'GUANARÉ' FOREST PLANTATIONS ON DEGRADED GRASSLANDS UNDER EXTENSIVE GRAZING

Document Prepared by Carbosur

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1 GENERAL

1.1 Implementation Description

The main objectives of the project activity are wood production, land restoration and carbon sequestration through afforestation. All practices follow FSC standard for sustainable forest management, while enhancing biodiversity conservation by increasing the connectivity of forests and generating income and job opportunities for local communities/ rural areas of Uruguay.

The project comprises a total of 18.576 hectares of land previously under extensive grazing by beef cattle, on which forest plantations for obtaining high-value, long-lived timber products and for sequestering large amounts of carbon dioxide from the atmosphere were established. The total area affected by the project is 33,225 hectares, if we include buffer zones, grasslands and native forests.

Forests were based mainly on Eucalyptus grandis and to a lesser extent Eucalyptus dunnii, *Eucalyptus tereticornis* and *Pinus taeda* plantations in 16 to 22-year rotations, managed with pruning (to a minimum height of 12 m) and two to three thinning operations, to obtain knot-free, high-diameter logs suitable for saw-milling and veneering. Plantation is already completed, and forests will be replanted after clear-cut harvest. Guanaré first areas were planted in 2006 and the last ones in 2011. 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, litter, non-tree vegetation, dead wood and harvested wood products).

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. Leakage is assumed to be zero. See chapter below.

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

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

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

The total GHG emission reductions or removals generated in this monitoring period is shown in Table 1, which is based in the Current Annual Increment (CAI). After obtaining the CAI, the annual growth by year (m3/year) and the percentage of GHG Emissions Reductions and Removals by year on the forests within the project boundaries was calculated.

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

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2013	0	1.382.754	0	1.382.754
2014	0	1.469.820	0	1.469.820
2015	0	1.162.199	0	1.162.199
2016	0	784.071	0	784.071
2017	0	679.375	0	679.375
2018	0	720.181	0	720.181
Total	0	6.198.401	0	6.198.401

1.2 Project Category and Activity Type

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

1.3 Project Proponent(s)

Organization name	Guanaré SA
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1.4 Project Location

The project area is located in East Uruguay, in Cerro Largo and Treinta y Tres departments. It comprises several sites, which are classified in 4 regions based on geographic location. The areas are homogeneous in terms of soil types, climate, land use history and socio-economic conditions.

The following map (Figure 1) shows the exact location of the project, and the cadastral units owned by Guanaré, where the project is located.

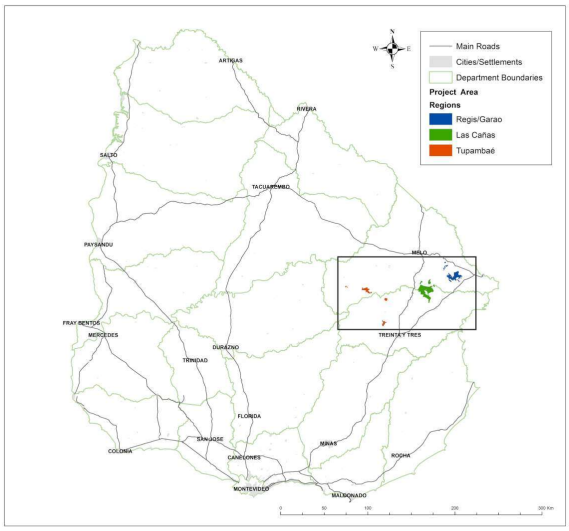

Figure 1. Map of Uruguay showing the location of the areas included in the proposed project activity (black frame).

For the purpose of defining the strata, the project area has been divided into three regions, which are shown from Figures 2 to 6. 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.

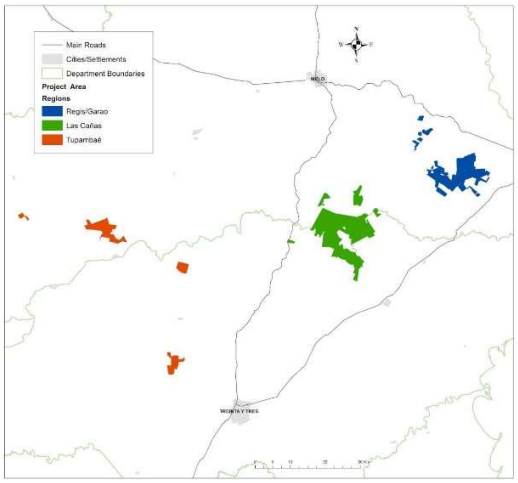

Figure 2. Map indicating the three project regions divided in three different colors.

