the ecological environment of the planted areas and the native forests surrounding the forest plantations	5
4) Create net positive benefits to the community and stakeholders of the project in comparison with the baseline scenario.	4

1.2 Standardized Benefit Metrics

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
GHG emission reductions or removals	Net estimated emission removals in the project area, measured against the without-project scenario	6,498,272 tCO ₂	3.2
	Net estimated emission reductions in the project area, measured against the without-project scenario	N/A	
Forest ¹ cover	For REDD ² projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario	N/A	
	For ARR ³ projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	18.988 ha	2.1
Improved land management	Number of hectares of existing production forest land in which IFM ⁴ practices are expected to occur as a result of project activities, measured against the without-project scenario	N/A	
	Number of hectares of non-forest land in which improved land management practices are expected to occur as a result of project activities, measured against the without-project scenario	N/A	
Training	Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities	330	2.3
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	68	2.3

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	Estimated by the End of Project Lifetime	Section Reference
Employment	Total number of people expected to be employed in project activities, ⁵ expressed as number of full-time employees ⁶	230	2.3
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	18	2.3
Livelihoods	Total number of people expected to have improved livelihoods ⁷ or income generated as a result of project activities	667	4
	Number of women expected to have improved livelihoods or income generated as a result of project activities	178	4
Health	Total number of people for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	667	2.3
	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	178	4
Education	Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	240	4.2
	Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	120	4.2

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 the 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	Estimated by the End of Project Lifetime	Section Reference
Water	Total number of people who are expected to experience 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 are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	N/A	
Well-being	Total number of community members whose well-being ⁸ is expected to improve as a result of project activities	63,320	4
	Number of women whose well-being is expected to improve as a result of project activities	33,916	4
	Expected number of globally Critically Endangered or Endangered species ⁹ benefiting from reduced threats as a result of project activities, ¹⁰ measured against the without-project scenario	27	5.2
	Expected change in the number of hectares managed significantly better by the project for biodiversity conservation, ¹¹ measured against the without-project scenario	44,854	5.2

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, Livelihoods, Health, Education and Water), and may also include other benefits such as strengthened legal rights to resources, increased food security, conservation of access to areas of cultural significance, etc.

⁹ Per IUCN's Red List of Threatened Species

¹⁰ In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

¹¹ Managed for 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, e.g. enhancing the status of endangered species

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
Biodiversity conservation	Expected number of globally Critically Endangered or Endangered species ¹² benefiting from reduced threats as a result of project activities, ¹³ measured against the without-project scenario	27	5.2

¹² Per IUCN's Red List of Threatened Species

¹³ 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 Goals, Design and Long-Term Viability

2.1.1 Project Proponent (G1.1)

The project is proposed by Lumin/Eucapine. Contact details of Lumin/Eucapine are the following:

- Agustin de la Rosa 765
- Melo, Uruguay
- Phone 464 30081 / 464 29 054

All properties of Lumin/Eucapine are legally owned and are covered by deeds duly registered with the National Records, registered with the corresponding number for the Registration of Real Estate. There are no conflicts related to tenure or use rights over the land affected to the project or its products.

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

2.1.2 Project Objectives (G1.2)

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.

2.1.3 Physical Parameters (G1.3)

Topography of the area consists of rolling hills with less than 300 m altitude, with abundant water streams. The mean annual temperature is 18 °C, varying from 12 °C (July) to 25 °C (January). 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 °C. Annual precipitation in the area ranges from 1,100 to 1,300 mm, homogeneously distributed along the year, although periods of severe drought and severe water excess are rather frequent. Potential evapotranspiration is about 900 mm/year. Runoff and drainage are on average in the order of 300 mm/year, feeding an extensive network of rivers and the Guaraní Aquifer, one of the largest of the world.

Soils are generally not very deep, of medium-to-coarse texture, with low natural fertility. Dominant land cover in the area is grassland, with predominance of herbaceous vegetation (mainly grass species) with interspersed and not very abundant shrubs. The vegetation is highly determined by land use (grazing of

cattle and sheep). Native vegetation before cattle was introduced in the XVII Century, was richer in shrubs and small trees, although grass and other herbaceous species were also abundant. In spite of high rainfall level and quite fertile and deep soils, trees appear naturally only at the side of rivers and streams, covering only 3 to 5 per cent of the land area. This has been attributed to the natural occurrence of frequent droughts which prevented slow growing trees from becoming established against an aggressive competition by grasses.

As it was stated above, the project area consists basically of grassland altered by many years of grazing. This would have caused a significant change in species, as well as some soil loss due to laminar erosion due to frequent over grazing. Due to the change in the regime of precipitation observed in recent years, with an increasing trend in both total precipitation and storm intensity, combined with the effects of overgrazing, particularly in dry periods, the soils in the project area would be subjected to increasing erosion and degradation pressures. The removal of vegetation by grazing cattle would also have caused a reduction in the annual inputs of organic carbon into the soil, thus causing a long-term reduction in the soil organic carbon content, which has been estimated at more than 20 per cent of the original soil organic carbon content.

This grazing-degraded grassland covers virtually all the project area. Associated with this, there are lowland, humid zones, with richer biodiversity and higher conservation value. The forests within the project boundaries will be planted on grazing-degraded zones, and it was designed with the objective of preserving the most valuable areas outside project boundaries but inside the land owned by "Lumin/Eucapine".

These conservation areas include natural forests alongside the rivers and minor water streams, composed by hydrophilic species close to the streams, and xerophytic species of shrubs and tall grasses surrounding them in a transition to the grasslands. These ecosystems have suffered alterations in the past, due to human intervention. Valuable tree species include *Salix humboldtiana*, *Sebastiana schottiana*, *Sapium sp.*, *Pouteria salicifolia* and *Erythrina crista galli*. Also, in the most humid areas *Lueha divaricata*, *Quillaja brasiliensis*, *Cupania vernalis*, *Ocotea acutifolia*, *Allophylus edulis*, *Sebastiana klotzschiana* and *Citharexylum montevidense* appear frequently. In intermediate zones, it is common to find *Schinus longifolius* and *Acanthosyris spinecens*, whereas the most common species in the drier zones are *Gochnatia malmei*, *Aloysia gratissima* and *Lithraea molleoides*.

Natural meadows found in this area are developed on hilly landscapes with shallow soils and a topography that determines a good drainage and runoff. Thus, meadows were affected by water deficit so vegetation is dominated by species with summer cycles; such as *Paspalum notatum*, *Setaria geniculata*, *Paspalum dilatatum* and *Axonopus compressus*. It can be found associated species providing forage in the rest of the year (*Stipa papposa*, *Stipa charruana*, *Briza minor*, *Aristida sp.*). Some larger sized species with more than 30 cm (*Baccharis trimera*, *Baccharis coridifolia*, *Eryngium paniculata* and *Eupatorium buniifolium*) could also be found.

On the other hand, favored by overgrazing, appears *Cynodon dactylon* which has been naturalized and has progressively colonized the soil, occupying the spaces left by species less resistant to trampling. Once established it gives no place, being considered as a noxious weed and as a sign of land degradation (decreased site productivity)

Lumin/Eucapine project will be established with a long-term perspective, with the ultimate purpose of achieving long-term sustainability and improving soil quality. Sustainable timber and cattle production and climate change mitigation are part of Lumin/Eucapine's objectives. The selection of forest management practices based on uneven lengths rotation cycles in a region far from timber markets is only possible with the additional carbon financing

2.1.4 Social Parameters (G1.3)

Land use in the project area on influence is predominantly natural grasslands for extensive livestock production. Other land uses are cropland (rice fields) and native forest. Main settlements in the area are listed in 2.1.5 belonging to Cerro Largo and Treinta y Tres departments.

The four departments of the North of the country (Artigas, Rivera, Tacuarembó and Cerro Largo) present the lowest degrees of development (Veiga, 2016). In Cerro Largo the distribution by geographical area is mostly urban (87.8%), lower than the total number of the country and also of the interior; with a rural population that was approximately 10,481 people (remaining 12.1%) according to the results of the 2004 Census. One education indicator is the literacy rate that, according to the General Census of 1996, reached 93.4% of the population of 15 or more years in Cerro Largo, being below the average of the interior (95.6%) and the total country (96.8%) (Barrenechea et al., 2008).

Life expectancy at birth is not the demographic indicators that measure achievements in health matters. According to INE, Cerro Largo has one of the lowest values of this indicator, with an index of life expectancy at birth of 75.4 years for 2006, which places the department in the national context in 15th place in this area (out of 19), with a value lower than the national average (75.7 years). It should be noted that Cerro Largo has held this position at the national level since the nineties.

The UNDP carries out a worldwide Human Development Index (HDI), which consists of "a synthetic measure of the achievements of a society in terms of human development", and "seeks to quantify and combine in an aggregate index the achievements average that registers a country in three fundamental dimensions: to achieve a long and healthy life (health dimension), to acquire useful knowledge (education dimension) and to have the necessary resources to enjoy a decent standard of living (standard of living or access to resources)".

According to the Human Development Report in Uruguay 2005, considering the order of the departments according to its HDI, Cerro Largo was located (with data for the year 2002) in the 15th place. This is if we consider an approximation to the level of living dimension through GDP per capita; since if this approach is considered through the income of households, descends to the 16th position. Therefore, it is among the departments of least relative human development in the country (in previous HDI calculations, for 1991 and 1999 it held the 17th and 14th positions, respectively).

In terms of economy, the generation of value in Cerro Largo denotes a high primary specialization, higher than the average of the interior, centred on livestock (cattle and sheep), rice, forestry and dairy cattle to a lesser extent, which do not contribute to the boost of local development.

The main activities in the department of Cerro Largo are beef cattle ranching (62% of establishments declare cattle ranching as the main source of income, occupying 85% of the area of the department according to the 2000 Agricultural Census), and the sheep (15% of establishments, occupying just over 4% of the departmental area). In addition, they are responsible for 64% of rural employment.

Employment in agriculture is concentrated in beef cattle, which represents 64% of employment (5,800 jobs). However, cattle ranching is one of the activities that have the lowest rates of people employed per thousand hectares (employs five people per thousand hectares).

When referring to Treinta y Tres, the distribution by geographical area is mostly urban (89.7%), lower than the total of the country but higher than the interior; with a rural population that includes a total of 5,079 inhabitants (remaining 10.3%) (Barrenechea et al., 2008). Literacy indicator, according to the General

Census of 1996, reached In Treinta y Tres to 94.7% of the population aged 15 or more, being below the average of the interior (95.6%) and that of the total country (96.8%).

According to the IDH, Treinta y Tres is located in 13th place (out of 19), remaining at a low average level with respect to previous years (also 13th in 1999). Life expectancy at birth is one of the demographic indicators that measure achievements in health. According to the INE, Treinta y Tres has one of the lowest values of this indicator, with an index of life expectancy at birth of 75.4 years for 2006, which places the department in the national context in 15th place in terms of life expectancy at birth, with a value somewhat below the national average (75.7 years).

In the department of Treinta y Tres, the main activities are livestock (cattle and sheep) and rice. The dairy must also take into account the involvement of a number of producers that are not negligible and that make it a way of life without visualizing alternative alternatives to that activity (some 60 families).

In summary, communities in the area are not diverse, they share the same language, religious belief, livelihood system, history or culture. Their relationship with natural resource is through the main responsible of the economy, beef cattle breeding.

Rural poverty is the origin of the main social problems in Uruguay. The region where Lumin/Eucapine has developed its project is particularly affected by a lack of development. Rural poverty has caused the internal migration from rural towns to precarious urban settlements in Montevideo and other cities, increasing marginality, criminality, lack of education, drug-addiction and other social problems. The region around the project site has a dominance of an extensive livestock system of production, which is characterized with a very low productivity level, very low employment, and precarious working conditions and reduced opportunities for women and youth, among other problems. 'Lumin/Eucapine' forest activity is expected to increase the gross value of production per unit area of land by six to eight folds, besides promoting a number of new activities which will multiply this impact.

2.1.5 Project Zone Map (G1.4-7, G1.13, CM1.2, B1.2)

The following map (**Figure 1**) shows the exact location of the project, and the cadastral units owned by Lumin/Eucapine, where the project will be located.

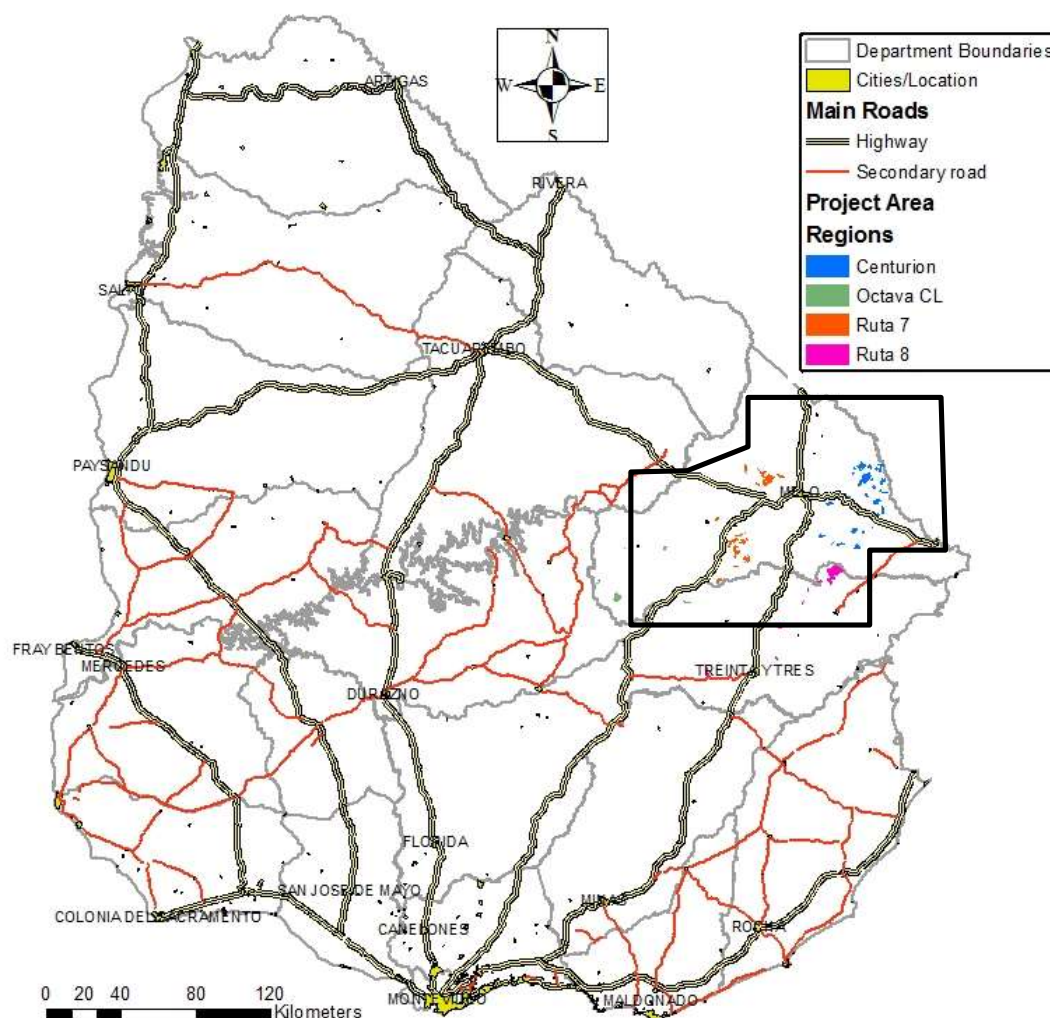


Figure 1. Map of Uruguay showing the location of the areas included in the proposed project activity (black frame).

For the purpose of defining the strata, the project area has been divided into four regions, which are shown from **Figure 2** to **Figure 7**. The areas are homogeneous in terms of soil types, climate, land use history and socio-economic conditions. The division into three regions is entirely based on geographic location.

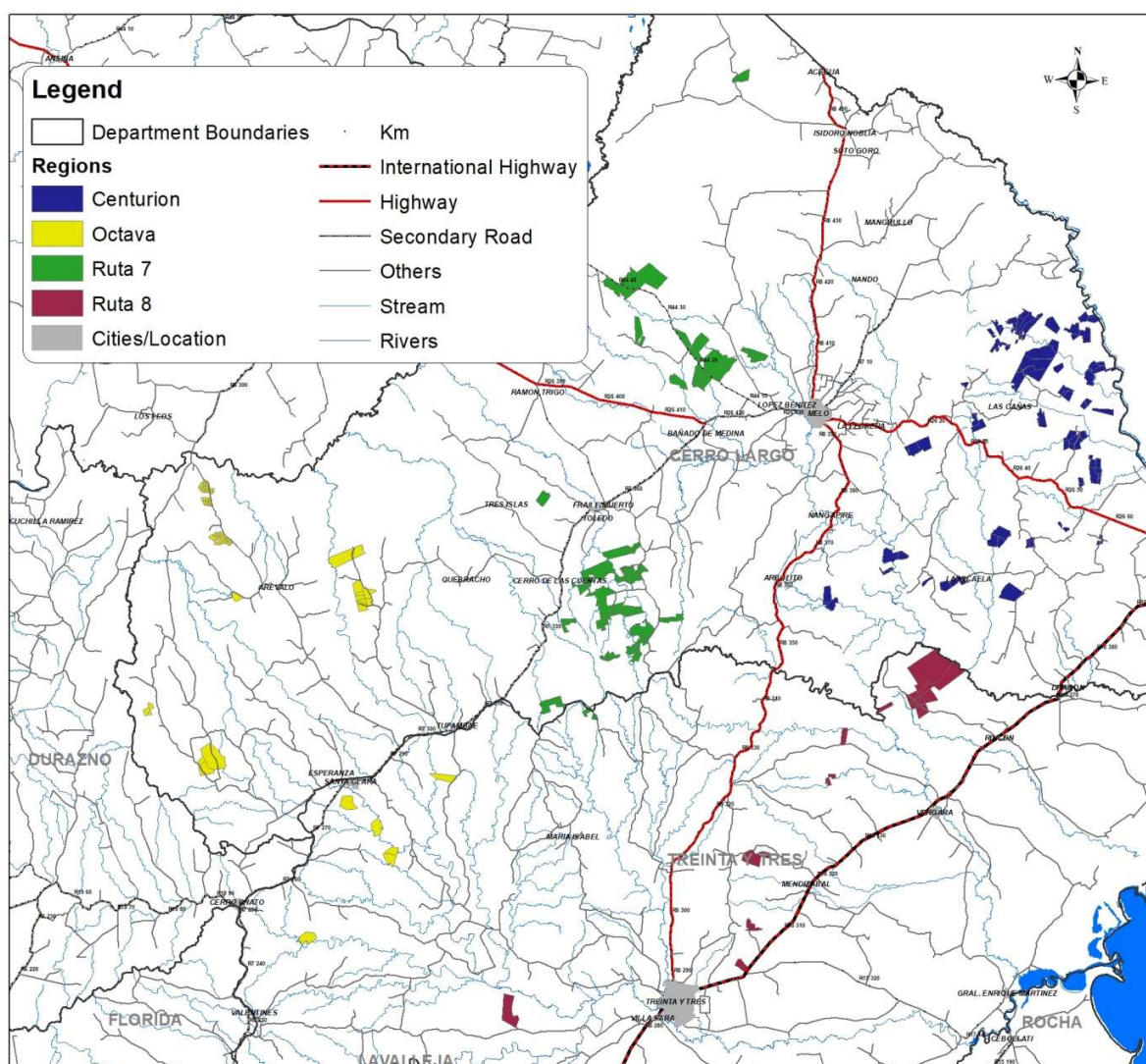


Figure 2. Map indicating the three project regions divided in three different colors.

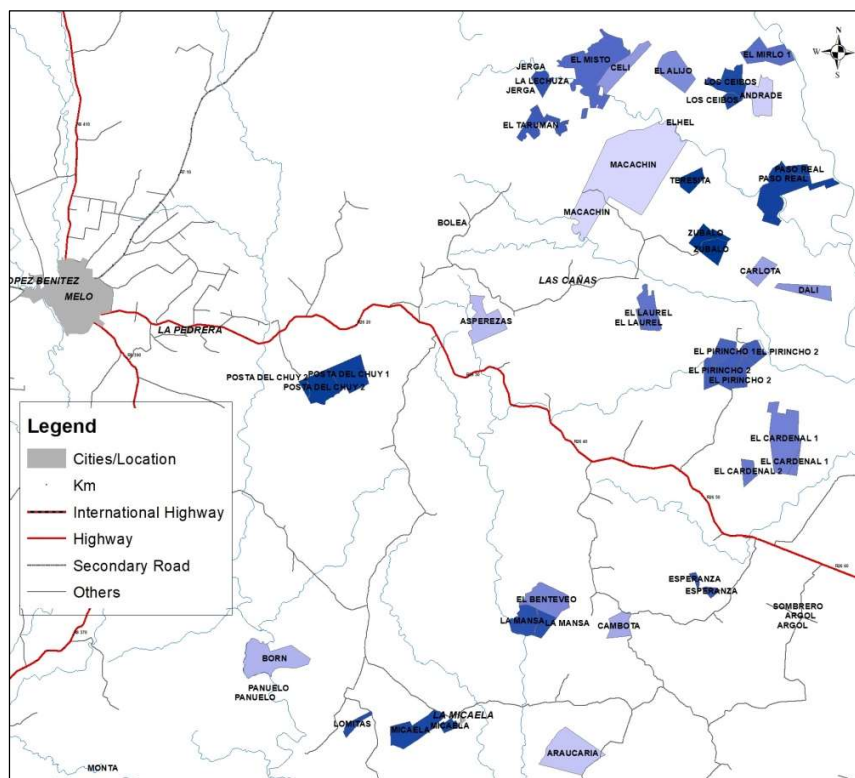


Figure 3. Location of properties which make up the region Centurión

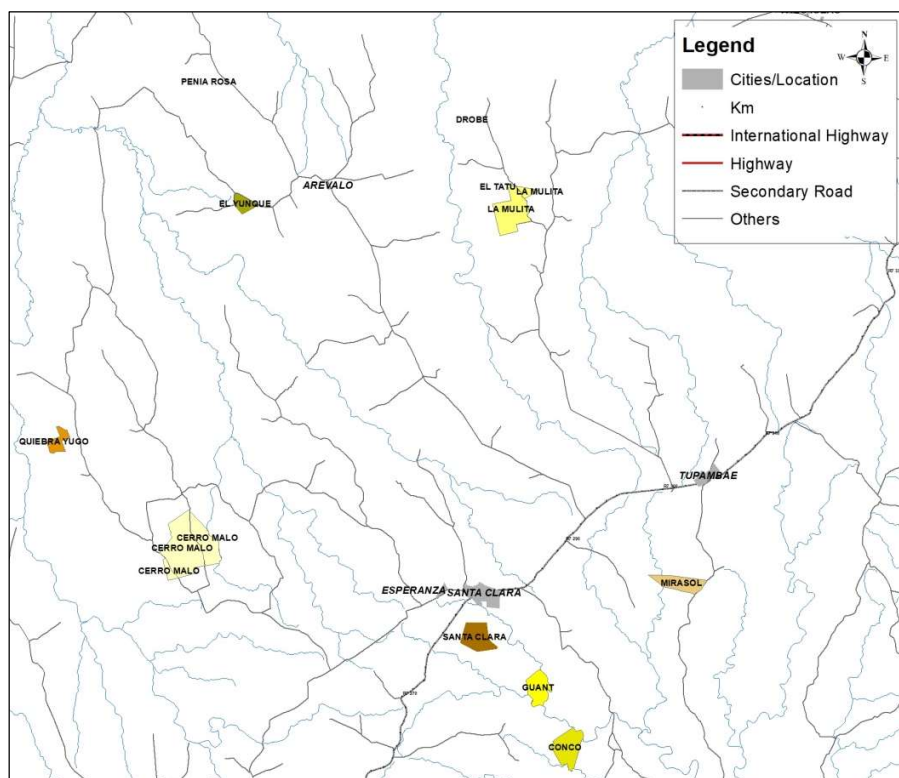


Figure 4. Location of properties which make up the region Octava CL

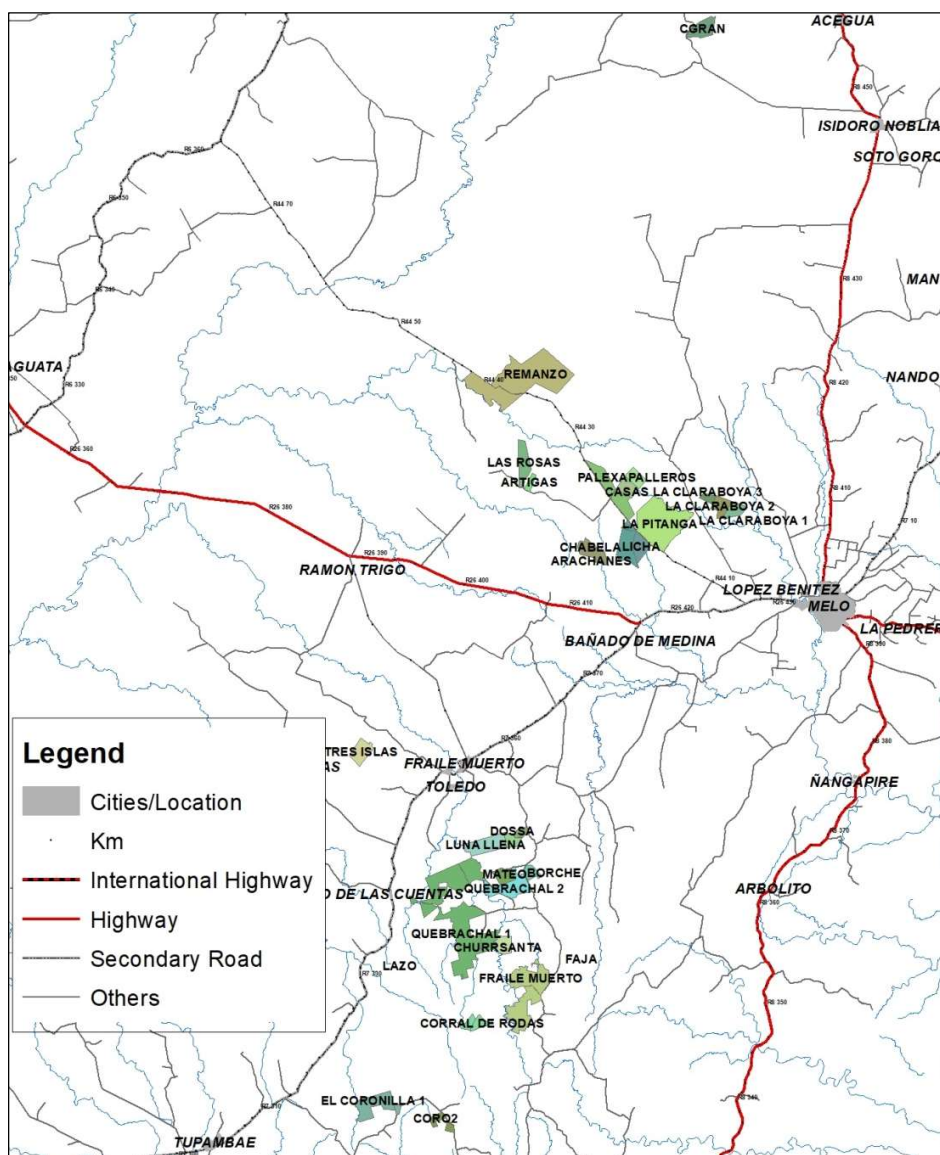


Figure 5. Location of properties which make up the region Ruta 7

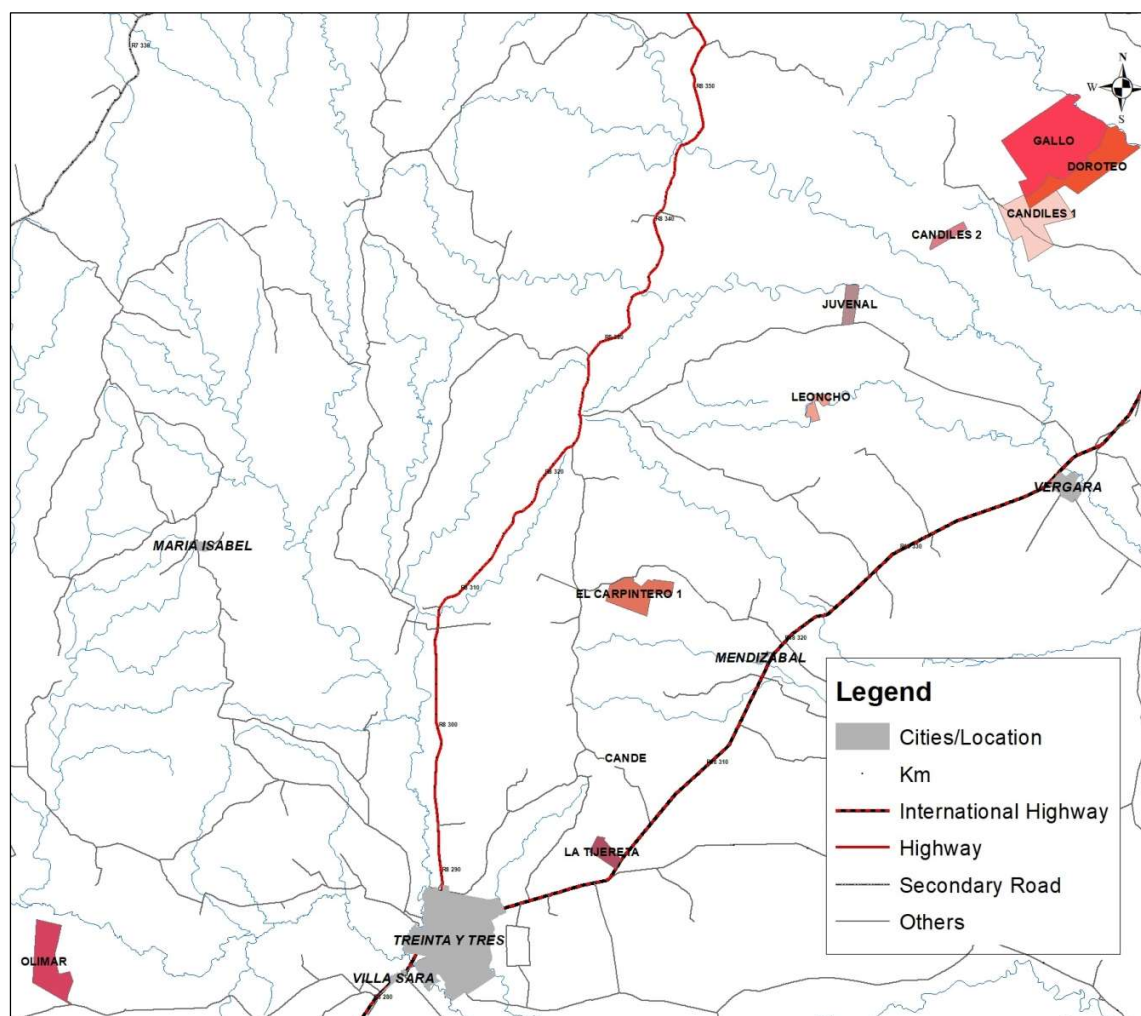


Figure 6. Location of properties which make up the region Ruta 7

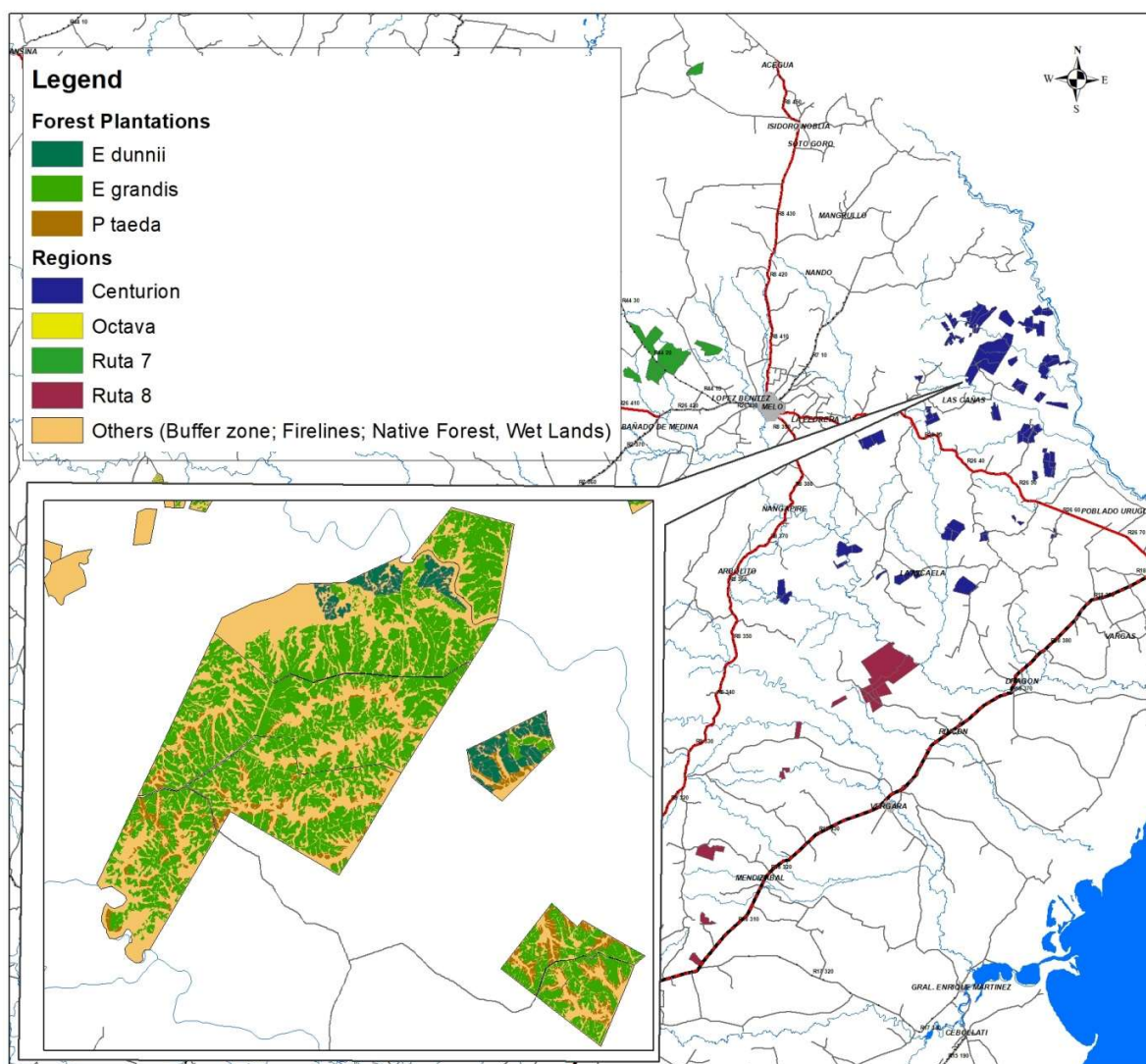


Figure 7. Lumin/Eucapine Project Land Use

Location of communities

Communities in the project area or local communities are understood as those of any size that are adjacent to the project management unit (farm), and also those that are close enough to have a significant impact on the economy or environmental values of the management unit or to their economies, rights or environments are significantly affected by positive or negative management activities or by the biophysical aspects of the management unit (Source: FSC-STD-01-001 V5-0, adapted).

In Uruguay there are no indigenous communities, neither any type of communities living exclusively in the forest and its services. Communities reside in rural areas, towns, villages or even cities in the project area of influence. Capital cities are considered as part of the community analysis since the impact on the population, although not direct, all the services and activities related to the project end up affecting. All other communities that are within Treinta y Tres and Cerro Largo and close enough to be affected by the project, is part of the analysis. The project is in a rural area with very low population density. **Table 1** presents a summary of the census information of the area surrounding the project in an area of approximately 20,000 km² (approximately 11.4% of the total territory of Uruguay)

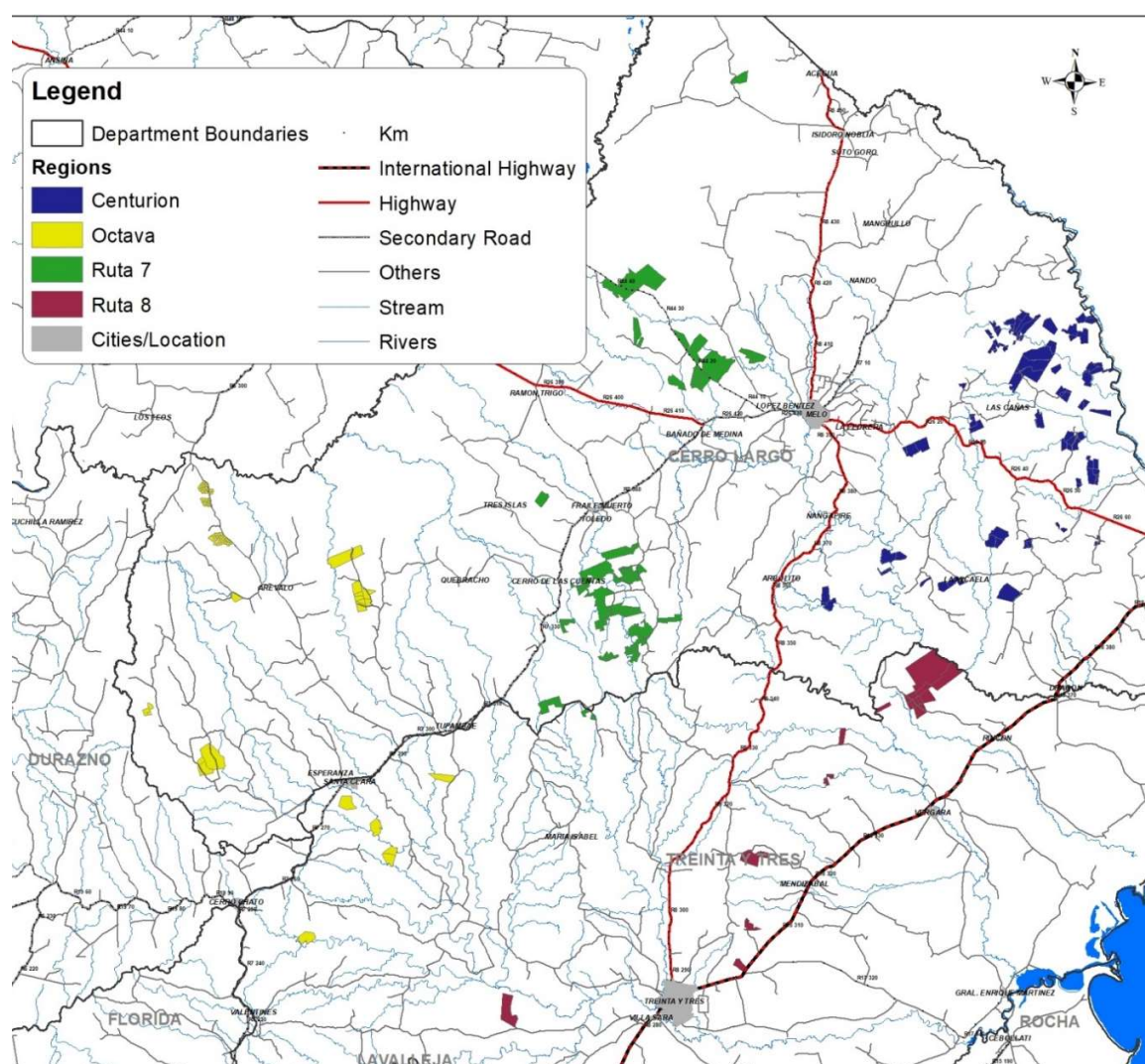


Figure 8. Location of properties which make up the Lumin/Eucapine project divided by region

Demarcation of the area of influence is done using a subjective but efficient method. Almost every community in Treinta y Tres and Cerro Largo is part of the analysis when the limit is put at 15km south to the southernmost farm, 15 km east to the eastern most farm, 15 km north to the northern most farm and 15km west to the western most farm. National route N° 7, N° 8, N°18 and N° 26 forms the structure of the area of influence and connects most of the communities identified below.

The city of Melo, with 50,578 inhabitants, is the biggest city in the area. The population density in the area is 2.0 inhabitants / km² (including the rural population), lower than the national average (18 hab / km²).

Table 1. Demographic Indicators from the project area

Town	Department	Population					
		Male	Female	Age class (years)			Total
				<20	20-64	>64	
Arevalo	Cerro Largo	43	39	43	34	5	82
Bañado de Medina	Cerro Largo	144	110	109	114	31	254
Cerro Chato	Treinta y Tres	810	851	674	859	128	1.661
Fraile Muerto	Cerro Largo	1.563	1.666	1.204	1.568	457	3.229
Isla Patrulla	Treinta y Tres	119	117	83	121	32	236
Maria Albina	Treinta y Tres	38	36	25	37	12	74
Melo	Cerro Largo	23.880	26.698	18.063	26.484	6.031	50.578
Mendizabal	Treinta y Tres	42	42	40	35	9	84
Placido Rosas	Cerro Largo	237	222	163	242	54	459
Quebracho	Cerro Largo	S/D	S/D	S/D	S/D	S/D	S/D
Rincon	Treinta y Tres	363	379	302	384	56	742
Rio Branco	Cerro Largo	6.541	6.915	4.686	7.333	1.437	13.456
Santa Clara de Olimar	Treinta y Tres	1.135	1.170	852	1.163	290	2.305
Treinta y Tres	Treinta y Tres	12.018	13.693	8.535	13.508	3.668	25.711
Tres Islas	Cerro Largo	113	98	91	109	11	211
Tupambae	Cerro Largo	608	561	451	586	132	1.169
Valentines	Treinta y Tres	87	91	64	95	19	178
Vergara	Treinta y Tres	1.983	2.003	1.435	2.068	483	3.986
Total		49.724	54.691	36.820	54.740	12.855	104.415
%		48%	52%	35%	52%	12%	100%

In the affected departments, according to the 2004 National Population and Housing Census, life expectancy at birth is 71.3 years for men and 79.0 years for women, similar figures for the national average. The urban population is 88% and the growth rate of the population is on average 0.1% per year. The birth and mortality rates are 1.6% and 1.0% per year, respectively, which evidences, in comparison with the rate of change of the population, the occurrence of an important emigration process.

The area in which the project focuses presents high poverty rates. The average income of the households of the affected departments was \$ 9,900 / month in 2004, 30% lower than the national average. As shown in **Figure 9**, in the census sections located around the project site, between 5 and 30% of households are below the poverty line.

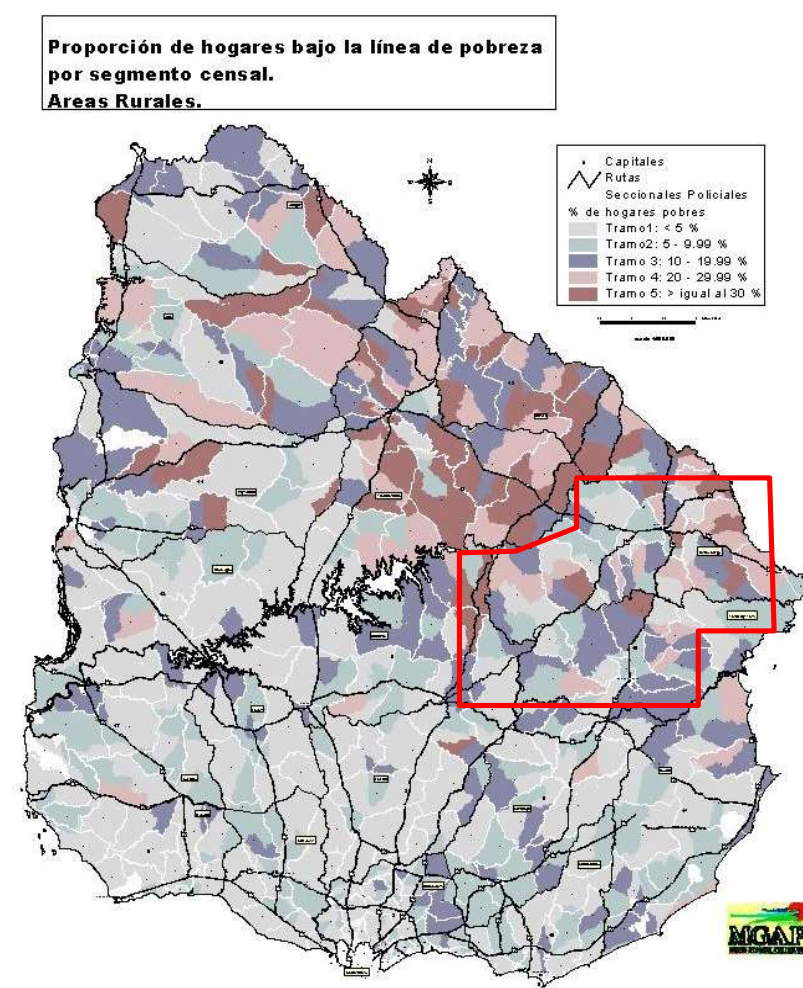


Figure 9. Proportion of households under poverty line in rural areas

2.1.6 Stakeholder Identification (G1.5)

Definition of stakeholder under this analysis is a person, group or organization that has interest or concern in Lumin/Eucapine. Stakeholders can affect or be affected by the organization's actions, objectives and policies. But not all stakeholders are equal. Affected stakeholders, which are essential for the operation of the organization, that is, all those who have a direct economic relationship with the company. Interested stakeholders, which are those who do not participate directly in the company's activities, but who are nevertheless affected by it.

The project is located in the Center-east region of Uruguay, in the departments of Cerro Largo and Treinta y Tres. Including major cities, Melo and Treinta y Tres, there are 16 small to medium size populated centers in the area of incidence and that are affected by project activities, so all the population in these cities/towns are identified as stakeholders (civil society).

Forest plantations need to be approved by the government of Uruguay and by the local government (in the case of Cerro Largo), so the Uruguayan forestry bureau (Dirección General Forestal) and the National

Directorate of the Environment (DINAMA) are also identified as stakeholders. In addition, Verra and CCBA are also identified as stakeholders.

A group of Lumin/Eucapine supervisors, managers and consultants analysed different stakeholders (localities, towns, cities) and create the list of stakeholders with information. Annually, LUMIN-Eucapine supervisors carry out surveys of those residents located where operational activities such as planting and harvesting are carried out. This activity seeks to establish a link with the neighbours/stakeholders, so they can understand the scope and impact of the activities that will be carried out in the area. In the event that doubts, queries or concerns arise, they are analysed and addressed. This process is included in the "Social monitoring and management plan", in chapter 5: "Communication and relationship with interested parties", where this activity is described, and the "Neighbourhood survey form" can be reviewed in the Annex on page 24 of this document. Some surveys carried out during 2021 are attached for reference, in addition to those reviewed in the audit process.

A list of stakeholders was developed, and it is actualized once a year, looking to those locations where silvicultural activities take place during the year. (see **Table 2**):

Table 2. Stakeholders (localities, towns, cities) identification

Localities in LUMIN-EUCAPINE's area of influence		
Localities - cities - town	Province	Contact person
Melo	Cerro Largo	Richard Portillo - Leonardo Cabillón
Centurión	Cerro Largo	
Cañas	Cerro Largo	
Tupambaé	Cerro Largo	
Arévalo	Cerro Largo	
Cerro de las Cuentas	Cerro Largo	
Fraile Muerto	Cerro Largo	
Rincón	Treinta y Tres	
Vergara	Treinta y Tres	
Santa Clara de Olimar	Treinta y Tres	

Part of the actions taken includes the visit, once a year or as demanded, of Lumin/Eucapine employees to neighbours living close to the project area.

As a summary, stakeholders are identified in five groups:

- Public Sector: National Government, Local Government, Uruguayan General Forestry Bureau (Dirección General Forestal- DGF), National Directorate of the Environment (DINAMA), Environmental Ministry (MVOTMA); Public Health Ministry (MSP), Social Development Ministry (MIDES), Firefighters, public health centers, among others
- Private Sector: Society of Forest Producers (SPF), Uruguayan Exporters Union (UEU), Uruguayan Chamber of Industries (CIU), forest contractors' companies, other forest companies, cattle breeders

- Civil Society: communities in small cities, towns and villages as well as Lumin/Eucapine workers
- ONG's
- Education/ Research: INIA, FAGRO, Rural Schools, LATU

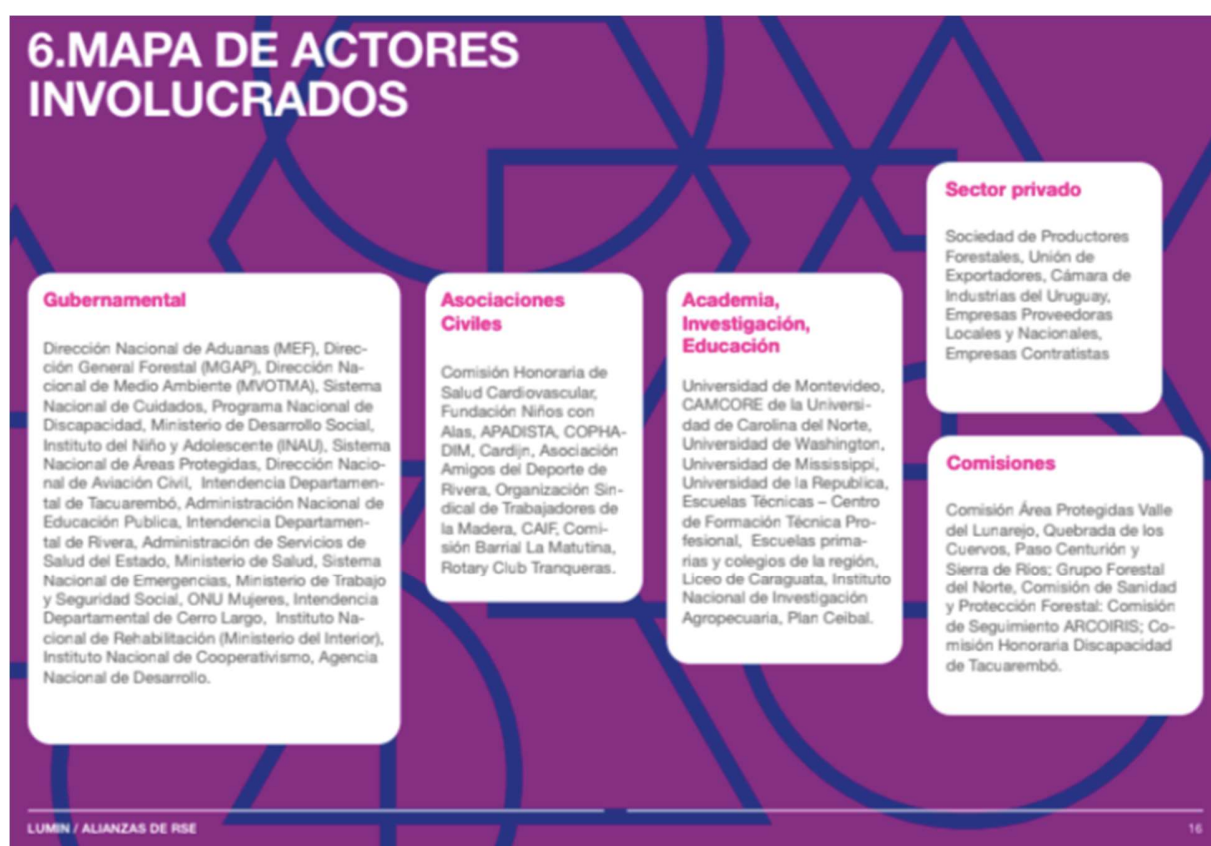


Figure 10. Map of identified stakeholders

Lumin/Eucapine is in charge of the project administration and overall management. Their activities also include the certification of the forest plantation against FSC, ISO or VCS. As a consequence of knowing their responsibilities against any stakeholders, they have formed an internal team with standardized procedures to manage and attend all stakeholders concerns.

Their first steps is the detection and permanent actualization of the neighbors to Lumin/Eucapine farms. A detailed spreadsheet file with all neighbors (name, address, telephone number) is available in Lumin/Eucapine. Lumin/Eucapine also has a list of all identified stakeholders in the area of influence, that is permanently consulted for communication with them. For the case of Cerro Largo and Treinta y Tres, there around 30 identified actors, distributed in different categories: public sector, police, NGOs, teaching centers, firefighters, commerce, clinic, neighbor. Full list of stakeholders with contact information is available in the following sections.

2.1.7 Stakeholder Descriptions (G1.6, G1.13)

As it is presented in the text above, stakeholders are grouped in five major categories and in “Affected” or “Interested” stakeholders. This categorization will be used for stakeholder’s description.

The public sector is present in the project lifetime at different levels. Identification of stakeholders such as the National Government (tax agency, etc.), local government, Uruguayan General Forestry Bureau (Dirección General Forestal- DGF), National Directorate of the Environment (DINAMA), Environmental Ministry (MVOTMA) is elemental for the establishment of the project. General Forestry Bureau and National Directorate of the Environment are the agencies that gives the approval for the forest establishment. The approval is given by complying with multiple requirements, the most important one is the accomplishment of national decree N° 349/005 “Environmental Impact Assessment”. The environmental approval also needs to be maintained through the project lifetime and DINAMA is always present in Lumin/Eucapine’s daily work. Local government are also an important stakeholder in the public category. After the recent law N°18.308, local governments, such as Intendencia de Cerro Largo and Intendencia de Treinta y Tres, has the legal authority over national government for territorial order. Intendencias has the power to allocate or not new areas for forestry production. In the case of Cerro Largo, the Intendencia has prohibited afforestation activities. In the case of Lumin/Eucapine, very good relations are maintained with public sector, for the professional work applied to comply with all regulations and for the proactive effort done to promote good forestry practices. Firefighters are also part of the public sector stakeholders, and their involvement to the project is permanent, given the constant interaction to monitor forest and awareness work on civil society about forest fires. But also, when disturbances event take place, and firefighters and army make presence to combat and mitigate fires. Following is a list of stakeholders identified by Lumin/Eucapine in Cerro Largo and Treinta y Tres

Table 3. Governmental Stakeholders identified by Lumin/Eucapine in Cerro Largo, Treinta y Tres

Categoría	Organismo / Organización	Contacto / Nombre	Localidad	Departamento
Destacamento Policial	Seccional 9°		Vergara	Treinta y Tres
Destacamento Policial	Seccional 8°		Tupambae	Cerro largo
Destacamento Policial	Seccional 1°		Treinta y Tres	Treinta y Tres
Destacamento Policial	Seccional 8°		Santa Clara	Treinta y Tres
Destacamento Policial	Seccional 3°		Rincon	Treinta y Tres
Destacamento Policial	Seccional 10°		Posta del chuy	Cerro Largo
Destacamento Policial	Seccional 13°		Placido rosas	Cerro largo
Destacamento Policial	Seccional 1°		Melo	Cerro largo
Destacamento Policial	Seccional 5°		Isla patrulla	Treinta y Tres
Destacamento Policial	Seccional 6°		Fraile Muerto	Cerro largo

Destacamento Policial	Seccional 7°		Cerro de las cuentas	Cerro largo
Destacamento Policial	Seccional 4°		Centurion	Cerro largo
Dirección Nacional de Bomberos	Destacamento Bomberos		Vergara	Treinta y Tres
Dirección Nacional de Bomberos	Destacamento Bomberos		Treinta y Tres	Treinta y Tres
Dirección Nacional de Bomberos	Destacamento Bomberos		Rio branco	Cerro Largo
Dirección Nacional de Bomberos	Destacamento Bomberos		Melo	Cerro Largo
FFAA	Regimiento "Dragones de Caballeria" - Cuartel de Santa Clara	Mayor Enrique Duarte	Santa Clara	Treinta y Tres
Gobierno Departamental	Dirección de Planificación Estratégica	José Amaro	Treinta y Tres	Treinta y Tres
Gobierno Departamental	Gestión Social		Melo	Cerro Largo
Gobierno Departamental	Dirección de Medio ambiente	Emilio Dominguez	Melo	Cerro Largo
Gobierno Municipal	Municipio	Macarena Da Roa	Tupambae	Cerro Largo
Gobierno Municipal	Municipio	Pablo Echeverria	Santa Clara	Treinta y Tres
Gobierno Municipal	Municipio	Fidencio Gonzalez	Vergara	Treinta y Tres
Gobierno Municipal	Municipio	Gaston Nauar	Fraile Muerto	Cerro Largo
Gobierno Municipal	Municipio	Eduardo Lucas	Arevalo	Cerro Largo
Gobierno Municipal	Municipio	Victor Noda	Cañas	cerro Largo
Gobierno municipal	Municipio	Humberto Allende	Cero de las Cuentas	Cerro Largo
Inspección Departamental Primaria	Inspección Departamental de Treinta y Tres	Marta Gómez	Treinta y Tres	Treinta y Tres
Inspección Departamental Primaria	Inspección Departamental Cerro Largo	Socorro Sosa	Melo	Cerro Largo
Ministerio	MIDES - Oficina Territorial	Adriana De Barbieri	Treinta y Tres	Treinta y Tres
Ministerio	MGAP - DRNR	Jose Maria Nin	Treinta y Tres	Treinta y Tres

Ministerio	MVOTMA - DINOT	Cnel. (R) Norberto Suárez		
Ministerio	MIDES - Oficina Territorial	Gervasio Rodríguez	Melo	Cerro Largo
Ministerio	MGAP - Dirección Departamental Treinta y Tres	Gabriel Ruete	Treinta y Tres	Treinta y Tres
Ministerio	MGAP - Dirección Departamental Cerro Largo	José Leonardo Pastorino	Melo	Cerro Largo

Private sector is another stakeholder group identified by Lumin/Eucapine. The “Sociedad de Productores Forestales - SPF” (Society of Forest Producers) is the entity that nucleates the private forestry sector. Alvaro Molinari, General Manager of Lumin/Eucapine, is part of the directorate of the SPF. There are also other primary stakeholders in the private sector identified by Lumin/Eucapine. All forest contractor’s companies that have been hired by the project developer are part of the groups with direct incidence. Small to medium enterprises providing services for land preparation, ant control, pruning, thinning or clear-cuts are identified stakeholders. Other forestry companies are present in the project area of influence. The relation between them is formally happening through the Sociedad de Productores Forestales, but also informally on the field. Uruguayan culture in isolated areas includes the assistance to colleagues in any matter, which is the case of forestry workers (or other sectors workers) among themselves.

Table 4. Private sector stakeholders identified by Lumin/Eucapine in Cerro Largo y Treinta y Tres

Categoría	Organismo / Organización	Contacto / Nombre	Localidad	Departamento
Asociación Empresarial	Centro Comercial e Industrial de Treinta y Tres	Ademar Sánchez	Treinta y Tres	Treinta y Tres
Asociación Empresarial	Centro Comercial e Industrial de Cerro Largo	Juan Nasif	Melo	Cerro Largo
Asociación Rural	Sociedad Agropecuaria de Cerro Largo	Eduardo Lucas	Melo	Cerro Largo
Asociación Rural	Sociedad de Fomento Rural de Cerro Largo	Pablo López	Melo	Cerro Largo
Consultor Forestal		Lic Raul Lombardi	Melo	Cerro Largo
Consultor Forestal	Ines Bocage	Ines Bocage	Montevideo	Cerro Largo
Contratista Forestal	Francisco Davila	Francisco Davila	Cerro Largo	Cerro Largo
Contratista Forestal	San Nicolas	Diego Szymkow	Tacuarembó	Cerro Largo
Contratista Forestal	Lazo servicios forestales	Edinson de Oliveira	Cerro Largo	Cerro Largo
Contratista Forestal	Marabi	Mario Medina	Cerro Largo	Cerro Largo

Contratista Forestal	Agromedina	Agustin Medina	Cerro Largo	Cerro Largo
Contratista Forestal	Alimar 1 srl	Alejandro Lavarello	Cerro Largo	Cerro Largo
Contratista Forestal	Tres Tilos	Rodrigo Bravo	Cerro Largo	Cerro Largo
Contratista Forestal	Robert jara	Robert Jara	bañado de medina	Cerro Largo
Contratista Forestal	Cooperativa Agraria Forestal de Arevalo	Sandra Almiron	Arévalo	Cerro Largo
Empleado/Administración	Lumin	Leticia Gomez	Melo	Cerro Largo
Medio comunicación	La voz de Melo		Melo	Cerro Largo

Civil society is the third detected group of stakeholders to the project. Civil society are residents in small towns in the area of incidence to the project and neighbours to the project sites. Neighbours are key actors for the project development. Their continuous presence in the area of influence makes this group a relevant player when project impact is assessed. Many positive but also negative effects are being monitored in such neighbours. Civil society has a claim/complaint form, and LUMIN web page that can be used to express their concerns about any activity implemented by Lumin/Eucapine, see section 2.3.7 and 2.3.8. There is no formal mechanism established to identify neighbours, but once there is at least one interaction, the company keeps contact of the person. Once a year a consultant, look all the external communications, analysed and perform survey in order to verify any issue or misunderstanding about LUMIN activities.

Table 5 shows the identified actors of the civil society that are part of the permanent consultation group. The list includes all the neighbours visited in the year 2020.

Table 5. Civil society stakeholders list

Categoría	Organismo / Organización	Contacto / Nombre	Localidad	Departamento
Apicultor		Ismael Eduardo Hernández Gardiol	ARAUCARIA	Cerro largo
Apicultor		Juan Pedro Baigorria Bueno	LA CANDELA	Treinta y Tres
Apicultor		Ricardo Carrera	MACACHIN	Cerro largo
Apicultor		Flavio Ricard Diaz	EL CARDENAL 1	Cerro largo
Apicultor		German Trtto	QUEBRACHAL 1	Cerro largo
Apicultor		Maria Edy Garay Duarte	LA PITANGA	Cerro largo
Apicultor		Jorge luis Rodales Nuñez	LA CLARABOYA 1	Cerro largo
Apicultor		Luis Techera	ARTIGAS	Cerro largo
Apicultor		Edgardo Zamora	ARACHANES	Cerro largo
Apicultor		Jorge luis Rodales Nuñez	CHABELA	Cerro largo
Apicultor		Gerardo Saravia	PALEXA	Cerro largo

Apicultor		Luis Techera	LAS ROSAS	Cerro largo
Apicultor		Maikel Jeicobb Croker Schaffner	CANDILES 1	Treinta y Tres
Apicultor		Wilson da Fonseca	LA PITANGA	Cerro Largo
Apicultor		Dionicio Olivera Godoy	CHABELA	Cerro largo
Apicultor		Maria Edy Garay Duarte	LA PITANGA	Cerro Largo
Apicultor		Mario Daniel Medina Bussorelli	QUEBRACHAL 1	Cerro Largo
Apicultor		Ismael Eduardo Hernández Gardiol	EL BENTEVEO	Cerro Largo
Apicultor		German Trtto	LUNA NUEVA	Cerro largo
Apicultor		Marcos Gabriel Arellano	CHABELA	Cerro largo
Apicultor		Alejandro Moreira	PALEXA	Cerro Largo
Apicultor		Daniel Saravia Rosas	PALEXA	Cerro Largo
Apicultor		Maria Edy Garay Duarte	LOMITAS	Cerro Largo
Apicultor		Juan Pedro Baigorria Bueno	PASO REAL	Cerro Largo
Medio comunicación	La voz de melo		Melo	Cerro Largo
Pastoreante		Ricardo Gonzalez Herken	EL REMANSO	Cerro largo
Pastoreante		Pablo Gaston Gonzalez	FRAILE MUERTO	Cerro largo
Pastoreante		Alvaro Manzino	MATEO	Cerro largo
Pastoreante		Edinson Fabian Juarez Recalde	QUEBRACHAL 2	Cerro largo
Pastoreante		Jorge Valin Carballo	FRAILE MUERTO	Cerro largo
Pastoreante		Athos Olivera	FRAILE MUERTO	Cerro largo
Pastoreante		Motimar s.a	EL LAZO	Cerro largo
Pastoreante		Alvaro Manzino	CORRAL DE RODAS	Cerro largo
Pastoreante		Ramon Recalde	QUEBRACHAL 1	Cerro largo
Pastoreante		Juan Ramon Arismendi	EL CORONILLA 4	Cerro largo
Pastoreante		Soc Rural Isla Patrulla	EL CORONILLA 1	Cerro largo
Pastoreante		Mario Rodriguez	EL TATU	Cerro largo
Pastoreante		Irma Machado Silvera	CERRO MALO	Cerro Largo
Pastoreante		Eduardo Lucas de Olivera	LA FAJA	Cerro largo

Pastoreante		Tilio Alberto Perdomo dos Santos	CASCABEL	Cerro Largo
Pastoreante		Ricardo Abila Fernandez	BORCHE	Cerro Largo
Pastoreante		Jose Luis Rosas Morales	LA PITANGA	Cerro Largo
Pastoreante		Paola Suarez Figarola	YAGUARON	Cerro largo
Pastoreante		Roberto Botello Bandera	GUARDIA VIEJA	Cerro largo
Pastoreante		Jose Pedro Afonso Noble	EL QUEBRACHO 2	Cerro largo
Pastoreante		Alfredo Tabeira	EL QUEBRACHO 2	Cerro Largo
Pastoreante		Genaro Araujo	CENTURION	Cerro Largo
Pastoreante		Hector Caldas Araujo	ZUBALO	Cerro Largo
Pastoreante		Maria Acuña Hauman	MACACHIN	Cerro Largo
Pastoreante		Libertad Fernandez Souza	MACACHIN	Cerro Largo
Pastoreante		Aldo Noel Techera	EL MISTO	Cerro Largo
Pastoreante		Luis Nery Alvarez	ASPEREZAS	Cerro largo
Pastoreante		Marquez Orcoyen Otto	EL PIRINCHO 1	Cerro Largo
Pastoreante		Solís Ramos Ferreira Porto	EL PIRINCHO 2	Cerro largo
Pastoreante		Heber Farias Lopez	EL MISTO	Cerro Largo
Pastoreante		Artuto Chavez	EL TARUMAN	Cerro Largo
Pastoreante		Aparicio Cruz Pinto	EL TARUMAN	Cerro Largo
Pastoreante		Julio Sosa Marquez	LA MANSA	Cerro Largo
Pastoreante		Mabel Vazquez	POSTA DEL CHUY 2	Cerro Largo
Pastoreante		Ramon Zapater	FRAILE MUERTO	Cerro Largo
Pastoreante		Eduardo Gonzalez Monteiro	MICAELA	Cerro Largo
Pastoreante		Sandro Idalino Gama	EL QUEBRACHO 2	Cerro largo
Pastoreante		Alba Barboza Acuña	EL PANUELO	Cerro Largo
Pastoreante		Juan Gaudencio Vidarte Pereira	CERRO GRANDE	Cerro Largo
Pastoreante		Yony Vieyto	CASAS	Cerro Largo
Pastoreante		Gimena Greque	LA JERGA	Cerro Largo

Pastoreante		Ramiro Daniel Fleitas Saravia	FRAILE MUERTO	Cerro Largo
Pastoreante		Libertad Fernandez Souza	CERRO VILLICO	Cerro Largo
Pastoreante		Martin Eiraldi Larroque	CHABELA	Cerro Largo
Pastoreante		Juan Rofocante Silveira	EL MISTO	Cerro Largo
Pastoreante		Solís Ramos Ferreira Porto	EL CARDENAL 1	Cerro Largo
Pastoreante		Heber Octavio Gomez Gutierrez	LAS BOLEADORAS	Cerro Largo
Pastoreante		Eduardo Lucas de Olivera	LA FAJA	Cerro Largo
Pastoreante		La sucesion de Jose Ramos	EL SOMBRERO	Cerro Largo
Pastoreante		Gonzalo Contreras	FRAILE MUERTO	Cerro Largo
Pastoreante		Sandra Acosta Morales	LUNA LLENA	Cerro Largo
Pastoreante		Ramon Recalde	EL CHURRINCHE	Cerro Largo
Pastoreante		Rene Pereira	LA LECHUZA	Cerro Largo
Pastoreante		Fernando Gonzales	PASO REAL	Cerro Largo
Pastoreante		Edison Lima	EL MIRLO 1	Cerro Largo
Pastoreante		Martin Eiraldi Larroque	PALEXA	Cerro Largo
Pastoreante		Joaquín Arróspide	PALEXA	Cerro Largo
Pastoreante		Melba Gonzalez	EL CARDENAL 1	Cerro Largo
Pastoreante		Enrique Alis Rivero Pereira	EL BENTEVEO	Cerro Largo
Pastoreante		María Acuña Hauman	MACACHIN	Cerro Largo
Pastoreante		La sucesion de Jose Ramos	LA ARGOLLA	Cerro Largo
Pastoreante		Vanda Santos Rodriguez	TRES CANOAS	Cerro Largo
Pastoreante		Mabel Vazquez	POSTA DEL CHUY 1	Cerro Largo
Pastoreante		Martin Eiraldi Larroque	LICHA	Cerro Largo
Pastoreante		Eneida Alves Correa	DALI	Cerro Largo
Pastoreante		Abel Acosta	EL YUNQUE	Cerro Largo
Pastoreante		Maria Adela Ayala	QUEBRACHAL 2	Cerro Largo
Pastoreante		Silvia Monteiro	ESPERANZA	Cerro Largo
Pastoreante		Luis Benito Balero Silveira	EL CARDENAL 2	Cerro Largo
Pastoreante		Pio Nicolas Garay Duarte	ARTIGAS	Cerro Largo

Pastoreante		Eneida Alves Correa	CARLOTA	Cerro Largo
Pastoreante		Hector Caldas Araujo	ZUBALO	Cerro Largo
Pastoreante		Erika Vanessa Ribero da Silva	EL ALIJO	Cerro Largo
Pastoreante		Jose Feijo Nemberg	LUNA NUEVA	Cerro Largo
Pastoreante		Javier Victor Secadas	QUIEBRA YUGO	Cerro Largo
Pastoreante		Jose Feijo Nemberg	DOS SANTOS	Cerro Largo
Pastoreante		Mabel Vazquez	POSTA DEL CHUY 2	Cerro Largo
Pastoreante		Wilmar Sorribas Morales	GUARDIA VIEJA	Cerro Largo
Pastoreante		Alexander Nazareth Techera Moreira	QUEBRACHAL 1	Cerro Largo
Pastoreante		Alvaro Manzino	QUEBRACHAL 1	Cerro Largo
Pastoreante		Yony Vieyto	PALLEROS	Cerro Largo
Pastoreante		Miguel Angel Suarez	HORCONES 2	Cerro Largo
Pastoreante		Miguel Angel Suarez	HORCONES 3	Cerro Largo
Pastoreante		Abel Acosta	PENARROSA 1	Cerro Largo
Pastoreante		Roberto Cabrera	HORCONES 1	Cerro Largo
Pastoreante		Julio Sosa Marquez	CAMBOTA	Cerro Largo
Pastoreante		Nelba Lyrís Fernandez	CERRO MALO	Cerro Largo
Pastoreante		Alvaro José Gallo Mirande	ARACHANES	Cerro Largo
Pastoreante		Auerelio Carlos Cardozo Viera	LA MULITA	Cerro Largo
Pastoreante		Mario Esteban Méndez Causto	LA MULITA	Cerro Largo
Pastoreante		Reino Santiago Saravia	TRES ISLAS	Cerro Largo
Pastoreante		Luis Benito Balero Silveira	EL CARDENAL 2	Cerro Largo
Pastoreante		Federico Rodriguez dos Santos	LA CLARABOYA 1	Cerro Largo
Pastoreante		Federico Rodriguez dos Santos	LA CLARABOYA 2	Cerro Largo
Pastoreante		Asociacion Civil Tacuari	ARAUCARIA	Cerro Largo
Pastoreante		Jhony Vidarte Madruga	LOMITAS	Cerro Largo

Pastoreante		Ramiro Daniel Fleitas Saravia	FRAILE MUERTO	Cerro Largo
Pastoreante		Baldemar Lopez Duarte	TERESITA	Cerro Largo
Pastoreante		Yony Vieyto	LA CLARABOYA 3	Cerro Largo
Pastoreante		Leonardo Fabricio Vidales Gomez	FRAILE MUERTO	Cerro Largo
Pastoreante		Ramon Recalde	LA SANTA	Cerro Largo
Pastoreante		Lorenzo Mier	LA CANDELA	Treinta y Tres
Pastoreante		Roberto Valentin dos Santos (Tremezano)	PASO ANCHO	Treinta y Tres
Pastoreante		Soc Rural Isla Patrulla	MAESTRO LENA	Treinta y Tres
Pastoreante		Diego Ramon Ortiz	GALLO	Treinta y Tres
Pastoreante		Julio Cesar Gomez Toya	CANDILES 1	Treinta y Tres
Pastoreante		De Souza Wasington David	LEONCHO	Treinta y Tres
Pastoreante		Jorge Edil Gonzalez Almeida	JUVENAL	Treinta y Tres
Pastoreante		De Souza Wasington David	LEONCHO	Treinta y Tres
Pastoreante		Tremezano Roberto Carlos	CERRO COLORADO	Treinta y Tres
Pastoreante		Roberto Valentin dos Santos (Tremezano)	CERRO COLORADO	Treinta y Tres
Pastoreante		Adan Marcelo Arismendi	EL CORONILLA 2	Treinta y Tres
Pastoreante		Richard Edward Almeida	LA TIJERETA	Treinta y Tres
Pastoreante		Diego Ramon Ortiz	DOROTEO	Treinta y Tres
Pastoreante		Jose Luis Da Luz	MIRASOL	Treinta y Tres
Pastoreante		Hector Gerardo Gonzalez Alvariza	LAS PAVAS	Treinta y Tres
Pastoreante		Guillermo Larrosa Romero	OLIMAR	Treinta y Tres
Pastoreante		Ademar Enrique Falero Suarez	EL CARPINTERO 1	Treinta y Tres
Pastoreante		Juan Ramon Arismendi	EL CORONILLA 2	Treinta y Tres
Vecino		Jorge Fonseca	ZUBALO	Cerro largo
Vecino Este		Saul Sosa	Sierras de Rios	Cerro Largo
Vecino Este		Solis Ramos	Saldaña	Cerro Largo
Vecino Este		Otto Maruquez	Saldaña	Cerro Largo
Vecino Este		Jose Gonzalez	Rincon	Treinta y Tres
Vecino Este		Richard Aranet Machado	Laguna del junco	Cerro Largo

Vecino Este		Guillermo Escotto	Laguna del junco	Cerro Largo
Vecino Este		Leonardo Granito	Laguna del junco	Cerro Largo
Vecino Este		Jaime Mederos	Fraile Muerto	Cerro Largo
Vecino Este		Ramon de Mello	Fraile Muerto	Cerro Largo
Vecino Este		Daniel Lara	cañas	Cerro Largo
Vecino Este		Albaluz Faliu Silva	Asperezas	Cerro Largo
Vecino Este		Alvaro Rodriguez	Asperezas	Cerro Largo
Vecino Este		Eduardo Bautista	Arevalo	Cerro Largo
Vecino Este		Dario Carballo	Arevalo	Cerro Largo
Vecino Este		Olga Lima	Arevalo	Cerro Largo

NGOs are present in that region. There is no formal method to identify NGO because they are very well known and with strong activity when referring to forestry in Uruguay, especially environmental NGOs. Lumin/Eucapine also has a list of NGOs that has been in contact with the company and to which Lumin/Eucapine have interest to be present in any organized activity. The following table shows the identified NGOs in Cerro Largo, Treinta y Tres and Montevideo.

Table 6. List of NGOs in Cerro Largo, Treinta y Tres

LISTA	Organismo / Organización	Contacto / Nombre	Localidad	Departamento
ONG	Rotary Club Treinta y Tres Sur	Sara Tarán	Treinta y Tres	Treinta y Tres
ONG	Campo Limpio	Aldo Invernizzi	Melo	Cerro Largo
ONG	Asociacion Patriada por la Historia	Dr. Ricardo Sienra	Montevideo	Montevideo
ONG	Club de Leones	Washington Fagúndez	Melo	Cerro Largo
ONG	COENDU	Mauricio Alvarez	Melo	Cerro Largo
ONG	COVE12	Elena Sosa	Cañas	Cerro Largo
ONG	COVE12	Beatriz Hernandez	Cañas	Cerro Largo
ONG	Unión Internacional para la Conservación de la Naturaleza	Rosanna Berrini	Montevideo	Montevideo
ONG	CMAF (Comision Mundial Areas Protegidas)	Carolina Sans	Montevideo	Montevideo
ONG	Aves Uruguay	Adrian Stagi	Montevideo	Montevideo
ONG	Rotary Club	Carlos Piana	Melo	Cerro Largo
ONG	Rotary Club	Noel Iribarne	Fraile Muerto	Cerro Largo
ONG	fundacion Celeste - Cerro de las cuentas	Etel Molina	Cerro de las cuentas	Cerro Largo
ONG	Unidos para Ayudar	Andrea Roth	Montevideo	Montevideo

ONG	CERCA (Comision honoraria de salud cardiovascular)	Laura Zacheo-Jimena	Montevideo	Montevideo
ONG	Amigos del Patrimonio Historico	Carlos Duera	Melo	Cerro Largo
ONG	COPAHDIM	Mary Maciel Borba	Melo	Cerro Largo

The last group of stakeholders are the investigation institution and educational centres. Many rural schools are present in the area of influence and Lumin/Eucapine has a strong commitment to support their activities.

Table 7. List of educational centers in project's area of influence (Cerro Largo and Treinta y Tres)

Categoría	Organismo / Organización	Contacto / Nombre	Localidad	Departamento
Escuela Pública	Escuela N° 116		Talavera	Cerro Largo
Escuela Pública	Escuela N° 127	Judith Souza	Arrozal Rosales	Cerro Largo
Escuela Pública	Escuela N° 39	Rodolfo Saralegui	BAÑADO DE LAS PAJAS.	Cerro Largo
Escuela Pública	Escuela N° 42	Melissa Rodriguez	Poblado Uruguay	Cerro Largo
Escuela Pública	Escuela N° 43	Melissa Rodriguez	Cuchilla de cambota	Cerro Largo
Escuela Pública	Escuela N° 84	FABIANA BETANCOUR	PASO DE LA ARMADA	Cerro Largo
Escuela Pública	Escuela N° 95	Sheila Da Silveira	Arroyo Malo	Cerro Largo
Escuela Pública	Escuela N° 105	Melissa Rodriguez	Rincon de los Olivera	Cerro Largo
Escuela Pública	Escuela N° 16	Centurion	Centurion	Cerro Largo
Escuela Pública	Escuela N° 17	Sierra de Rios	sierra de rios	Cerro Largo
Escuela Pública	Escuela N° 30	Cañas	Cañas	Cerro Largo
Escuela Pública	Escuela N° 49	Susel Melo	Sarandi de Barcelo	Cerro Largo
Escuela Pública	Escuela N° 82	Victoria Isasti	Laguna del junco	Cerro Largo
Escuela Pública	Escuela N° 72	Michela Rivero	La Micaela	Cerro Largo
Escuela Pública	Escuela N° 33	Iris Bordachar	Cuchilla grande	Cerro Largo
Escuela Pública	Escuela N° 36	Ma del carmen Alvarez	Cuchilla del Carmen	Cerro Largo
Escuela Pública	Escuela N° 66	Ethel Molina	Cerro de las cuentas	Cerro Largo
Escuela Pública	Escuela N° 68	Rosario Muniz	Fraile Muerto (toledo)	Cerro Largo
Escuela Pública	Escuela N° 43	Luis Neira	Cambota	Cerro Largo
Escuela Pública	Escuela N° 93	Elaine Etcheverry	Asperezas	Cerro Largo
Escuela Pública	Escuela N° 61	Raquel Ruiz	Arevalo	Cerro Largo

Escuela Técnica	Escuela Técnica Melo	Carlos Vaz	Melo	Cerro Largo
Universidad de la República	Centro Universitario Cerro Largo	Carlos Mantero	Melo	Cerro Largo
Universidad de la República	Centro Universitario Cerro Largo	Enrique Mazzei	Melo	Cerro Largo
Universidad de la República	CENUR Noreste (Directora)	Isabel Barreto	Melo	Cerro Largo

2.1.8 Project Activities and Theory of Change (G1.8)

The main contribution of Lumin/Eucapine project activity is the improving of local wellbeing, in a region of Uruguay with elevated levels of poverty, through i. the generation of high quality and stable employment, ii. income improvement for local workers and communities, iii. the enhance of social cohesion for rural area disperse population, iv. the promotion of local productive integration, v. the increase of access to services like health, education and mobility at local level.

Creation of employment is one of the main social benefits of the project. Typically, an extensive livestock production system employs 1.4-4.4 persons every 1,000 ha. Lumin/Eucapine project is expected to multiply that figure by more than 3-8 times. Despite this is a reality in the Uruguayan landscape, it is difficult to demonstrate the causal relationship between an increase in employment with the project and poverty eradication in the region. Therefore, the project proponent arguments that generation of employment will help alleviate the poverty in the region.

Project activity consists in the establishment of forest on land that had previously been under grassland for more than 300 years. It was developed under the VCS scope 14: "Agriculture, Forestry and Other Land Use" as an "Afforestation, Reforestation and Revegetation project. 'Lumin/Eucapine' afforestation on degraded grazing land is a single GHG Project.

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. Forest plantation for obtaining saw wood, pulp wood and removing carbon dioxide from the atmosphere are being established since 2006.

The project activity is implemented on degraded land, which is expected to continue to degrade in the absence of the project and hence the land cannot be expected to revert to a non-degraded state without human intervention.

Forests consist of *Eucalyptus grandis* and to a lesser extent *Eucalyptus dunnii* and *Pinus taeda* plantations managed with a rotation length of 16 to 22 years. The plantations are established on land previously used for cattle grazing. The implementation of the project activity will not cause any displacement of cattle.

The main objectives of the project activity are wood production, land restoration and carbon sequestration through afforestation. Around 90% of the total planted area was implanted between 2006 and 2012, and smaller areas were planted between 2014 and 2020. Forest plantation will be replanted after clear-cut harvest. Project crediting period is 60 years and project lifetime is 100 years. All practices will be compatible with FSC standard for sustainable forest management.

Planted forests will remove carbon dioxide from the atmosphere and store it in different carbon pools (living above-ground and below-ground biomass, soil organic carbon, litter and dead wood). All these carbon pools

will be accounted towards issuance of VCUs. However, due to methodology provisions, only above ground biomass, litter and dead wood will be monitored.

In the fields where Lumin 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.

The theory of change or causal model approach is implicit the project, as it is presented in the appendix 2. The project activity is introducing undoubtful positive changes to the landscape with permanents benefits to the community well-being. The 'with project' scenario is compared with the 'without project' scenario of social and economic well-being in the absence of the project, is presented in a study prepared by in an independent firm Ferrere and a second report by another independent firm Exante (see section 2.1.13). Project activities have outputs, outputs to outcomes, and outcomes to impacts in the appendix 2.

2.1.9 Climate, Biodiversity and Community Benefits Assessment Period (G1.9)

The time period over which changes in GHG emissions, climate change adaptive capacity and resilience, biodiversity and community well-being resulting from the project activities are monitored is 22 February 2006 to 22 February 2066.

2.1.10 Differences in Assessment Periods (G1.9)

There is no difference between the GHG emissions accounting, climate adaptive capacity and resilience, community and biodiversity assessment periods.

2.1.11 Implementation schedule (G1.9)

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 FSC 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
February 2020	CCB Validation and second verification process (2013-2020) started

2.1.12 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 fire fighting.	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 2013¹⁴ and LUMIN work in technical committee.
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 there is a serious pest problem erupted in the project area, and the pesticides will

¹⁴ PAIF: <http://www.spf.com.uy/institucional-actividades-incendios-forestales>
<https://www.lumin.com/institucional?lang=en>

		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 wind storms. 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 wind storms	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 °C.	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. <i>Pine</i> or <i>E. dunnii</i> 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.

2.1.13 Benefit Permanence (G1.11)

Creation of employment is one of the main social benefits of the project. Typically, an extensive livestock production system employs 1.4-4.4 persons every 1,000 ha. Lumin/Eucapine project is expected to multiply that figure by more than 3-8 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, alleviation 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 will generate several job opportunities, creating nearly 450 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 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 alleviation 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)¹⁵, 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.cpa ferrere.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 6¹⁶.

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.

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 which have already secured (Posco Uruguay) or are also seeking carbon finance (GFP, Guanare 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 could be exported through Montevideo harbour at prices which will be higher than those that could be obtained by selling pulpwood, which is the traditional wood product exported from Uruguay.

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.

As of December 2020, Lumin/Eucapine has no plans to not invest in the industry sector in the Centre east region. Nevertheless, as mentioned above, Lumin/Eucapine forest plantation may contribute to promote the establishment of industrial investments in the area.

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

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

¹⁵ Carámbula, M. y Piñeiro, D. La Forestación En Uruguay: Cambio Demográfico y Empleo en Tres Localidades

¹⁶ http://www.spf.com.uy/data/paginas/Informe_Impacto_Cadena_Forestal_CPA_Ferrere_22-11-17.pdf, or click here

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.

In 2012, a survey was carried out with the help of experts to identify those properties that presented ecosystems of relevance and presence of species for inclusion in the annual monitoring plan. As a result of that LUMIN defined, “Macachin” and “Paso Real” farms in Cerro Largo, and “Gallo-Doroteo” in Treinta y Tres as potential High Conservation Value sites. Once LUMIN became FSC certified, these sites were included as “High Conservation Value” sites, and all of them has a management and monitoring plan in place.

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, and UTE with the name “Fauna and Flora of the Forests of Uruguay”.

Among the measures needed and taken to maintain and enhance the climate, community and biodiversity benefits beyond the project lifetime, are:

- Species planted have previously proven to be adapted to the agro-ecological conditions of the project zone.
- Once the forest is harvested, replanting will be performed between existing lines. These is a common practice in long rotation forests aim to produce high quality wood.
- In order to keep production at same levels after project lifetime, it will be necessary to fertilize new seedlings after a new plantation is done.
- No ongoing enforcement or disputes have been raised in the past and until now, relating to the protection of the planting area, as there are no native communities living in the project area. In addition, the farms are demarcated by fences, and are correctly marked as private land. This limits external risks that could hinder the continuation of the forest when the project is over.
- The financial profitability produced by the project is very likely to get the project owner to extend the project, to continue management practices that protect the credited carbon stocks beyond the length of the project crediting period (100 years).
- In the project area, soil productivity is relatively low, and production of grass is reduced compared to other soils in Uruguay. These soils are categorized, by Law, as “Forest Priority Soils”. Therefore, the best production activity to implement over these soils is forestry. The only other production activity that can be done over these soils is extensive livestock production. As shown in other sections of this report, forestry is by far the best option.
- Protected areas inside the project area will surely be more developed and better preserved than prior to the Project implementation, so it is expected that after project lifetime, these areas will be of much higher interest to communities and stakeholders

The community benefits will be maintained beyond the lifetime of the project mainly because long rotation forest plantations, which is the main productive activity of the project, will be maintain for the lifetime of the project. Lumin/Eucapine strategy, is to perform most of the silvicultural activities (soil preparation, nursery activities, planting, thinning, pruning and harvesting) with contractors. Most of these contractors are small and medium size companies conformed/made-up with workers from local communities. Also, all the social activities and biodiversity studies perform by property manager will be maintain during project lifetime. This is a request, not only of the CCB standard, but also FSC.

2.1.14 Financial Sustainability (G1.12)

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.

The cash flow estimated for the afforestation activity in the project site without the financial benefits from the carbon credits will be available for the validation team as part of the PD documentation. The cash flow included all relevant costs and revenues along the crediting period.

Eight IRRs were estimated, corresponding to each of the regions consistent with forest regions delineated before (Centurion, Octava CL, Ruta 7 and Ruta 8) and the specie planted. The estimated IRRs for afforestation without carbon finance in the project area are shown in table 8.

The estimated IRRs for afforestation in the project area without profits from carbon credits are therefore lower than the estimated benchmark IRR (8.1% and 9.2%).

It is again concluded that the continuation of the pre-project land use is the baseline scenario. A sensitivity analysis was made to make the conclusion that the project activity does not meet the benchmark more robust.

2.1.15 Eligibility Criteria for Grouped Projects (G1.14)

This is not a Grouped Project

2.1.16 Scalability Limits for the Grouped Projects (G1.15)

This is not a Grouped Project

2.1.17 Risk Mitigation Approach for Grouped Projects (G1.15)

This is not a Grouped Project

2.2 Without-project Land Use Scenario and Additionality

2.2.1 Land-Use Scenarios without the Project (G2.1)

The baseline scenario was defined by using the “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”, version 01. Since only one stratum was identified for the baseline scenario, the procedure is only applied once.

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. In addition, barriers analysis and common practice analysis showed that afforestation in the area of the proposed project activity is not likely to occur without carbon financing.

2.2.2 Most-Likely Scenario Justification (G2.1)

The most-likely scenario is the same as baseline scenario, please refer to section 2.2.1 for detailed information.

2.2.3 Additionality (G2.2)

Additionality has been demonstrated through application of Steps 0 to 2 above and through Common Practice Analysis in Step 4 (in this section below). Despite the fact that sub-step 2c resulted in only one land use scenario and according to the “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities” it is the baseline scenario, the investment analysis was conducted in the afforestation activity to reinforce the conclusion that forest activity in the area was not meant to be developed without being registered in a carbon scheme and generating carbon certifies.

Investment analysis

Sub-step 3a. Determine appropriate analysis method

The Investment analysis will not determine which of the remaining land use scenario is the most economically or financially attractive because there is only one land use scenario remaining. However, it will demonstrate that the IRR for each location does not reach the benchmark IRR.

Option III, benchmark analysis is selected.

Sub-step 3b. Apply benchmark analysis

The benchmark is to represent standard returns in the market, considering the specific risk of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer.

The IRR is selected as the indicator for the benchmark analysis. The Capital Asset Pricing Model (CAPM) is used to estimate the expected internal rate of return on unleveraged project activity that compensates the investor on risk and time value of money (k_e)

Benchmark analysis is done considering the year when the first area to afforest, of each of the regions, was projected. Thus, four benchmarks were estimated (year 2006, 2007, 2008 and 2009).

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

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

Where:

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

r_f = risk free rate (%)

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

β = systematic risk of the project activity (dimensionless)

prs = premium for sovereign risk (%)

Determination of the risk free rate r_f

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

r_f equals 4.9%, 4.8%, 4.3% and 4.2% in 2006, 2007, 2008 and 2009 respectively in accordance with the US Department of the Treasury

(<http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2006>)

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

The arithmetic average annual premium for market risk with respect to US Treasury bonds is selected. It is a conservative value, from a well-documented source (Damodaran, 2011) who calculated the premium for market risk for the period from 1928 to 2011 (a period of 20 years before the project initiation was selected). The following procedure was followed to obtain the selected value for this parameter:

Go to <http://pages.stern.nyu.edu/~adamodar/>

- 1) Click Valuation Icon
- 2) Go to point 3. TOPIC
- 3) Click Datasets icon
- 4) Go to Data sets chart
- 5) Click historical Returns on stocks, Bonds and Bills – United States

Other possible sources for premium for market risk would yield a similar result. These include:

Ibboston Associates (www.ibboston.com)

Barra (www.barra.com)

Bloomberg (www.bloomberg.com)

The estimated values are 5.6% (2006) 4.8%(2007) 4.6% (2008) and 4.2% (2009)

Determination of the systematic risk of the project activity: β

It has to be considered that systematic risk of forestry activities depends greatly on the markets where the industries are located. As an example, average unleveraged β values for paper/wood/forestry sectors for

the year 2006 are estimated to be 0.82 (USA), 1.27 (emerging markets), 1.04 (Japan), 0.75 (Europe) and 1.09 (Australia/Canada) by the New York University L.N. Stern School of Business (Damodaran 2011).

Uruguay is an emerging market. The average value of β for these markets (considering Paper & Related Products and Forestry) for the period 2006-2007 was 1.27 (Damodaran 2011). However, for the purpose of this analysis more conservative values of 0.50, 0.57, 0.69 and 0.60 were selected (2006 to 2009 respectively). These are average betas of all emerging markets estimated by Damodaran (only for paper and forest products) without considering location. This value was derived by the following procedure:

- 1) Go to <http://pages.stern.nyu.edu/~adamodar/>
- 2) Click Valuation Icon
- 3) Go to point 3. TOPIC
- 4) Click Datasets icon
- 5) Chart Dataset

There are other possible sources for obtaining a suitable β value would yield similar results. These include:

Ibboston Associates (www.ibboston.com)

Barra (www.barra.com)

Bloomberg (www.bloomberg.com)

Determination of Premium for Sovereign Risk, prs

Sovereign risk reflects the amount of additional market risk for public bonds from one country as compared to the reference case (in this case, the US). The difference in yield between bonds issued by the US Treasury and those from another country constitutes the Premium for Sovereign Risk. Average premium for sovereign risk for Uruguay for year 2006 was calculated at 3.81, in 2007 was 3.67, in 2008 as 3.65 and 2009 as 3.68 percentage points. Reputable and public sources of information were used¹⁷.

Calculation of benchmark Internal Rate of Return for the afforestation activity

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

$$2006 \text{ Values: } k_e = 4.9 + [(5.6) \cdot 0.50] + 3.81 = 11.53\%$$

$$2007 \text{ Values: } k_e = 4.8 + [(4.8) \cdot 0.57] + 3.67 = 11.26\%$$

$$2008 \text{ Values: } k_e = 4.3 + [(4.7) \cdot 0.69] + 3.65 = 11.12\%$$

$$2009 \text{ Values: } k_e = 4.2 + [(4.1) \cdot 0.60] + 3.68 = 10.33\%$$

Since the estimated benchmark is in nominal terms, it was discounted by the US CPI in order to make it comparable with the Internal Rate of Return. CPI data was taken from the US Department of Labor (<ftp://ftp.bls.gov/pub/special.requests/cpi/cpiiai.txt>). Average of the last 10 years prior to project start was selected for the calculation, which resulted in 2.3%, 2.4%, 2.6% and 2.2% for the years 2006, 2007, 2008 and 2009 respectively.

¹⁷ www.rafap.com.uy

In conclusion, the benchmark IRR in real terms for an afforestation activity without carbon finance in the project area is estimated to be 9.23% (2006), 8.86% (2007), 8.52% (2008) and 8.13% (2009).

Sub-step 3c. Calculation and comparison of IRR

The cash flow estimated for an afforestation activity in the project site without the financial benefits from the carbon credits will be available for the validation team as part of the PD documentation. The cash flow included all relevant costs and revenues along the crediting period.

Eight IRRs were estimated, corresponding to each of the regions consistent with forest regions delineated before (Centurion, Octava CL, Ruta 7 and Ruta 8) and the specie planted. The estimated IRRs for afforestation without carbon finance in the project area are shown in table 8.

Table 8. Benchmarks and IRR comparison for each specie and region.

<i>Specie</i>	<i>Region</i>	<i>Year</i>	<i>Benchmark %</i>	<i>IRR (%)</i>
<i>Eucalyptus</i>	<i>Centurion</i>	<i>2007</i>	<i>8,8</i>	<i>6,5</i>
<i>Eucalyptus</i>	<i>Octava CL</i>	<i>2008</i>	<i>8,5</i>	<i>5,4</i>
<i>Eucalyptus</i>	<i>Ruta 7</i>	<i>2006</i>	<i>9,2</i>	<i>7,3</i>
<i>Eucalyptus</i>	<i>Ruta 8</i>	<i>2007</i>	<i>8,8</i>	<i>6,4</i>
<i>Pine</i>	<i>Centurion</i>	<i>2007</i>	<i>8,8</i>	<i>3,3</i>
<i>Pine</i>	<i>Octava CL</i>	<i>2009</i>	<i>8,1</i>	<i>2,0</i>
<i>Pine</i>	<i>Ruta 7</i>	<i>2006</i>	<i>9,2</i>	<i>3,7</i>
<i>Pine</i>	<i>Ruta 8</i>	<i>2006</i>	<i>9,2</i>	<i>2,9</i>

The estimated IRRs for afforestation in the project area without profits from carbon credits are therefore lower than the estimated benchmark IRR, for all regions and starting dates.

It is again concluded that the continuation of the pre-project land use is the baseline scenario. A sensitivity analysis was made to make the conclusion that the project activity does not meet the benchmark more robust.

Sub-step 3d. Sensitivity analysis

The sensitivity analysis was performed by using the Montecarlo simulation method (Fischman 1996). Probability density functions for several parameters used for estimation of the cash flow were defined, and 1,000 estimates of the IRR were made for random combinations of those parameters. The analysis showed that the probability of the IRR of being lower than the benchmark for the three locations where the project activity is being held is 100%. Thus, the conclusion above is again highly robust.

Following is the summary (table and graph showing the distribution of the simulated IRR values for the 1,000 runs) of the results obtained by the Montecarlo simulation for each location (assumptions made for the simulation can be found at annex):

Summary:
Entire range is from 1,7% to 3,2%

Base case is 2,0%	
Statistics:	Forecast values
Trials	1,000
Base Case	2.0%
Mean	2.5%
Median	2.5%
Mode	---
Standard Deviation	0.3%
Variance	0.0%
Skewness	0.1479
Kurtosis	2.77
Coeff. of Variability	0.1055
Minimum	1.7%
Maximum	3.2%
Range Width	1.5%

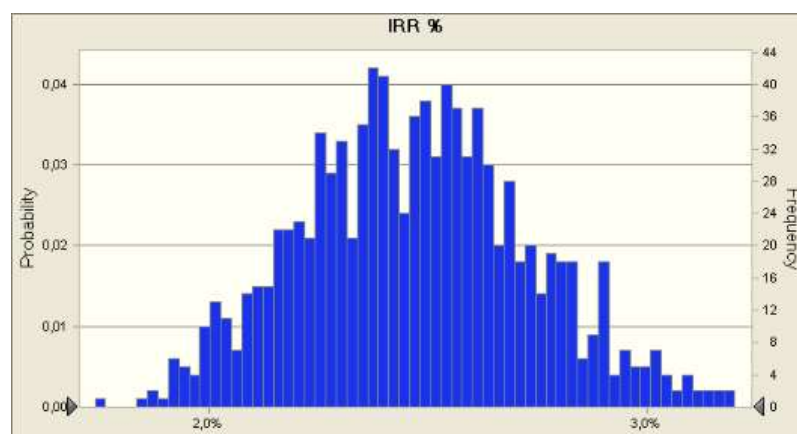


Figure 11. Outcomes of the sensitivity analysis for Pine in Octava CL region

Summary:	
Entire range is from 1,5% to 4,2%	
Base case is 2,9%	
Statistics:	Forecast values
Trials	1,000
Base Case	2.9%
Mean	2.9%
Median	3.0%
Mode	---
Standard Deviation	0.5%
Variance	0.0%
Skewness	-0.1148
Kurtosis	2.86
Coeff. of Variability	0.1579
Minimum	1.5%
Maximum	4.2%
Range Width	2.7%

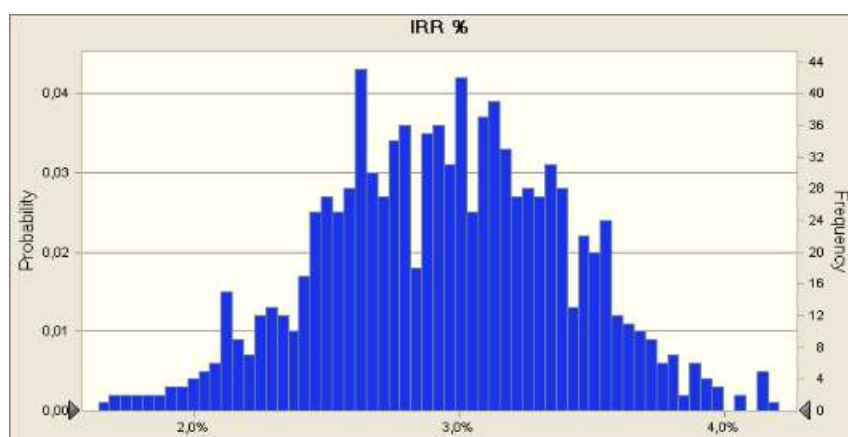


Figure 12. Outcomes of the sensitivity analysis for Pine in Ruta 8 region

Summary:

Entire range is from 2,3% to 5,0%

Base case is 3,7%

Statistics: Forecast values

Trials 1,000

Base Case 3.7%

Mean 3.8%

Median 3.8%

Mode ---

Standard Deviation 0.4%

Variance 0.0%

Skewness -0.0561

Kurtosis 2.76

Coeff. of Variability 0.1100

Minimum 2.3%

Maximum 5.0%

Range Width 2.7%

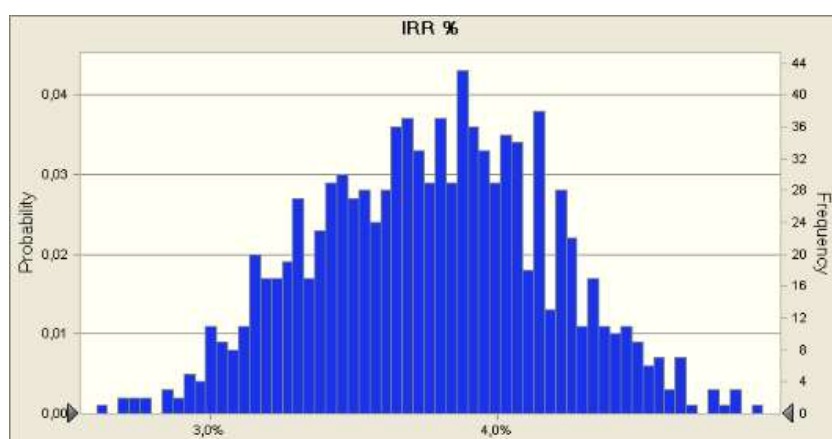


Figure 13. Outcomes of the sensitivity analysis for Pine in Ruta 7 region

Summary:

Entire range is from 1,9% to 4,4%

Base case is 3,3%

Statistics: Forecast values

Trials 1,000

Base Case 3.3%

Mean 3.3%

Median 3.3%

Mode ---

Standard Deviation 0.4%

Variance 0.0%

Skewness -0.1434

Kurtosis 2.91

Coeff. of Variability 0.1293

Minimum 1.9%

Maximum 4.4%

Range Width 2.5%

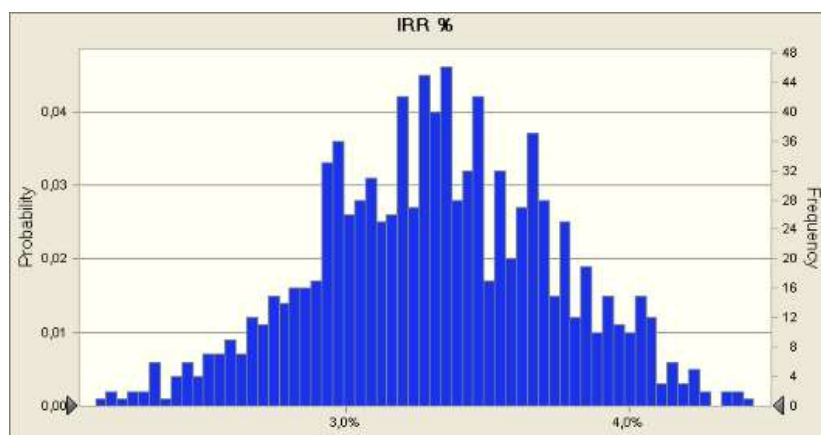


Figure 14. Outcomes of the sensitivity analysis for Pine in Centurion region

Summary:

Entire range is from 4,1% to 8,1%

Base case is 6,4%

Statistics: Forecast values

Trials 1.000

Base Case 6,4%

Mean 6,4%

Median 6,4%

Mode ---

Standard Deviation 0,6%

Variance 0,0%

Skewness -0,2267

Kurtosis 3,19

Coeff. of Variability 0,0936

Minimum 4,1%

Maximum 8,1%

Range Width 4,0%

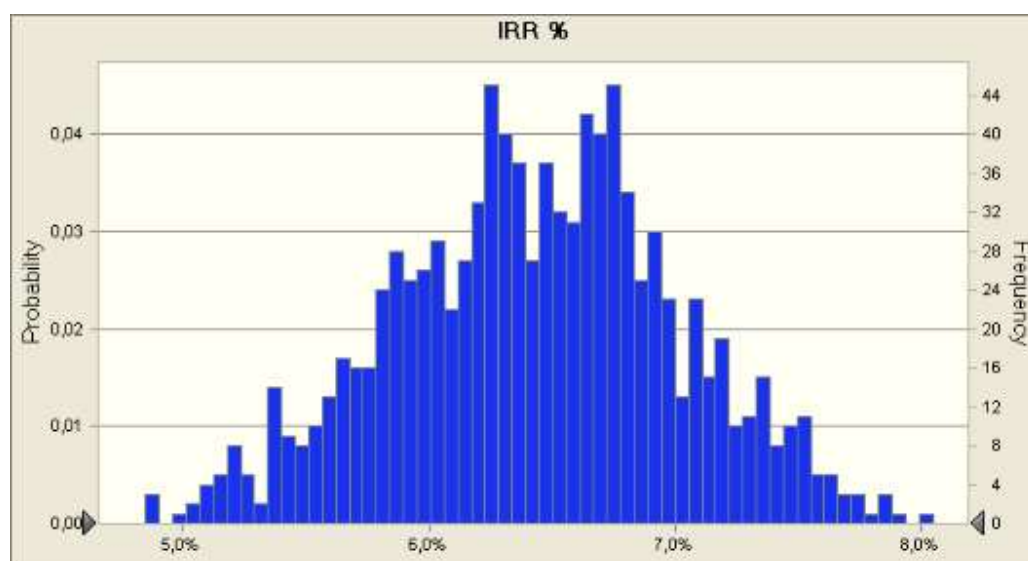


Figure 15. Outcomes of the sensitivity analysis for Eucalyptus in Ruta 8 region

Summary:

Entire range is from 3,6% to 7,4%

Base case is 5,4%

Statistics: Forecast values

Trials 1.000

Base Case 5,4%

Mean 5,4%

Median 5,4%

Mode ---

Standard Deviation 0,6%

Variance 0,0%

Skewness -0,0835

Kurtosis 2,88

Coeff. of Variability 0,1142

Minimum 3,6%

Maximum 7,4%

Range Width 3,8%

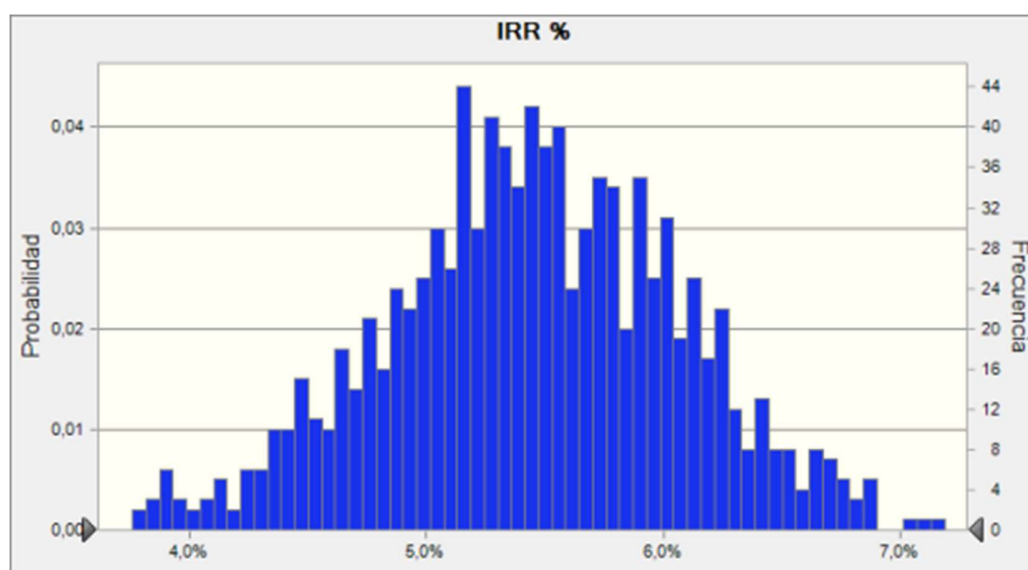


Figure 16. Outcomes of the sensitivity analysis for Eucalyptus in OctavaCL region

Summary:

Entire range is from 4,6% to 8,1%

Base case is 6,5%

Statistics: Forecast values

Trials 1.000

Base Case 6,5%

Mean 6,5%

Median 6,5%

Mode ---

Standard Deviation 0,6%

Variance 0,0%

Skewness -0,0195

Kurtosis 2,57

Coeff. of Variability 0,0952

Minimum 4,6%

Maximum 8,1%

Range Width 3,4%

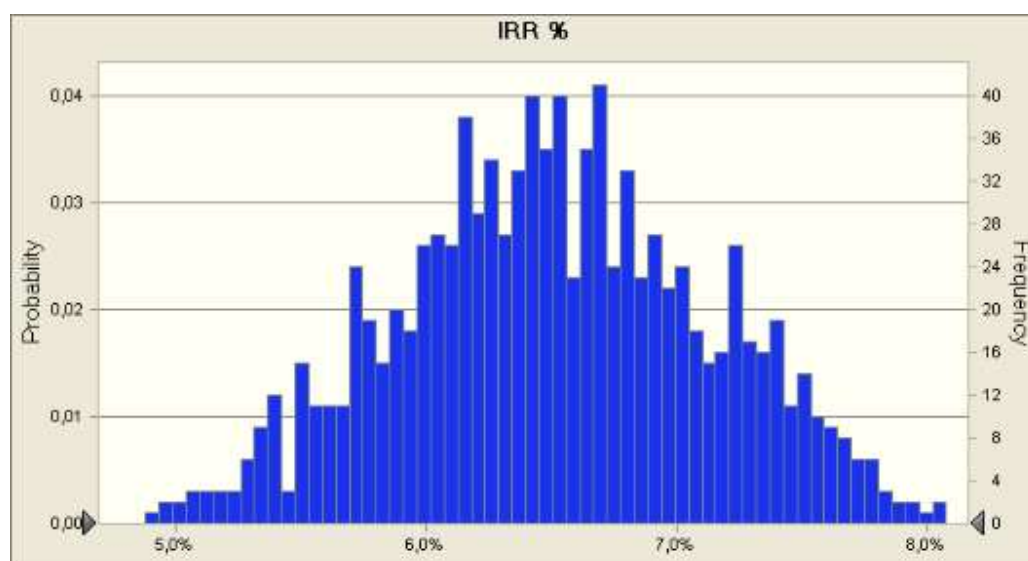


Figure 17. Outcomes of the sensitivity analysis for Eucalyptus in Centurion region

Summary:

Entire range is from 5,4% to 8,9%

Base case is 7,3%

Statistics: Forecast values

Trials 1.000

Base Case 7,3%

Mean 7,3%

Median 7,3%

Mode ---

Standard Deviation 0,6%

Variance 0,0%

Skewness -0,0819

Kurtosis 2,88

Coeff. of Variability 0,0802

Minimum 5,4%

Maximum 8,9%

Range Width 3,6%

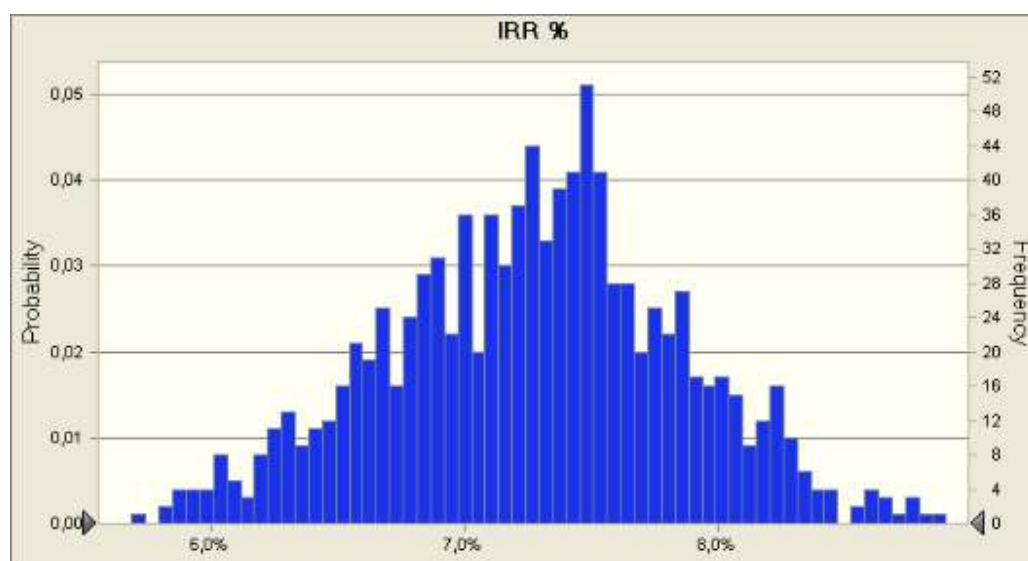


Figure 18. Outcomes of the sensitivity analysis for Eucalyptus Ruta 7 region

Step 4. Common practice analyses

In spite of a large extension of forest priority soils in the Departments of Treinta y Tres and Cerro Largo, the forest promotion policy implemented in 1987 resulted in only a limited extent of afforestation. Approximately only 10% of “forest priority soils” area established in the regulatory framework has been afforested (according to the *Ministry of Livestock, Agriculture and Fisheries*, the total area of “forest priority soils” in the department of Cerro Largo and Treinta y Tres is 1,014,066 ha¹⁸). This represented a very different scenario from that in the other forest regions of the country. As it was explained above, the reasons for this lack of response are to be found in the long distances to wood delivery points (industries or ports) and in the poorer quality of the soils as compared to the North and West regions.

The relatively small area that was forested in the NE region (Cerro Largo and Treinta y Tres) during the period 1987-2005 was in response to the existence of a plantation subsidy, the availability of soft credits from Banco de la República and the exemption of all income and land taxes. As the subsidies were gradually decreased since 2002 until their complete suppression in 2005, the rate of plantation also declined (Figure 19). The soft credits and several of the tax exemptions were also eliminated between 2003 and 2005.

The subsidies, depending on the year, had a value of up to US\$ 200 per hectare affected to the plantations (including plantations and servicing areas, which normally amount to 50 to 60 per cent of the effectively planted areas). The value of the subsidy was equivalent to more than 50 per cent of the price of the land.

The soft credits for forest planting provided by Banco de la República had low interest rates (LIBOR plus 1.5 to 2.0 per cent per year) and a grace period of 10 years for both principal and interests. They were conceived for short rotation cycles (i.e., 10 years), clearly not appropriate for the NE region of Uruguay due to the relatively low value of pulpwood (the only product that can be obtained in such a short period). And when the time of repayment came for plantations made in the early 1990's, forest owners were forced to renegotiate their debts with the bank because they just could not sell their wood. Many were even forced

¹⁸ <http://www.cebra.com.uy/renare/mapa/cartas-tematicas/>

to sell their properties later. It must be also noted that, after the sharp decline in the LIBOR occurred in 2001, the Banco de la República unilaterally decided to change the rules and applied a value higher than LIBOR for calculating the interest rates. This aggravated the situation of debtors. This line of soft credits was gradually modified after 2002 and was later phased out.

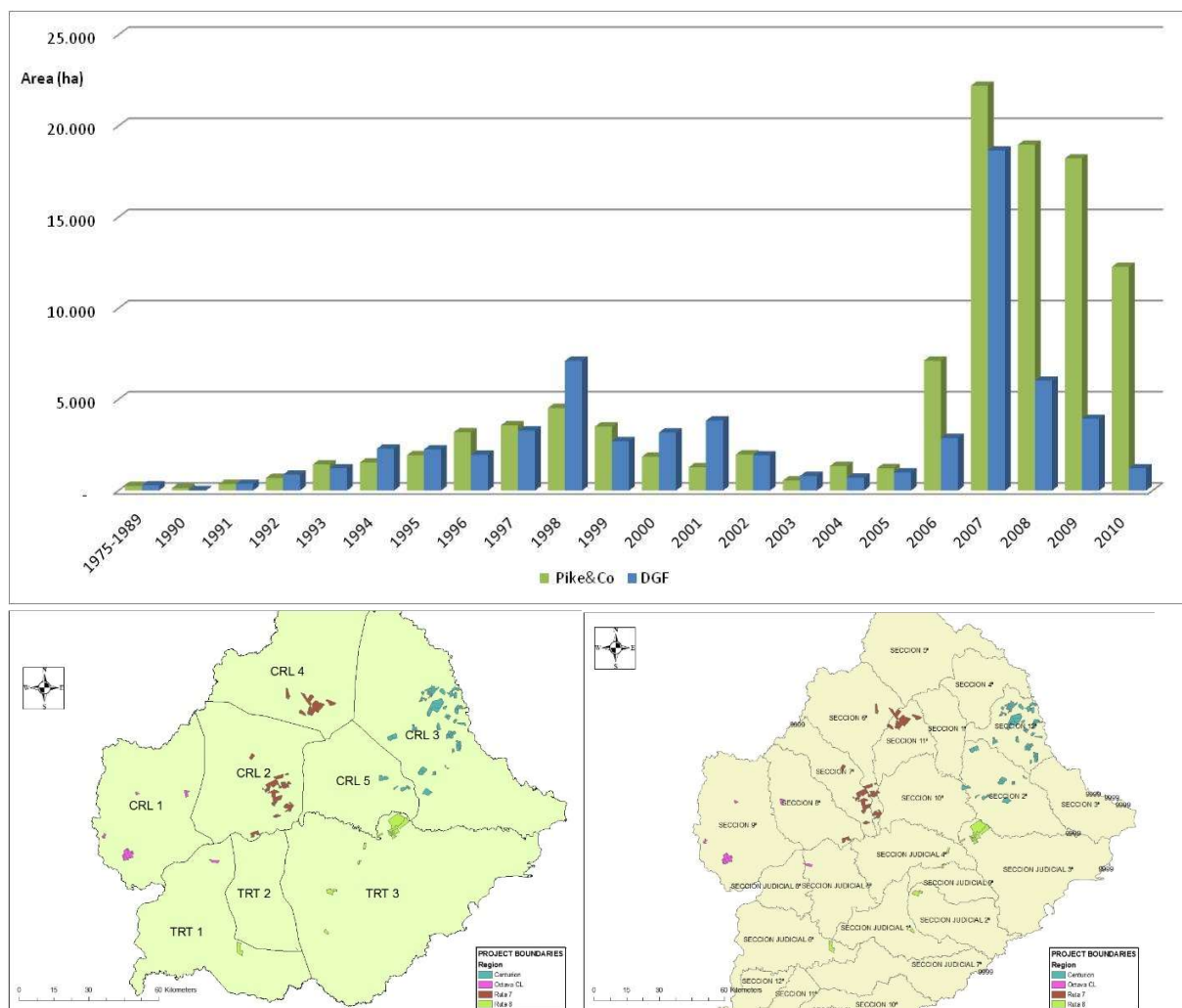


Figure 19. Above: historical annual forest plantation rates in the region of the project according to two sources of information (private data from Pike & Co. and official statistic from Forest General Directorate); Lower left: map with a detail of project area and the geographic units ("foricenters") included in Pike & Co's statistics reported in the graph above; Lower right: map with a detail of project area and the geographic units ("Judicial sections") included in DGF's statistics reported in the graph above

The situation after 2005 corresponded to a completely different scenario. The rate of plantation in the region increased sharply, in spite of a lack of policy incentives. This increase is highly associated to the consideration of carbon finance by investors. As shown in Table 9, 91 per cent of the forests planted during the period 2006-2011 corresponding to a total of more than 77,000 ha, are either procuring or have already achieved registration under carbon programs (CDM, CCX and VCS).

Table 9. Forest area planted between 2006 and 2011, by owner, in Weyerhaeuser Uruguay project region.

	Genus		Effective	Seeking Carbon
Company	Eucalyptus	Pinus	Area (ha)	Finance
Weyerhaeuser Uruguay SA	19.741	2.887	22.628	Yes (VCS)
Guanare	22.605		22.605	Yes (VCS)
GFP		21.497	21.497	Yes (VCS)
RMK	4.415		4.415	Yes (VCS)
Pradera Roja	3.826		3.826	Yes (VCS)
CJPPU	3.274		3.274	Not known
POSCO	2.076		2.076	Yes (CDM)
Others	1.937		1.937	Not known
ITAA	1.186		1.186	Yes (VCS)
BULGUERONI	906		906	Not known
Antonio Arocena	850		850	Yes (VCS)
Forestal Oriental	603		603	Not known
Tierras Forestales	501		501	Not known
FERNÁNDEZ	300		300	Not known
Yandian	107		107	Not known
Agrosocio Brasileiro	72		72	Not known
SAPS KRAZEMBLUM	53		53	Not known
Total Area (ha)	62.451	24.384	86.835	

Yes (VCS or CDM)	79.082	91%
Not Known	7.753	9%

The common practice analysis was done following the requirements set in the Step 4 of the “Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities”. It was analysed in it, to which extent similar forestation activities to the one proposed have been implemented previously or are currently underway. Similar forestation activities are defined as that which are of similar scale, take place in a comparable environment, inter alia, with respect to the regulatory framework and are undertaken in the relevant geographical area.

Throughout the analysis is concluded that there are similar forest activities (in terms of scale, species, etc) in the area (table 9). However, 91% of those companies established in the area are seeking carbon finance. There was not identification of similar forest activities without requiring carbon finance (paragraph 33 of the tool). Therefore, there is no need to compare the proposed project activities to others (paragraph 34 of the tool). In conclusion, similar activities cannot be observed, then the project activity is not the baseline scenario, and hence it is additional.

Regarding community and biodiversity additionality, it is well known and documented that livestock production in Uruguay has very low positive community and biodiversity impacts, so all the positive impacts described in this document would not have been implemented under the without project scenario.

Community Additionality: Land use in the project area on influence is predominantly natural grasslands for extensive livestock production. The region around the project site has a dominance of an extensive livestock system of production, which is characterized with a very low productivity level, very low employment, and

precarious working conditions and reduced opportunities for women and youth, among other problems. 'Lumin/Eucapine' forest activity is expected to increase the gross value of production per unit area of land by six to eight folds, besides promoting a number of new activities which will multiply this impact. Typically, an extensive livestock production system employs 1.4-4.4 persons every 1,000 ha. Lumin/Eucapine project is expected to multiply that figure by more than 3-8. The main contribution of Lumin/Eucapine project activity to the eradication 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)¹⁹, 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.cpa ferrere.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 6²⁰.

The most remarkable Community Impacts are:

- Promotion of small family businesses and creation of several job opportunities
- Production of internationally tradable products
- Eradication of rural poverty
- Incorporation of technology
- Increased nationally added value to forestry products

To compare these community impacts with the baseline scenario, we present in this section a new report performed by EXANTE, a private economic and financial advice firm (www.exante.com.uy). The study shows that the number of workers every 1.000 hectares is 17 in the forestry sector and just 7 in the livestock sector. Lumin/Eucapine Project will produce high quality logs to be industrialized in plywood mills and sawmills, will above the average of the forestry sector. The forest priority soils that are planted in Lumin/Eucapine, can only be used for livestock production, and this was shown to the VVB team during the site visit.



Note: a presentation of this study can be seen in the following link: <http://www.spf.com.uy/2020/12/15/la-contribucion-del-complejo-forestal-a-la-economia-uruguaya/>

¹⁹ Carámbula, M. y Piñeiro, D. La Forestación en Uruguay: Cambio Demográfico y Empleo en Tres Localidades

²⁰ http://www.spf.com.uy/data/paginas/Informe_Impacto_Cadena_Forestal_CPA_Ferrere_22-11-17.pdf

Biodiversity additionality: The forestry sector in Uruguay is, by far, the most legislated sector among the different Uruguayan Agri sectors. General Forestry Bureau and National Directorate of the Environment are the agencies that gives the approval for the forest establishment. The approval is given by complying with multiple requirements, the most important one is the accomplishment of national decree N° 349/005 “Environmental Impact Assessment”. The environmental approval also needs to be maintained through the project lifetime and DINAMA is always present in Lumin/Eucapine’s daily work. 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. Regarding these EIA’s, Lumin/Eucapine presented different actions and plans in order to promote positive impacts on biodiversity in the project area. All these regulations are NOT requested in any other agricultural sector in Uruguay. In addition, the project is FSC certified. It is important to note that livestock production in Uruguay does not have any type of sustainable management certification.

2.2.4 Benefits to be used as Offsets (G2.2)

Community benefits: To maximize the socio-economic benefits, the afforestation design include forests managed with pruning (to a minimum height of 6 m) and two to three thinning operations, to obtain knot-free, high-diameter logs suitable for saw-milling and veneering. This will result in a significant community benefits, mainly through increased employment and quality of employment and rural development (decentralization). In addition, there is also an increase (in relation to cattle production) in the number of job opportunities for women, in activities such as nurseries, planting, pruning and others. This would help to improve the stability of rural families. Forestry workers in Uruguay normally return home after each workday, which is a big improvement over the situation of the livestock sector, which strongly depends on workers residing on farms, away from their families.

Biodiversity benefits: The establishment of forest plantations designed to preserve high biodiversity value areas (such as native forests, wetlands and low areas under grassland) has proved to be effective in Uruguay. Since large-scale forest planting started in the 1990s, several surveys (mostly conducted by independent scientists on behalf of forest companies) have found a proliferation of birds, frogs, and mammals, some of which had been considered as extinct or endangered. These studies also allowed finding at least three new species (two birds and one frog) which had never been reported before in the country. The project activity would produce similar impacts. After the afforestation project is fully launched, it not only produces positive benefits to soil erosion control, but also has far-reaching significance to wildlife resources protection. Harvesting of natural forests is prohibited in all the area.

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

The VCS Project Description and 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 (<https://www.gub.uy/ministerio-ambiente/inicio>) .

Also, because Lumin/Eucapine is FSC Certified, annual audits are performed with meetings with local communities and other stakeholders, where all the project's impacts are shown and explained to communities and stakeholders, including the Carbon sequestration project. As an example of this, annual visits were done (and they will continue next years) to contact local stakeholders to update them regarding the status of Lumin/Eucapine project, deliver new information to them and disseminate project activities.

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 and consultants analyzed different stakeholders (localities, towns, cities) and create the list of stakeholders with contact information. A list of stakeholders was developed, and it is actualized once a year, prioritizing and looking to those locations where silvicultural activities will take place during the year. (see **Table 10**):

Table 10. List of stakeholders identified and prioritized by affected status.

Localities in LUMIN-EUCAPINE's area of influence		
Localities - cities - town	Province	Contact person
Melo	Cerro Largo	Richard Portillo - Leonardo Cabillón
Centurión	Cerro Largo	
Cañas	Cerro Largo	
Tupambaé	Cerro Largo	
Arévalo	Cerro Largo	
Cerro de las Cuentas	Cerro Largo	
Fraile Muerto	Cerro Largo	
Rincón	Treinta y Tres	
Vergara	Treinta y Tres	
Santa Clara de Olimar	Treinta y Tres	

Part of the actions taken includes the visit, once a year or as demanded, of Lumin/Eucapine employees to neighbours living close to the project area. During these visits, Lumin/Eucapine employees complete the form shown in **Figure 20**



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 20. Form to be completed during visits to neighbours

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 21**. The information is collected, processed and recorded in Lumin/Eucapine.

[illegible]

Figure 21: 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 neighbours' 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 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 labour 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 Stakeholders on Validation and 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.

Information to stakeholders is available at any time, and the communications process can be made, personally while in contact with our site supervisor and manager or using our web page. If necessary LUMIN can make public consultations, por example when community validation regarding HCV sites. Topics of these consultations include any concerns, complaints or suggestions stakeholders may have.

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.

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 11** will be contacted in Cerro Largo and Treinta y Tres department.

Table 11. 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	CMAF (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 12** will be contacted in Treinta y Tres department

Table 12. 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	CMAF (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 Consultations (G3.4)

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

It has to 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, neighbours' fences, power lines, etc. established by national regulation (public sector stakeholder).

This stakeholder is normally the previous land owner 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.

Rural communities can also influence in the project design. For example, recently, LUMIN has a meeting with the community of Cañas, in which more than 30 people participated, including residents of the town as well as departmental authorities. At this meeting, some concerns were raised related to the use of the local road, the security conditions of the bridge and the sewer. In this sense, both LUMIN and representatives of the Municipality of Cerro Largo, announced the work and cooperation plan that exists between both institutions for the management of rural roads in that area, in particular at harvest time, at the same time that the Municipality undertook to evaluate the state of the bridge and sewerage as soon as possible. Subsequently, taking into account local orders, LUMIN collaborated with posters to circulate with caution in the area.

Apart from this, although LUMIN has properties near the Quebrada de los Cuervos Protected Area, which would be legally approved to forest, in agreement with the local community it was decided not to exploit those properties.

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.

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 section 2.3.3, stakeholders can raise their comments or suggestions and the "complaints and claims in the "Neighbours visit form" (**Figure 20**) if some complaints were informed these will be addresses in "External Communication matrix" form (**Figure 21**). 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 adaptive 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 analysing 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 neighbours 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 neighbour 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 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 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 Feedback and Grievance Redress Procedure (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/neighbours.

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 proceed 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, analysed 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 section 2.3.16).

2.3.13 Accessibility of the Feedback and Grievance Redress Procedure (G3.8)

The manager of the company, or whoever he designates, will be responsible for the resolution of all the communications that have to be answered.

2.3.14 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 neighbour 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 is available for the validator in case of need.

2.3.15 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 labour 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.

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

Forestry in the country has its own regulation for labour 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 committees²¹ (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.

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

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:

²¹ These committees are called "Consejos de Salarios" in Spanish.

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.

2.3.17 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/ 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 Project Governance Structures (G4.1)

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 Required Technical Skills (G4.2)

For the development of the Project, are required skills and experience related to:

- Experience in management of natural resources conservation projects
- Ability to interact with different actors and stakeholders,
- Development of Projects with rural populations,
- Experience in the development of carbon projects and environmental services
- Experience in the evaluation and monitoring of biodiversity

The project owner and the experts group provide technical advice and technical training, and carry out Project implementation of quality control and quality assurance at the same time.

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 160 employees (direct employees and contractors) are working in Lumin/Eucapine project. All these employees are included in the company's "Annual Capacitation Plan".

2.4.3 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.

With more than 20 years of experience in Uruguay. In addition to the area presented in this project (Cerro largo and Treinta y Tres departments), LUMIN manages a total 60,000 hectares, with 35,000 hectares of planted forests in Rivera and Tacuarembó, also managed intensively with pruning and thinning. Our forests are a mix of pine and eucalyptus, with a central focus on sustainability for both environmental management systems and practices related to harvesting the trees. In addition to this, Lumin-Eucapine work with a clonal seedling nursery with the aim of developing a forest that produces raw materials aimed at manufacturing solid wood products with excellent structural and engineering properties at a competitive cost. Through sustainable forest management practices, we provide products that meet a wide variety of human needs, while at the same time preserving a healthy environment.

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 neighbourliness, 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.

Also, Lumin/Eucapine hired Carbosur, to asses and develop the VCS & CCB project. CARBOSUR (www.carbosur.com), a Uruguayan company that was established in 2000 to provide specialized services on climate change mitigation. Key services offered by Carbosur include consulting to governments, non-governmental organizations, and private companies in several areas related to the environment and climate change. Carbosur is involved with the design and development of climate change mitigation projects, and undertakes related services such as performing project baseline studies, designing and implementing monitoring plans and identification of project developers and sources of funding for projects. The members of CARBOSUR are dedicated professionals who are strongly committed to contributing to sustainable development and supporting of their clients' needs by combining their expert technical knowledge skills with practical experience.

Carbosur has extensive experience in the mechanisms of the Kyoto Protocol of the United Nations Framework Convention for Climate Change (UNFCCC), as well as in non-regulated schemes, such as the Verified Carbon Standard. It has participated in the carbon markets of both schemes, trading carbon certificates in Uruguay and abroad.

The company is involved in numerous activities related to the identification, design and implementation of projects to reduce greenhouse gas emissions within the agricultural-livestock-forestry and energy sectors, as well as the implementation of Low-Energy Development strategies. As an example of this, CARBOSUR developed 8 ARR projects in Uruguay (IDs 965, 962, 961, 920, 959, 960, 2576 and one presented to de CDM), verifying more than 20 million vcu's. One of these projects (ID 959) was also validated with the CCB Standard (Climate, Community & Biodiversity).

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

N/A

2.4.5 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, favouritism, 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 than 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.

2.4.6 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 behaviours are totally forbidden.

2.4.7 Commercially Sensitive Information (Rules 3.5.13 – 3.5.14)

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

2.5 Legal Status and Property Rights

2.5.1 Statutory and Customary Property Rights (G5.1)

All the land is privately owned by Lumin/Eucapine

2.5.2 Recognition of Property Rights (G5.1)

Since these lands are all legal forestry land, the ownership is clear, and there is no dispute over land ownership in the project site

2.5.3 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.

2.5.4 Property Rights 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.

2.5.5 Illegal Activity Identification (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.

2.5.6 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.

2.5.7 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 decisions²², while the second granted the environmental authorization.

2.5.8 Approvals (G5.7)

The total planted area had 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).

2.5.9 Right to Claim Benefits (G5.8)

Please refer to existing documentation regarding Lumin/ Eucapine's land ownerships provided during validation under VCS

2.5.10 Other Programs (G5.9)

The project was also validated and verified under the VCS, project ID Number 960.

2.5.11 Double Counting (G5.9)

This project will not seek to generate or has received any other form of environmental or social credit.

²² <http://www.mgap.gub.uy/portal/hgxpp001.aspx?7,20,417,O,S,0,,>

3 CLIMATE

3.1 Without-Project Climate Scenario

3.1.1 Without-Project Estimated Greenhouse Gas Emissions (CL1.1)

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 Net Positive Climate Impacts

3.2.1 With-Project Estimated Greenhouse Gas Emissions (CL2.1)

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

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

Where:

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

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

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

Where:

ΔC_{ACTUAL}	Actual net greenhouse gas removals by sinks; t CO ₂ -e
ΔC_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:

$$GHG_E = \sum_{i=1}^n GHG_{E,i}$$

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 CO ₂ -e
T	1,2,3,.....,t* years elapsed since the start of the A/R CDM project activity

The tool for “Estimation of non-CO₂ 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.

$$\Delta C_P = \Delta C_{TREE} + \Delta C_{DW} + \Delta C_{LI} + \Delta C_{SOC}$$

ΔC_P	Change in carbon stock in all selected carbon pools in the project scenario, t CO ₂ -e
ΔC_{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 activity”; t CO ₂ -e
ΔC_{DW}	Change in carbon stocks 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 activity”; t CO ₂ -e
ΔC_{LI}	Change in carbon stocks 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 activity”; t CO ₂ -e
ΔC_{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 CO ₂ -e

Biomass carbon pools

Above and below ground biomass have been estimated according to the tool “Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activity”. A summary of the main factors used and each source of data are presented in the table 10 below. Estimations are archived as part of the project documentation and will be available for the validation team. The following equations were used in order to estimate above and below ground biomass, and biomass carbon stock:

$$B_{TREE} = V_{TREE} * D_J * BEF_{2,J} * (1 + R_J)$$

B_{TREE}	Biomass of trees within the project boundaries at a given point in time
V_{TREE}	Stem volume of tree species estimated by using the tree dimension(s) as entry data into a volume table; m ³
D_j	Basic wood density of tree species j; t d.m. /m ³
$BEF_{2,j}$	Biomass expansion factor for conversion of stem biomass to above-ground tree biomass, for tree species j; dimensionless
R_j	Root-shoot ratio for tree species j; dimensionless

$$C_{TREE} = 44 / 12 * B_{TREE} * CF_{TREE}$$

C_{TREE}	Carbon stock in tree biomass in tree biomass within the project boundary at a given point of time; t CO ₂ -e
B_{TREE}	Biomass of trees within the project boundaries at a given point in time
CF_{TREE}	Carbon fraction of tree biomass; t C t d.m. ⁻¹

Table 13. Assumed parameters used for estimation of tree biomass carbon stocks

Parameter	Symbol	E. grandis, E dunnii and P. taeda	Source
Mean Annual Increment (m ³ .ha ⁻¹ .yr ⁻¹)	MAI _j	From 18 to 30	Growth model: SAG grandis and SISPINUS)
Wood basic density (Mg.m ⁻³)	D _j	0.44, 0,482 and 0.46 respectively	Country-specific values
Biomass expansion factor (dimensionless)	BEF _{1j}	From 1.15 to 3.4	IPCC Good Practice Guidance for LULUCF (2003), Table 3A.1.10
Carbon fraction (dimensionless)	CF	0.5	Tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs"
Root-to-shoot ratio (dimensionless)	R _j	From 0.2 to 0.4	Tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs"

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 in the area managed with Pine plantations:

- 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 Tables 1 and 2 of the tool;
- Since the land use prior to project start was grassland, only Table 2 applies. For the temperate warm moist climate region corresponding to the project activity, none of the three combinations included in Table 2 are applicable;
- 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 14. Parameters used for estimation of 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 ($SOC_{INITIAL,i}$) is estimated by multiplying the factors in **Table 14** 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 Weyerhaeuser Uruguay project.

The following methodological formula is used for calculating the annual change in SOC stock:

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

Where:

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

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

Litter and Dead Wood

Estimations were done in accordance with the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”. Values of the conservative default-factors expressing carbon stock in litter and dead wood as a percentage of carbon stock in tree biomass was selected according to the guidance provided in the methodological tool (8% in the case of dead wood and 4% for litter).

$$C_{DW} = C_{TREE} * DF_{DW}$$

C_{DW}	Carbon stock in dead wood at a given point in time; t CO ₂ -e
C_{TREE}	Carbon stock in trees biomass at a point in time, as calculated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activity”; t CO ₂ -e
DF_{DW}	Conservative default factor expressing carbon stock in dead wood as a percentage of carbon stock in tree biomass; percent

$$C_{LI} = C_{TREE} * DF_{LI}$$

C_{LI}	Carbon stock in litter at a given point in time; t CO ₂ -e
C_{TREE}	Carbon stock in trees biomass at a point in time, as calculated in the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activity”; t CO ₂ -e
DF_{LI}	Conservative default factor expressing carbon stock in litter as a percentage of carbon stock in tree biomass; percent

3.2.2 Net Impact (CL2.2)

Baseline net GHG removals and total GHG emissions due to leakage are zero, thus ex-ante estimation of C AR-CDM equals ΔC_{ACTUAL} .

According to VCS version 3.1 AFOLU requirements, the amount of carbon credits must not exceed the long term GHG benefit of the project. The period over which the long-term average GHG benefit is calculated is 116 years (to include the harvest in the last rotation cycle started before the end of the crediting period). The total GHG benefit, calculated as the sum of stock changes along the 116-year period, is 6,498,272 t CO₂ (Table 15).

Table 15. Estimated net GHG removals

Years	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)	Years	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
	0	0	0	0	2057	0	-538.262	0	-538.262
2007	0	35.937	0	35.937	2058	0	-599.388	0	-599.388
2008	0	205.332	0	205.332	2059	0	-1.009.088	0	-1.009.088
2009	0	424.559	0	424.559	2060	0	149.508	0	149.508
2010	0	571.781	0	571.781	2061	0	518.467	0	518.467
2011	0	735.027	0	735.027	2062	0	667.912	0	667.912
2012	0	829.850	0	829.850	2063	0	359.031	0	359.031
2013	0	778.132	0	778.132	2064	0	718.899	0	718.899
2014	0	725.625	0	725.625	2065	0	385.282	0	385.282
2015	0	721.576	0	721.576	2066	0	-91.178	0	-91.178
2016	0	730.665	0	730.665	2067	0	124.319	0	124.319
2017	0	592.707	0	592.707	2068	0	67.754	0	67.754
2018	0	44.217	0	44.217	2069	0	-633.682	0	-633.682
2019	0	187.253	0	187.253	2070	0	457.749	0	457.749
2020	0	193.003	0	193.003	2071	0	150.577	0	150.577
2021	0	144.969	0	144.969	2072	0	-949.626	0	-949.626
2022	0	508.418	0	508.418	2073	0	-573.196	0	-573.196
2023	0	297.907	0	297.907	2074	0	-679.922	0	-679.922
2024	0	-813.849	0	-813.849	2075	0	-961.512	0	-961.512
2025	0	-517.852	0	-517.852	2076	0	227.216	0	227.216
2026	0	-579.508	0	-579.508	2077	0	621.178	0	621.178
2027	0	-932.282	0	-932.282	2078	0	764.186	0	764.186
2028	0	136.363	0	136.363	2079	0	386.744	0	386.744
2029	0	441.208	0	441.208	2080	0	784.632	0	784.632
2030	0	581.647	0	581.647	2081	0	427.135	0	427.135
2031	0	375.188	0	375.188	2082	0	-76.614	0	-76.614
2032	0	728.755	0	728.755	2083	0	52.055	0	52.055
2033	0	514.668	0	514.668	2084	0	64.580	0	64.580
2034	0	41.474	0	41.474	2085	0	-734.098	0	-734.098
2035	0	166.413	0	166.413	2086	0	462.911	0	462.911
2036	0	106.842	0	106.842	2087	0	239.473	0	239.473
2037	0	-646.041	0	-646.041	2088	0	-776.573	0	-776.573

2038	0	542.236	0	542.236	2089	0	-570.875	0	-570.875
2039	0	291.204	0	291.204	2090	0	-581.501	0	-581.501
2040	0	-840.463	0	-840.463	2091	0	-1.089.027	0	-1.089.027
2041	0	-634.537	0	-634.537	2092	1	12.702	0	12.702
2042	0	-627.101	0	-627.101	2093	2	412.545	0	412.545
2043	0	-1.074.820	0	-1.074.820	2094	3	729.253	0	729.253
2044	0	107.656	0	107.656	2095	4	306.209	0	306.209
2045	0	503.903	0	503.903	2096	5	832.207	0	832.207
2046	0	740.176	0	740.176	2097	6	504.843	0	504.843
2047	0	362.204	0	362.204	2098	7	26.097	0	26.097
2048	0	819.315	0	819.315	2099	8	148.329	0	148.329
2049	0	380.120	0	380.120	2100	9	92.293	0	92.293
2050	0	-180.073	0	-180.073	2101	10	-668.366	0	-668.366
2051	0	-48.734	0	-48.734	2102	11	504.764	0	504.764
2052	0	65.434	0	65.434	2103	12	254.036	0	254.036
2053	0	-732.103	0	-732.103	2104	13	-848.837	0	-848.837
2054	0	585.264	0	585.264	2105	14	-574.049	0	-574.049
2055	0	365.091	0	365.091	2106	15	-681.917	0	-681.917
2056	0	-740.994	0	-740.994					
TOTAL						0	6.498.272	0	6.498.272

3.3 Offsite Climate Impacts (Leakage)

3.3.1 Types of Expected Leakage (CL3.1)

Leakage is assumed to be zero. See chapter below

3.3.2 Quantity of Expected Leakage (CL3.1, 3.3)

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.

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 year²³. 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

²³ INIA., 2001. Tecnologías forrajeras para sistemas ganaderos de Uruguay. Boletín de Divulgación 76.

reduced number of bulls are sold to slaughterhouses). It is Lumin/Eucapine's policy that land owners can continue with their activities for a period of six months to one year 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 with long-term rental contracts.

Furthermore, according to data gathered from governmental Livestock Controller Division (DICOSE)²⁴ there has been a smooth increase in the beef cattle and sheep stock in the departments of Cerro Largo and Treinta y Tres (where the project activity occurs) in the last decade (from 1.75 million livestock units, LSU, in 2003 to 1.92 million LSU in 2009). On the other hand, according to data taken from National Forest Directorate (DGF)²⁵ forest plantations have also been increasing for the same period of time (from 37 thousand hectares in 2003 to 72 thousand hectares in 2009) in the same departments. In addition, native forest has been also increasing in terms of area in the last 43 years at the National level. According to National Forest Inventory (2010)²⁶ and to the forest maps based on aerial photographs of 1967²⁷ native forests have increased 21% in terms of area. The fact that total forest area and number of livestock have been increasing, analysing Cerro Largo and Treinta y Tres official data, is an evidence that project activity does not result in displacement of the previous productive system. Therefore, leakage is assumed to be zero.

3.3.3 Leakage Mitigation (CL3.2)

Therefore, leakage is assumed to be zero.

3.4 Climate Impact Monitoring

3.4.1 Climate Monitoring Plan (CL4.1)

Data and Parameters Available at Validation

Table 16. Parameters available at validation

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

²⁴ <http://www.mgap.gub.uy/DGSG/DICOSE/dicose.htm>

²⁵ <http://www.mgap.gub.uy/portal/hgxpp001.aspx?7,20,442,O,S,0,,>

²⁶ <http://www.mgap.gub.uy/portal/hgxpp001.aspx?7,20,440,O,S,0,,>

²⁷ URUGUAY MAP. Forest Directorate.- First Forest Chart. Montevideo: MAP, 1979
([http://www.mgap.gub.uy/portal/hgxpp001.aspx?7,20,410,O,S,0,MNU;E;2;15;125;1;MNU;,\(](http://www.mgap.gub.uy/portal/hgxpp001.aspx?7,20,410,O,S,0,MNU;E;2;15;125;1;MNU;,())

Justification of choice of data or description of measurement methods and procedures applied:	N/A
Any comment:	N/A

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
Justification of choice of data or description of measurement methods and procedures applied:	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
Justification of choice of data or description of measurement methods and procedures applied:	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:	Densidad, Dureza y Color de Eucalyptus grandis de Uruguay Ing. Quím. Silvia Böthig Informe de Investigación N° 5, Julio 2001"
Value applied:	0.46 and 0.52
Justification of choice of data or description of measurement methods and procedures applied:	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:	Calculated as B/A where $B = \exp[-1.085 + 0.9256 \cdot \ln(A)]$, where A is aboveground biomass ($t \text{ d.m. ha}^{-1}$) and B is below-ground biomass ($t \text{ d.m. ha}^{-1}$) [Source: Table 4.A.4 of IPCC GPG-LULUCF 2003]
Value applied:	0.23 to 0.29 depending on the tree age
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Any comment:	N/A

Data Unit / Parameter:	$V_{\text{TREE } j \text{ p } i}$
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:	Existing local species-specific tree growth models. (SAG grandis)
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A

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.
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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
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Any comment:	Stem volume estimations of local growth models are under bark, thus this factor is applied

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
Justification of choice of data or description of measurement methods and procedures applied:	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
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Any comment:	NA

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; dimensionless
Source of data:	Table 6 of "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM Project" activities.
Value applied:	0.95
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Any comment:	N/A

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
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Any comment:	N/A

Data and Parameters Monitored

Table 17. Parameters monitored

Data Unit / Parameter:	DBH
Data unit:	cm
Description:	Diameter at breast height of tree
Source of data:	Field measurements in sample plots
Description of measurement methods and procedures to be applied:	Usually, the diameter at breast height of the tree, but it could be any other diameter or dimensional measurement (e.g. basal diameter, root-collar diameter, basal area, etc.) applicable for the model or data source used. Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, are applied
Frequency of monitoring/recording:	Before every verification event
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied
Calculation method:	N/A
Any comment:	N/A

Data Unit / Parameter:	H
Data unit:	m
Description:	Height of trees
Source of data:	Field measurements in sample plots
Description of measurement methods and procedures to be applied:	Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, are applied
Frequency of monitoring/recording:	Before every verification event
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied
Calculation method:	N/A
Any comment:	N/A

Data Unit / Parameter:	T
Data unit:	Year
Description:	Time period elapsed between two successive estimations of carbon stock in trees and shrubs
Source of data:	Recorded time
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Calculation method:	N/A

Any comment:	If the two successive estimations of carbon stock in trees are carried out at different points of time in year t_2 and t_1 , (e.g. in the month of April in year t_1 and in the month of September in year t_2), then a fractional value is assigned to T
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Data Unit / Parameter:	$A_{p,i}$
Data unit:	ha
Description:	Area of sample plot
Source of data:	Field measurement
Description of measurement methods and procedures to be applied:	Standard operating procedures (SOPs) prescribed under national forest inventory are applied. In the absence of these, SOPs from published handbooks, or from the IPCC GPG LULUCF 2003, are applied
Frequency of monitoring/recording:	Every five years since the year of the initial verification
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Quality control/quality assurance (QA/QC) procedures prescribed under national forest inventory are applied. In the absence of these, QA/QC procedures from published handbooks, or from the IPCC GPG LULUCF 2003, are applied
Calculation method:	N/A
Any comment:	Sample plot location is registered with a GPS and marked on the project map

Description of the Monitoring Plan

Monitoring will be done according to the consolidated methodology AR-ACM0001 "Afforestation and reforestation of degraded land" (version 05,2, EB 65), Analysis of its applicability conditions have been developed in section 2,2 of this PD,

Monitoring comprises gathering information, performing calculations and making estimations of GHG emissions and removals, It ensures that commonly established principles of forest inventory and management are put into practice, All data gathered as part of the monitoring plan are archived electronically and kept at least for two years after the end of the last crediting period,

Physical limits will be calculated and checked periodically. The project boundary and the boundaries of pre-defined strata will be adjusted after plantations are established. This is done by aerial photo interpretation

and using GPS technology and the information will be organized in GIS format. Areas of each stratum will be recalculated and adjusted accordingly,

All activities performed in each stratum will be recorded and relevant parameters quantified,

Sampling design and stratification

Project boundaries are defined at the beginning of project activity and updated along the crediting period, Boundaries may vary or new strata may be created after disturbances effects (pests, droughts, fire) and boundaries will be redefined, Geographic coordinates are established, recorded and archived, A Geographic Information System will be implemented with the following basic layers:

- project boundaries
- aerial photographs
- soils map
- roads, fences, firebreaks, etc.,
- permanent sampling plots

Other layers will be added in the future and the layers will be linked to several databases,

With the purpose of developing the monitoring plan, Weyerhaeuser Uruguay area will be divided into 45 strata, Stratification was done considering region (as described in section 2,3); age class (plantation date); and species planted, Current stratification could suffer subdivisions or merges in the case unexpected disturbances occur or insignificant intra-stratum variability is detected in the annual variation in carbon pools (e.g, forest fires), The size of the sample plot is a trade-off between accuracy, precision, and time (cost) of measurement, The size of the plot is also related to the number of trees, their diameter, and the carbon stock variance among plots, The plot should be large enough to contain an adequate number of trees per plot to be measured, IPCC Good Practice Guidance for LULUCF, chapter 4,3, recommends using a single plot varying between 100 m² to 600m², increasing the size from densely planted stands of 1000 trees per hectare to sparsely planted stands of multi-purpose trees, Because of application of thinning, forest stands in this project, have a low number of trees per hectare, tending to have a few large trees per hectare as the stands get older, and uniformly distributed, Taking into consideration the guidance by IPCC and the project-specific conditions, circular plots of 500 m² have been selected for monitoring, Permanent sampling plots are selected, since these are considered to be more efficient for estimating changes in carbon stocks by filtering out any variance due to plot effect,

Estimation of the number of sample plots was done in accordance with the methodological tool "Calculation of the number of sample plots for measurements within A/R CDM project activities", Calculations are archived as part of project documentation, The monitoring plan will aim at an estimation of the mean carbon stocks with a precision level of 10% with 90% confidence, These are the values suggested by the selected methodology, and have also been chosen because they reach a compromise between precision in estimation of the population parameters and costs of the measurement and processing (section 4,3,3,4,1 IPCC GPG), The outcome of the estimation from the tool was a total of 158 plots for the whole project area,

The location of the plots will follow 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 (NAPA) developed by Pike & Co, will be used to randomly locate the permanent sampling plots (location is systematic, with random start), This software has a feature to enable the location of all plots on forest areas (i.e., it avoids plots from being located in firebreaks and other non-planted areas), The map with the location of the

sampling plots is 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 22**.

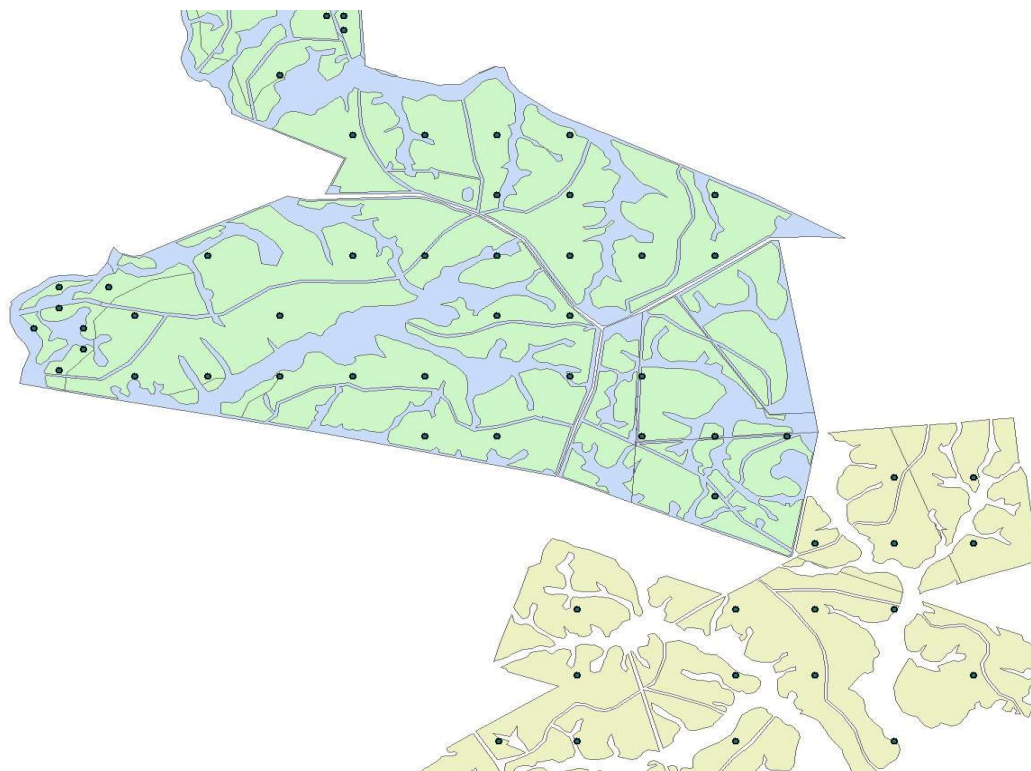


Figure 22. Example of location of permanent sampling plots.

Data Collection

Each pool will be 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. Stem volume, will be calculated applying a manual of procedures developed for local conditions, based on DBH and height measurement in each plot. Stem volume of trees is 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 will be used in order to estimate the carbon stock.

Deadwood will be calculated according to the tool “Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities”. The conservative default approach might be selected. Otherwise, two types of dead wood will be measured in the field: standing dead wood and lying dead wood. The former will be measured in the same sample plots used for estimating biomass stocks, and will be subdivided into three categories. The carbon stock for the first two categories (dead standing trees and dead standing trees with fewer leaves and twigs) will be estimated in the same way as for living trees applying a reduction factor to account for lost biomass. The third category, which are standing trees with no leaves and branches, will be also divided into three types according to the rottenness level of the wood (a specific method will be applied in order to define rottenness). Each category will have a specific reduction factor. Laying dead wood will be estimated with the transect method. Two transect lines, intersecting and bisecting

orthogonally each other in the center of the plot will be set, The length of the line should be of 100 meters in total, The diameter of wood pieces with diameter larger than 10 cm that are touched by the transect line are measured, The rottenness category is estimated as for standing dead wood, Then the methodological formula is applied.

The conservative default approach might be selected to estimate litter pool, If not, samples for measuring litter carbon stock shall be collected from the same plots used for living biomass estimations, using a sample frame to be laid on the ground on random locations, All litter on the area within the frame will be collected, A sub-sample shall be extracted and weighed, It shall be further oven-dried and weighed again, Dry to wet weight ratio shall be estimated, and the resulting value shall be applied to all samples in the plot, Then the methodological formula is applied.

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

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.
- 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 for eliminating inconsistent or erroneous field data; perform random checks of field measurements in order to detect measurement errors or systematic biases; some of such measures are: 1) use field computers and automatic data loggers (e.g., electronic recording caliper), and hire independent workers for transferring field data to digital media. (IPCC GPG 5.3.6.1); 2) during field work, double check 10% of sampling measurements with an independent party team or with a team different from the one that performed the measurement or sampling; if

the difference between measurements is higher than 5%, a third definitive measurement will be run. If the difference is higher than 10%, the data or the plot will be eliminated;

- establish procedures to ensure representativeness of PSPs (i.e., to avoid biased estimates due to differential management of PSPs); 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 be 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 PSPs, in order to correlate these values with plot measurements;
- development of allometric 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 will be coordinated by the project proponent

Entity applying monitoring plan

Company: Lumin/Eucapine

Agustin de la Rosa 765

Melo, Uruguay

Phone 464 30081 / 464 29 054

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

The full project documentation will be published on VCS and CCB website for public comments, as well as the project summary in Spanish version, and the local communities and other stakeholders can easily download from the website.

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

3.5 Optional Criterion: Climate Change Adaptation Benefits

3.5.1 Regional Climate Change Scenarios (GL1.1)

N/A

3.5.2 Climate Change Impacts (GL1.2)

N/A

3.5.3 Measures Needed and Designed for Adaptation (GL1.3)

N/A

4 COMMUNITY

4.1 Without-Project Community Scenario

4.1.1 Descriptions of Communities at Project Start (CM1.1)

The four departments of the North of the country (Artigas, Rivera, Tacuarembó and Cerro Largo) present the lowest degrees of development (Veiga, 2016). In Cerro Largo the distribution by geographical area is mostly urban (87.8%), lower than the total number of the country and also of the interior; with a rural population that was approximately 10,481 people (remaining 12.1%) according to the results of the 2004 Census. One education indicator is the literacy rate that, according to the General Census of 1996, reached 93.4% of the population of 15 or more years in Cerro Largo, being below the average of the interior (95.6%) and the total country (96.8%) (Barrenechea et al., 2008).

Life expectancy at birth is not the demographic indicators that measure achievements in health matters. According to INE, Cerro Largo has one of the lowest values of this indicator, with an index of life expectancy at birth of 75.4 years for 2006, which places the department in the national context in 15th place in this area (out of 19), with a value lower than the national average (75.7 years). It should be noted that Cerro Largo has held this position at the national level since the nineties.

The UNDP carries out a worldwide Human Development Index (HDI), which consists of "a synthetic measure of the achievements of a society in terms of human development", and "seeks to quantify and combine in an aggregate index the achievements average that registers a country in three fundamental dimensions: to achieve a long and healthy life (health dimension), to acquire useful knowledge (education dimension) and to have the necessary resources to enjoy a decent standard of living (standard of living or access to resources)".

According to the Human Development Report in Uruguay 2005, considering the order of the departments according to its HDI, Cerro Largo was located (with data for the year 2002) in the 15th place. This is if we consider an approximation to the level of living dimension through GDP per capita; since if this approach is considered through the income of households, descends to the 16th position. Therefore, it is among the departments of least relative human development in the country (in previous HDI calculations, for 1991 and 1999 it held the 17th and 14th positions, respectively).

In terms of economy, the generation of value in Cerro Largo denotes a high primary specialization, higher than the average of the interior, centred on livestock (cattle and sheep), rice, forestry and dairy cattle to a lesser extent, which do not contribute to the boost of local development.

The main activities in the department of Cerro Largo are beef cattle ranching (62% of establishments declare cattle ranching as the main source of income, occupying 85% of the area of the department according to the 2000 Agricultural Census), and the sheep (15% of establishments, occupying just over 4% of the departmental area). In addition, they are responsible for 64% of rural employment.

Employment in agriculture is concentrated in beef cattle, which represents 64% of employment (5,800 jobs). However, cattle ranching is one of the activities that have the lowest rates of people employed per thousand hectares (employs five people per thousand hectares).

When referring to Treinta y Tres, the distribution by geographical area is mostly urban (89.7%), lower than the total of the country but higher than the interior; with a rural population that includes a total of 5,079 inhabitants (remaining 10.3%) (Barrenechea et al., 2008). Literacy indicator, according to the General

Census of 1996, reached In Treinta y Tres to 94.7% of the population aged 15 or more, being below the average of the interior (95.6%) and that of the total country (96.8%).

According to the IDH, Treinta y Tres is located in 13th place (out of 19), remaining at a low average level with respect to previous years (also 13th in 1999). Life expectancy at birth is one of the demographic indicators that measure achievements in health. According to the INE, Treinta y Tres has one of the lowest values of this indicator, with an index of life expectancy at birth of 75.4 years for 2006, which places the department in the national context in 15th place in terms of life expectancy at birth, with a value somewhat below the national average (75.7 years).

In the department of Treinta y Tres, the main activities are livestock (cattle and sheep) and rice. The dairy must also take into account the involvement of a number of producers that are not negligible and that make it a way of life without visualizing alternative alternatives to that activity (some 60 families).

In summary, communities in the area are not diverse, they share the same language, religious belief, livelihood system, history or culture. Their relationship with natural resource is through the main responsible of the economy, beef cattle breeding.

4.1.2 Interactions between Communities and Community Groups (CM1.1)

One of the keys to LUMIN's sustainable forest management is the link with the communities where it carries out its activities on a daily basis, both in the relationship with neighbors and local actors, as well as supporting the institutions that work in the territory in various relevant areas, for the development of these communities, in topics such as education, health, well-being, care and culture, among others.

Regarding the supported activities, it seeks to strengthen the capacities of local institutions, while generating an impact on the local development of these communities, focusing efforts on those issues that most concern local actors and also company employees.

Until 2019, LUMIN worked with the Celeste Foundation in supporting sports activities in towns in the interior of the departments of Treinta y Tres and Cerro Largo, with actions based on physical activity and the transmission of values. In the department of Cerro Largo, work was carried out in Fraile Muerto, Ramón Trigo, Tupambaé, Bañado de Medina and Cerro de las Accounts. In this sense, LUMIN supported the soccer program for children from 6 to 12 years old, especially in towns in the interior of the country with less access to sports infrastructure and opportunities, promoting sports values in education. Within this framework, LUMIN officials participated in a sports and educational activity held in Isidoro Noblia in Cerro Largo, with the presence of more than 60 children, as well as local authorities and recognized soccer players. The company gave the children board games, balls and vests for physical activities in the local gym.

At the same time, in 2019 LUMIN incorporated support to an institution that also works with people with disabilities, but in this case in the city of Melo, as is the case of COPAHDIM (Commission for Parents of the Intellectual Disabilities of Melo). This institution has the support of the Uruguayan Child and Adolescent Institute (INAU) and the Social Security Bank; providing differentiated care through workshops and psychomotor, speech therapy and physiotherapeutic support. The institution serves more than 140 users, with a total of 29 professionals and technicians who work with this population. On this occasion, the request for support was also for the creation of a computer room for the institution, through the delivery of 7 laptops, which will allow users to be trained and interact with technological and educational tools.

Within the Árbol Project, although during 2018 they worked with schools in Cerro de las Cuenta and Fraile Muerto, in 2019 schools in this department were prioritized, in which neighbors and rural producers of the

areas also participated, seeking to internalize more of the forestry cycle, and highlighting that it is the first time that a company in the field comes to talk with the community. In these activities carried out in Arrozal Rosales, Rincón de los Olivera and Centurión, more than 100 people gathered. Boards were also donated to the Melo Technical School for its carpentry course.

In Centurión, LUMIN has supported the conditioning of the chapel to prepare it for the local CAIF, as the company has supported Cañas CAIF years ago; building issues, floor, ceiling, bathroom, kitchen, doors, etc.

In the department of Treinta y Tres, Fundación Celeste have been carried out activities to promote sport values in the education of children and adolescents, and work has been done with schools in Vergara and Santa Clara de Olimar. Also, LUMIN is working with Fraile Muerto local community in order to boost the cultural heritage of the region.

4.1.3 High Conservation Values (CM1.2)

High Conservation Value	Quebrada de los Cuervos
Qualifying Attribute	<i>Biodiversity reserve, ecosystem services</i>
Focal Area	
High Conservation Value	Paso Centurión/ Sierra de los Ríos
Qualifying Attribute	<i>Biodiversity reserve, ecosystem services</i>
Focal Area	
High Conservation Value	Gallo-Doroteo farm
Qualifying Attribute	Biodiversity reserve, ecosystem services
Focal Area	
High Conservation Value	Macachin farm
Qualifying Attribute	Biodiversity reserve, ecosystem services
Focal Area	
High Conservation Value	Gallo-Doroteo farm
Qualifying Attribute	Biodiversity reserve, ecosystem services
Focal Area	
High Conservation Value	Paso Real farm

Qualifying Attribute Focal Area	Biodiversity reserve, ecosystem services
High Conservation Value Qualifying Attribute Focal Area	Museo Gral. Aparicio Saravia (Estancia El Cordobés) National Historical Monument
High Conservation Value Qualifying Attribute Focal Area	Parroquia de Santa Clara de Olimar Historical site
High Conservation Value Qualifying Attribute Focal Area	Azotea de Fructuoso Mazziotta Historical site
High Conservation Value Qualifying Attribute Focal Area	Casa de las Crónicas de Justino Zavala Muñiz. Historical site
High Conservation Value Qualifying Attribute Focal Area	Quinta de los Naranjos de López Sar. Historical site
High Conservation Value Qualifying Attribute Focal Area	Casa de estancia de Justino Muñiz y entorno Historical site
High Conservation Value Qualifying Attribute Focal Area	Casa de estancia "Las Marías" de Doroteo Navarrete, parque, manguera de piedra y entorno <i>Historical site</i>

High Conservation Value	"Azotea de Pay Alonso", manguera de piedra, monte indígena y entorno
Qualifying Attribute	<i>Historical site</i>
Focal Area	

High Conservation Value	Lugar en que se desarrolló el "Combate de Arbolito", estela erigida donde cayó Antonio Florencio (Chiquito Saravia) y entorno en un área de 10 hectáreas circundantes a la estela.
Qualifying Attribute	<i>Historical site</i>
Focal Area	

High Conservation Value	Antigua Azotea de Altezor - Quinta de Tropa
Qualifying Attribute	<i>Historical site</i>
Focal Area	

4.1.4 Without-Project Scenario: Community (CM1.3)

Expected changes in the well-being conditions and other characteristics of communities under the without project land use scenario are difficult to assess. According to the description of the communities at project start (4.1.1) and considering the evolution of the communities during the last 13 years, the most probable scenario without project land use scenario is that communities would not have improved in their well-being.

Conclusion is achieved based on the historical characteristics of communities and how they are linked to beef cattle breeding. This is the main economic activity that has generated employment and is the main source of income for the region, over the last 300 years. Soil productivity is relatively low, and production of grass is reduced compared to other soils in Uruguay. Therefore cow-calf operation is the main activity: method of raising beef cattle in which a permanent herd of cows is kept by a farmer or rancher to produce calves for later sale. This is the perfect scenario for maintaining "gaucho" traditions. Gaucho is part of the national folklore, but the actual gauchos are only descendants of the original archetype.

4.2 Net Positive Community Impacts

4.2.1 Expected Community Impacts (CM2.1)

Creation of employment

Creation of employment is one of the main social benefits of the project. Typically, a traditional extensive livestock production system employs 1.4-4.4 persons every 1,000 ha. Lumin/Eucapine project is expected to increase that figure by more than 8-10 times.

Beyond an increased number of direct and indirect 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:

Promotion of small family businesses and creation of several job opportunities

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 outsourced contractor companies. 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 the culture of 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.

Internationally tradable products

The entire production of Lumin/Eucapine project (wood and carbon credits) will have the national and international market as main final destination. Livestock meat and beekeeping is produced within Lumin/Eucapine property by local cattle breeders and their products are also internationally tradable.

Reduction of rural poverty

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)²⁸, demonstrate that forestry projects oriented

²⁸ Carámbula, M. y Piñeiro, D. La Forestación En Uruguay: Cambio Demográfico y Empleo en Tres Localidades

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.

Incorporation of technology

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.

It is also identified as 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.

Increased nationally added value to forestry products

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, Guarané 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 harbour at prices which will be higher than those that could be obtained by selling pulpwood, which is the traditional wood product exported from Uruguay.

These sustainable high quality wood, is 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.

Development of new productive value chains

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 invest in a new industry in the east region. Nevertheless, as mentioned above, the presence in the region of Lumin/Eucapine and its forest plantations, may contribute to promote the establishment of industrial investments in the area.

Geographic decentralization of development

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.

Improve of local community's well-being.

Lumin/Eucapine has several programs in place to support and assist local communities in the project's area of influence. Public schools, social organizations, public institutions, such as local governments, firefighters, ministries, are fundamental strategic partners to implement lines of work and support projects in the long term.

Lumin/Eucapine is committed to promoting and improving the well-being of the community, often contributing material goods (firewood, tools, school supplies), staff time (educational presentations in schools, visits to places of value) and fundamentally collaboration in the search for programs that create local development opportunities. A complete and detailed list of programs, activities and supports is available to the audit team. In addition, LUMIN is actively participating in UN Women and getting involved in the improvement processes regarding gender issues proposed by UN Women.

4.2.2 Negative Community Impact Mitigation (CM2.2)

The project owner has appointed a staff member to record and collect all communications included conflicts and dissatisfaction between Lumin/Eucapine and local communities/neighbours.

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 proceed 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 neighbours 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.

4.2.3 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 labour income
- 2) Job creation: The project will provide permanent, temporary, direct and indirect employment opportunities. Most of the work will belong to 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.

4.2.4 High Conservation Values Protected (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.

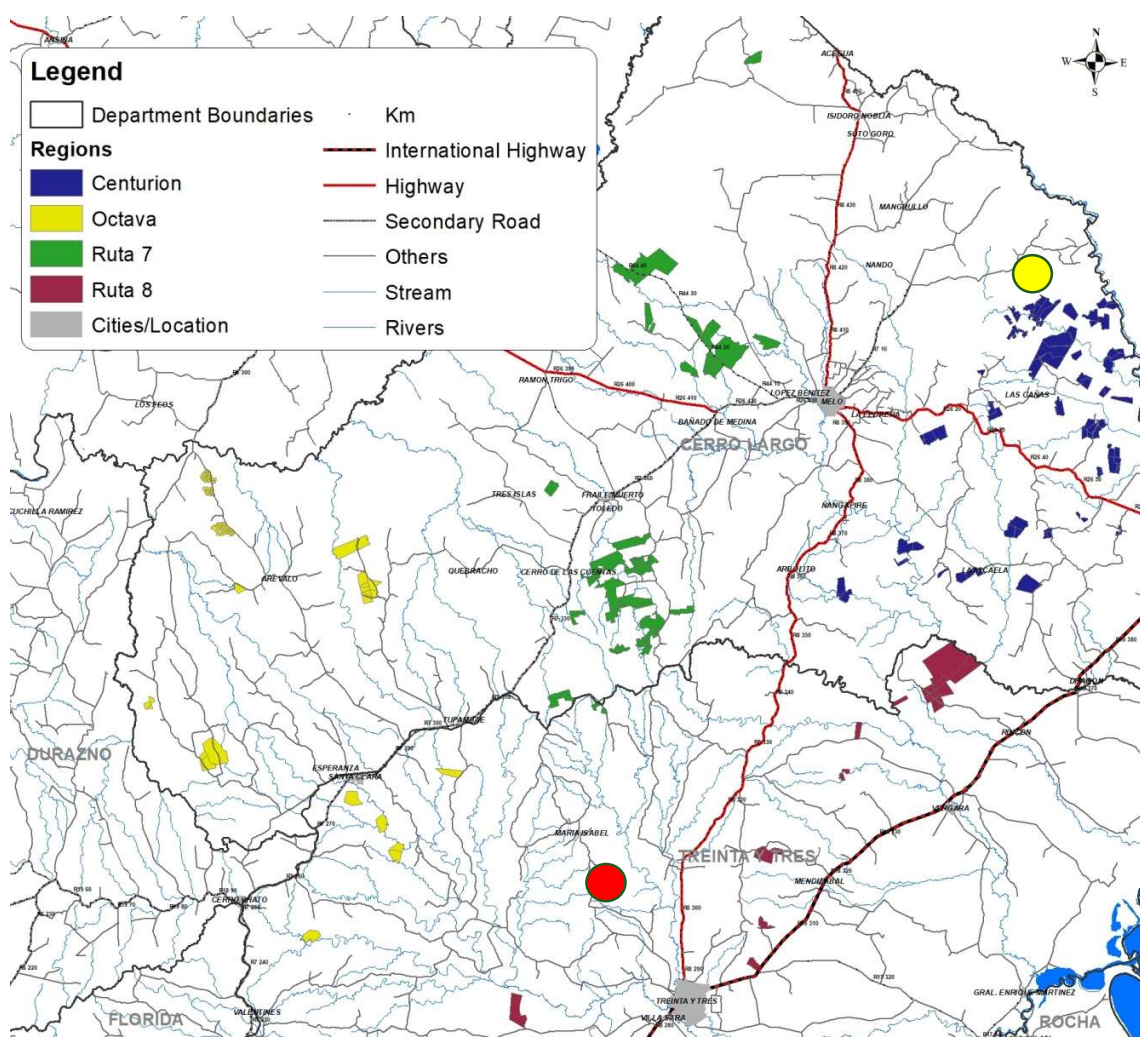


Figure 23. Location of Quebrada de los Cuervos (red dot) and Paso Centurión (yellow dot)

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. Studies of the same characteristics were carried out in other Lumin 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.

4.3 Other Stakeholder Impacts

4.3.1 Impacts on Other Stakeholders (CM3.1)

The project activities may 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.

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

No severe impacts have been identified on other stakeholders.

Although LUMIN maintains close relations with neighbours 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.

4.3.3 Net Impacts on Other Stakeholders (CM3.3)

As there has not been identified negative impacts, there is no need to anticipate to their results.

4.4 Community Impact Monitoring

4.4.1 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 analysing 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 analysed 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 neighbours 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, as the case may be. Full "Social Monitoring and Management Plan" 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. The monitoring purpose is to identify the areas for improvement, where the level of compliance is not being achieved and for the development of new strategies to accomplish the objective.

Assumption	Indicator	Source of data	Monitoring frequency	Goal
Improve of livelihood of communities and stakeholders	Number of direct employees living in the area of influence	Human Resources Sustainability Annual Report	Annual	At least 10% of the employees should be residing in the area of influence
	Number of indirect employees living in the area of influence	Mobile Employees Attendance System Sustainability Annual Report	Annual	At least 50% of the employees should be residing in the area of influence
Improvement of technical capacities of communities and stakeholders	Number of trained people in forestry-related areas	Internal registry of trainings Sustainability Annual Report	Annual	100% of forestry contracted companies should be trained every year
Improvement of communities' well-being	Number of complaints resolved	Internal record of complaints and resolutions	Annual	100% of complaints should be answered in maximum two

		Sustainability Annual Report		weeks and resolved as soon as possible
	Contribution of project developer to communities in material assistance (donations)	Sustainability Annual Report	Annual	Contribute with communities with what is possible

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 will be conducted during periodic social monitoring visits to the areas of influence. Positive and negative impacts of forestry activity will be questioned.

This will allow 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.

4.4.2 Monitoring Plan Dissemination (CM4.3)

The monitoring plan and results of every verification will be published on Lumin/Eucapine website which can be consulted by stakeholders. Also, a contact person with phone numbers will be published.

4.5 Optional Criterion: Exceptional Community Benefits

The project does not seek to obtain the Gold Level for exceptional community benefits.

4.5.1 Exceptional Community Criteria (GL2.1)

N/A

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

N/A

4.5.3 Community Participation Risks (GL2.3)

N/A

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

N/A

4.5.5 Net Impacts on Women (GL2.5)

N/A

4.5.6 Benefit Sharing Mechanisms (GL2.6)

N/A

4.5.7 Benefits, Costs, and Risks Communication (GL2.7)

N/A

4.5.8 Governance and Implementation Structures (GL2.8)

N/A

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

N/A

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (B1.1)

The natural grasslands are the most representative habitat of Uruguay. This environment, mainly due to agricultural exploitation, has been degraded and modified over time, leaving only a few pristine areas. The natural prairie is the habitat of many species of fauna, many of them categorized as RAE species worldwide.

Although afforestation takes place in certain types of prairie environments, which leads to a reduction in the area of the natural grasslands, the correct designs and management make the biodiversity of the area little affected and, in certain cases, improved. This is the case of most Lumin/Eucapine farms where the company establish and conserve buffer areas of grazing environments.

The project area consists basically of grassland altered by many years of grazing. This activity would have caused a significant alteration of dominant species, as well as some soil loss due to laminar erosion due to frequent over grazing. This grazing-degraded grassland covers most of the project area. Associated with this, there are lowland, humid zones, with richer biodiversity and higher conservation value. The forests of the proposed project activity will be planted on grazing-degraded zones, and the project was designed with the objective of preserving the most valuable areas.

These conservation areas include natural forests by the rivers and streams, composed by hydrophytic species close to the streams, and xerophytic species surrounding them in an ecotone with a shrub, straw, high-grass transition to the grasslands. These ecosystems have suffered alterations in the past, due to human intervention. Valuable tree species include *Salix humboldtiana*, *Sebastiania schottiana*, *Sapium sp.*, *Pouteria salicifolia* and *Erythrina cristagalli*. Also, in the most humid areas *Lueha divaricata*, *Quillaja brasiliensis*, *Cupania vernalis*, *Ocotea acutifolia*, *Allophylus edulis*, *Sebastiania klotzchiana* and *Citarexylum montevidense* appear frequently. In intermediate zones, it is common to find *Schinus longifolius* and *Acanthosyris spinecens*, whereas the most common species in the drier zones are *Gochinatha malmei*, *Aloysia gratissima* and *Lithraea melloides*.

In Uruguay plantations are established on old farming land, mainly established on degraded grasslands that is the most important type of vegetation in Uruguay. Plantations are located neither in the tropics nor rainforests.

The native pastures of Uruguay, since the introduction of the cattle by the Spaniards at the end of the 15th century, have undergone a substantial modification from those times to the present. This condition has intensified due to overgrazing, the introduction of exotic forage species and the tendency to add new grazing lands by burning areas of humid grasslands, shrubby areas (chircales) and other natural ecosystems that used to be habitats of RAE and IUCN species.

5.1.2 High Conservation Values (B1.2)

High Conservation Value	Quebrada de los Cuervos
Qualifying Attribute	<i>Biodiversity reserve, ecosystem services</i>
Focal Area	N/A

High Conservation Value	Paso Centurion y Sierra de Rios
Qualifying Attribute	<i>Biodiversity reserve, ecosystem services</i>
Focal Area	N/A

There are 2 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 affecting the Quebrada de los Cuervos and Paso Centurion y Sierra de Rios area.

No other HCVs were identified related to biodiversity in the project zone before the implementation of the project. Native forests were degraded because of intensive beef production and lack of control to hunter.

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).

5.1.3 Without-project Scenario: Biodiversity (B1.3)

Uruguay is located in a biogeographic transition zone in the southern part of the South American continent. The confluence of biogeographic regions gives rise to natural fields interspersed with wetlands, different types of native forests, landscapes and important bodies of water, including coastal lagoons. Noteworthy biodiversity exists at the ecoregional, ecosystem, species and genetic levels. Furthermore, habitat diversity reveals a variety of interesting species, many of which are globally significant in ecological, economic and social terms.

Natural temperate grasslands (Pampas) cover about 60% of the national territory and are significantly affected by intensified land use practices.

Native Forest areas in Uruguay have grown steadily over the past 25 years (from 3.5% coverage to 6%). The forestry sector (forest plantations based on introduced species) has recently experienced dynamic growth, with significant investment occurring as a result of opportunities offered for developing new projects, such as sawmills, power plants and pulp mills.

Uruguay is home to several bird species considered globally threatened, such as the yellow cardinal, the black-and-white monjita (*Heteroxolmis dominicanus*) and the marsh seedeater. Several tree species located in Uruguay are at their southern and eastern natural range limits, implying genetic variability of populations important for breeding programmes. Other native species are known for their medicinal or aromatic characteristics, for timber or as ornamentals. Many landraces have evolved from introduced species, such as wheat, during the colonial era.

Source: <https://www.cbd.int/countries/profile/default.shtml?country=uy>

In Uruguay plantations are established on old farming land, mainly established on degraded grasslands that is the most important type of vegetation in Uruguay.

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (B2.1)

After the afforestation project is fully launched, there will be an increase in plant species, and the project will implement afforestation activities through scientific and rational allocation methods, without burning and cutting or harvesting native forests, all of them protected by the company.

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.

Biodiversity indicators for Gallo-Doroteo Farm

	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

Biodiversity indicators for Macachin 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

Biodiversity indicators for Paso Real 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

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.

5.2.2 Mitigation Measures (B2.3)

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, and another kind of exotic invasive species like gorse (*Ulex europaeus*) (Source: Lumin/Eucapine web site)

General measures for the protection of the facilities include: prohibition of hunting, fishing, catching specimens and damaging the native forest; measures to prevent and control fires; environmental safeguards that include guidelines for the responsible management of the various natural ecosystems present, soil conservation, protection of water resources, and proper waste management.

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

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, Lumin/Eucapine focused special studies in those areas. In them, 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 are habitat and biological corridors for many RAE fauna species.

In all the wildlife studies conducted by Lumin/Eucapine, strict pasture species have been detected in forest lands, as well as new bird species for Uruguay.

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.

5.2.4 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 High Conservation Value (HCV), Paso Real, Macachin and Gallo Doroteo.

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*), Matajojo (*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 (*Phyllanthus sellowianus*).

5.2.5 Species Used (B2.5)

The project is planted mostly with *Eucalyptus grandis*, Pinus spp and, to a lesser extent, *E. dunnii* (in lower areas where *E. grandis* can be affected by frost damage), which are not native to the area. The choice of species is due primarily to the fact that 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. It is worth mentioning that there are no tree species native to the ecosystem where forests will be established, since the original vegetation is grassland. Native forests, located on low areas at the margins of an extensive network of rivers and minor water streams, cover less than 5% of Uruguay's territory. Native tree species have usually short, contorted stems, and very slow growth rates. Because of these features, there are currently no native tree species suitable for large-scale commercial plantations. A few species with potential commercial uses have been identified, but there is very limited knowledge on their management. Also, their feasibility would largely depend on finding a market value for their wood products. Specific sampling was performed on native forests in order to evaluate growth, sanitary status and number of species.

E. grandis Hill ex Maiden (rose gum), a member of the Myrtaceae family is not native to Uruguay. However, it originates in a region of Australia with ecological conditions highly similar to those of Uruguay. This similarity explains why this species adapted so well to Uruguayan conditions, where it has been successfully grown and bred for many years (the National Institute of Agricultural Research of Uruguay has released a few locally developed varieties, which will be used by 'Treinta y Tres' project). In addition, there are numerous native relatives of Eucalyptus in Uruguay, including more than 20 native tree species belonging to the Myrtaceae family.

5.2.6 Invasive Species (B2.5)

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 sites 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

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

Species	<i>Eucalyptus grandis</i>
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
Potential 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 <i>E. grandis</i>. 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
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Species	<i>Eucalyptus dunnii</i>
Justification of Use	This specie will be planted in lower areas where <i>E. grandis</i> can be affected by frost damage. Similarly to <i>E. grandis</i>, <i>E. dunnii</i> 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
Potential 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 <i>E. dunnii</i>. 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	<i>Pinus spp</i>
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
Potential 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.

5.2.8 GMO Exclusion (B2.7)

Lumin/Eucapine Project is certified by the responsible forest management FSC® (Forest Stewardship Council®), so it has a commitment with FSC values. One of them is the prohibition of introduction of genetically modified organisms in forestry operations.

5.2.9 Inputs Justification (B2.8)

Lumin has within its health and safety policies, the commitment to managing the hazards associated with the operation and are an essential requirement to operate. It also implements specific standards for the management and handling of pesticides, for example, the standard No. 24 Handling, Transportation, and deposits of Agrochemicals, which regulates the conditions and the way to manage pesticides, this standard is available in the Operations Manual that is used by all those linked to the activity.

At the same time, Based on FSC Principle 6, Environmental Impact, management systems should promote the development and adoption of non-chemical methods for pest management, in order not to harm the environment. The use of chemical pesticides should be avoided or minimize use as possible.

Since 2020 the new FSC pesticide policy implies for those who use pesticides for weed control, the implementation of an Environmental and Social Risk Assessment, which represents an improvement for the proper and responsible handling of pesticides.

EVALUACION DE RIESGO AMBIENTAL Y SOCIAL			Aspectos a evaluar	Referencias para evaluar
Predio			Producto	PAP Prohibido o Muy restringidos implica valor 1 (En caso de mezcla se toma el mas Peligroso)
Contratista			Aplicador habilitado	Menos del 60 % tenga la habilitacion implica valor 1
Fecha			Cercania vecinos-escuelas	Distancia menor a 300 metros se considera valor 1 (Res mgap S/N 04)
Actividad	Aplicacion Insecticida		Cercania sitios con valor historico cultural	Verificar en cartografia LUMIN presencia implica valor 1
	Aplicación herbicida	X	Predio con AAVC	Verificar en cartografia LUMIN presencia implica valor 1
Intensidad de la aplicación	Superficie forestal total de la UM		Presencia de colmenas	Aplicación insecticida liquido implica valor 1
	Superficie total estimada en Has a tratar		Cercania a cursos de agua	Distancia menor a 10 metros se considera valor 1 (Res mgap S/N 08)
	% del area a tratar	#DIV/0!	Cercania Monte Nativo	Distancia menor a 20 mts, implica valor 1
			Ecosistemas en peligro	Cerros chatos del norte, grandes arenas, Verificar en cartografia LUMIN presencia implica valor 1
			Gestion de residuos	El no cumplimiento de la política Seg 22, implica valor 1
			Planilla de control de EPP	Registro mensual y diariamente verificacion visual del estado del EPP
Producto	Clasificacion según FSC	Valor	medidas de mitigacion	Plan de accion propuesto
Panzer	PAP restringido	0	No	
			No	
			No	
Aspectos Sociales	Planilla control de EPP	0	No	
	Aplicador habilitado	0	No	
	Cercania de vecinos-escuelas- Centros poblados	0	No	
	Cercania sitios con valor historico cultural	1	Si	Verificar distancia de 10 metros desde la aplicacion al Panteon
	Predio con AAVC	0	No	
	Presencia de colmenas	0	No	
Aspectos ambientales	Cercania curso de agua	0	No	
	Cercania monte nativo	0	No	
	Presencia de ecosistemas en peligro	0	No	
	Gestion de residuos	0	No	
	Planilla control de maquinaria	0	No	
	Hojas de datos del producto disponible	0	No	
Valor 0 no implica plan de accion, Valor 1 implica implementacion de plan de accion				

Figure 24, environmental and social risk assessment for pesticide use form.

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.

The pesticides used are on the list of the General Plant Health Division of the MGAP.

Since 2018, Lumin/Eucapine has been working with an expert Doctor in toxicology, to validate the work procedures with pesticides, update the information regarding the products that are used as well as their categorization from the point of view of occupational health and safety, accompanied by awareness workshops for personnel who are expose to the use of pesticides.

The forestry procedure declares its commitment to reduce the use of chemical products ", this objective is carried out through research. For herbicides, the aim is to introduce grazing livestock to reduce their use and, if necessary, use those with less toxicity: in the case of the ant control chemicals, it has information about trials (several companies, University, SPF) with the same objective (research examples: entomopathogenic fungi, detailed description of the life cycles for the rationalization of the use of the bait). The annual records of the use of chemical products are reviewed and it is observed that with the integral management of pests carried out by the company, there are no increases in the use of pesticides.

The staff of the contractor companies for pesticide application work uses safety equipment in accordance with current legislation. The personnel are supervised by the Lumin/Eucapine supervisors, there is a strict control of these cases, as it is verified in the internal system of Sacs.

The deposits visited during FSC audits comply with current legal regulations and the provisions of the ILO, regarding storage and emergency procedures in case of accidental spillage of pesticides.

5.2.10 Waste Products (B2.9)

Through organized and controlled waste management, it is intended to achieve the objectives of maintaining order and hygiene conditions, as well as preventing and minimizing environmental contamination in the different camps on premises or operations of or managed by Lumin/Eucapine.

All Waste generated in the operation must previously be managed, have gone through an evaluation stage that ensures that there is no other alternative for recycling, other than its final disposal.

In Lumin/Eucapine Operational Manual, in chapter 2, there is a description of the different ways of waste handling and disposal, and specific Waste disposal policy N°22. Its also important to highlight that Lumin/Eucapine have specific waste disposal temporary sites for pesticides, fuel, and other harmful wastes, which are managed by specialized waste management company (OLECAR), located in Cerro Largo.

5.3 Offsite Biodiversity Impacts

5.3.1 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Measures (B3.2)

Negative Offsite Impact	Mitigation Measure(s)
<i>Fire make damage into ecosystem patch</i>	<i>Verified the fire prevention plan. Fire fighter crew in place.</i>
<i>Illegal activities, like hunting, native forest cut or without permission camp</i>	Procedure of prevention of illegal activities
<i>High density of cattle - degradation of grasslands and native forest, by shift of livestock from plantation to said natural areas</i>	<i>Proper management. Livestock density control (units per ha). Livestock management plan. Evaluation of pastures within afforestation.</i>
<i>The advance of the native forest towards the plantation, eliminates the buffer areas</i>	<i>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</i>

5.3.2 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, reverting 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.

5.4 Biodiversity Impact Monitoring

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

Criteria for the categorization of representative Lumin/Eucapine properties for the conservation of biodiversity

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 HCVA, 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 .



Figure 25. 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)."

5.4.2 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.

5.5 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 terafall

FEBRERO 2020

RESPONSABLES

Lic. Raúl Lombardi

Lic. Giancarlo Geymonat

1

Lombardi, R. ~ Geymonat, G.

5.5.1 High Biodiversity Conservation Priority Status (GL3.1)

N/A

5.5.2 Trigger Species Population Trends (GL3.2, GL3.3)

N/A

APPENDICIES

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

Appendix 1: Stakeholder Identification Table

Lumin/Eucapine team responsible of the social monitoring has elaborated a descriptive file of the main stakeholders identified, denominated "Stakeholders List" sheet. The following figure is showing an example of these file.

	B	C	D	E	F	G	H
	Organismo / Organización	Contacto / Nombre	N° teléfono	mail	Localidad	Departamento	Clasif. Part
1	Agencia de Desarrollo Rivera	Francisco Centurión	099 562 327		Rivera	Rivera	interesado
2	Campus Regional de Educación Tecnológica Noreste	Sandra Garate	099 469 133		Rivera	Rivera	interesado
3	ANEP Director de relaciones internacionales y cooperación-Consejo directivo	Franco Centurion	29007070 (1117)	fcenturion@anep.edu.uy	Montevideo	Montevideo	interesado
4		Federico Coll	099 520 600		Zanja Honda 1	Rivera	Afectado
5		Andrés Landechea	099 824 465		Tranqueras	Rivera	Afectado
6		Martin Rodriguez		martinapic@hotmail.com	Tranqueras	Rivera	Afectado
7		Karlen Nicolas	099 103 983		Tatucera	Rivera	Afectado
8		Antonio Salvageot	099 926 402		Ríos 1	Rivera	Afectado
9		Daniel Valdomir	098 287 040	jdvaldomir@fcien.edu.uy	Curticeiras 1	Rivera	Afectado
10		Carlos Pistón	095 297 245	cpiston@yahoo.com	HHK1	Rivera	Afectado
11		Ismael Gougeon	091 005 494		Estancia Vieja 2	Rivera	Afectado
12		Mario Bekendorf	094 636 281		Capon Alto 3	Rivera	Afectado
13		Gilberto Irutia		gilbertoapicultor@hotmail.com	Buena vista 1	Rivera	Afectado
14		Jon Cesar Lacassi Sandin		jhonlacassi@hotmail.com	Buena vista 1	Rivera	Afectado
15		Roberto Wilson Linale Lasarga		RobertoLinale@gmail.com	Buena vista 1	Rivera	Afectado
16		Edison Fernando Miranda		carta	Buena vista 1	Rivera	Afectado
17		Carlos Pistón	098 297 245	cpiston@yahoo.com	Álamo Blanco	Rivera	Afectado
18		Ismael Eduardo Hernández Gardiol	94683857		ARAUCARIA	Cerro largo	Afectado
19		Juan Pedro Baigorria Bueno	98394346		LA CANDELA	Treinta y Tres	Afectado
20		Ricardo Carrera	99713395		MACACHIN	Cerro largo	Afectado
21		Flavio Ricard Diaz	94577504		EL CARDENAL 1	Cerro largo	Afectado
22		German Trtto	99829419		QUEBRACHAL 1	Cerro largo	Afectado
23		Maria Edy Garay Duarte	98711159		LA PITANGA	Cerro largo	Afectado
24		Jorge Luis Rodales Nuñez	95819982		LA CLARABOYA 1	Cerro largo	Afectado
25		Luis Techera	99118785		ARTIGAS	Cerro largo	Afectado
26		Edgardo Zamora	99806753		ARACHANES	Cerro largo	Afectado
27		Jorge Luis Rodales Nuñez	95819982		CHABELA	Cerro largo	Afectado
28		Gerardo Saravia	99969180		PALEXA	Cerro largo	Afectado
29		Luis Techera	99118785		LAS ROSAS	Cerro largo	Afectado
30		Maikel Jeicobb Croker Schaffner	94683857		CANDILES 1	Treinta y Tres	Afectado
31		Wilson da Fonseca	98802857		LA PITANGA	Cerro Largo	Afectado
32							

Stakeholder

Rights, Interest and Overall Relevance to the Project

Identify communities and any community groups within them, any cross-cutting community groups, and list other stakeholders

Appendix 2: Project Activities and Theory of Change Table

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
Forest plantation (afforestation)	Timber sustainably produced and carbon removals	Carbon credits	Mitigation of climate change	wood production, land restoration and carbon sequestration. Generation of income and job opportunities for local communities/ rural areas
Preservation of HCV areas	Increase the biodiversity value	Improved community's wellbeing	Generation of a more sustainable scenario for forestry development	enhancing biodiversity conservation and increasing the connectivity of forests, which brings ecological value for wood production
Training to Lumin/Eucapine staff and forest contractors companies	Trained staff member and forestry contractor companies' people in several topics	Better social and labor working conditions,	Better quality of life	wood production in a sustainable way
Promote community social and economic development	Implement project involving community and forest uses	Community involved in the project	Community members with a better well-being	wood production in a sustainable way, generating income for local communities/rural areas
Forest operations (land preparation, plantation, thinning, harvesting, pest and disease control, etc.)	Job creation	Larger quantity of personal in the field,	Help in alleviation of rural poverty, decentralization of the economy	Trained and qualified personnel in the forestry field will ensure the implementation of the multiple activities that the project needs to implement.