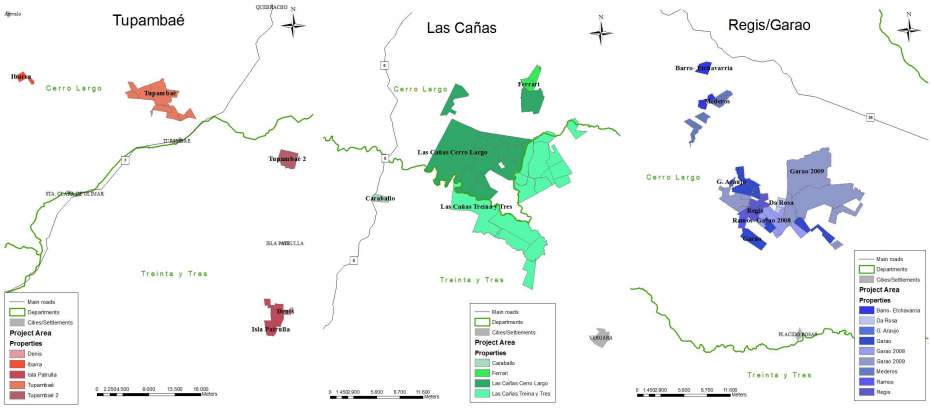

Figure 3. Location of properties which make up the region Tupambaé, **Figure 4.** Location of properties which make up the region Las Cañas and **Figure 5.** Location of properties which make up the region Regis/Garao.

2 CLIMATE

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2013	0	1.382.754	0	1.382.754
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3 COMMUNITY

Creation of employment is one of the main social benefits of the project. Typically, an extensive livestock production system employs 1.4 persons every 1,000 ha. Guanaré/FAS project is expected to multiply that figure by more than 10.

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

- Promotion of small family businesses and creation of several job opportunities

As it was mentioned above, 'Guanaré/FAS' project activity will generate several job opportunities, creating nearly 700 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 Guanaré/FAS, are registered in Uruguay as "PYMES" (small and medium sized enterprises - SME), mostly family companies.

- Internationally tradable products

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

Cattle breeding is an activity conducted by third-party companies, that rents the land not being used for forestry within Guanare´s property. This activity generate synergy with forest and is not displaced out of the area. Guanare has a policy to prioritize former cattle breeders in the area to rent their land. By this mean, cattle farmers that have sold the land has not the necessity to move other places. This has an enormous social impact to communities.

- Eradication of rural poverty

The main contribution of Guanaré/FAS 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), 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.

As it is mentioned in the previous paragraph, generation of job is not only for the forestry part, but also for livestock production within Guanare project site. At the moment of this report, 362 indirect job positions have been created and 64 direct jobs.

- 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. Guanaré/FAS 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.

The technology is incorporated to the company by the people who is working in it. All forestry workers in Guanare project are incorporating the use of technology (silvicultural technology, GPS, drons, vehicules, tools), increasing their working capacity beyond this project.

- Increased nationally added value to forestry products

Guanaré/FAS 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 Guanaré/FAS and of other similar initiatives in the area are also seeking carbon finance (GFP, Weyerhaeuser 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 Guanaré/FAS could be exported through Montevideo harbor at prices which will be higher than those that could be obtained by selling pulpwood, which is the traditional wood product exported from Uruguay.

In addition, the forest management adopted by Guanaré/FAS would increase the amount of carbon sequestered by trees, thus increasing the carbon embedded value in wood products.

- Development of new productive chains

Guanaré/FAS has no plans to not invest in the industry sector. Nevertheless, as mentioned above, Guanaré/FAS forest plantation may contribute to promote the establishment of industrial investments in the area.

In 2018, the government of Uruguay has signed a contract with a foreign company to establish the third pulp-mill in Uruguay. If all conditions are complied, the plant will be established in the center zone of Uruguay, closer to Guanaré/FAS project area. This new plant could be installed given the development of the forest sector in that region of the country. E. grandis has been established and managed for high-quality timber, and the reasonable market destination could be Rivera/Tacuarembo (sawmill) or Montevideo (harbor).

- Geographic decentralization of development

As it was mentioned above, Guanaré/FAS 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.

Guanaré/FAS has implemented a program to support and assist local communities, public schools, public entities (firefighters, police) or any stakeholders with problematics solvable by Guanaré/FAS, with donations of various types. From materials goods (firewood, tools, school supplies) to staff time (educational presentations in schools) and sometimes cash, Guanaré/FAS is committed to promote and enhance the well-being of the community. A complete and detailed list of donations is available for VVB during validation.

4 BIODIVERSITY

After the afforestation project is fully launched, there will be an increase in flora and fauna species, and the project will implement afforestation activities through scientific and rational allocation methods, without burning, cutting or harvesting native forests.

Ecotones and buffer areas are very important areas from the point of view of biodiversity and its conservation. 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 Guanaré, 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.

Due to traditional long-term livestock farming, ecological structure of most project sites was relatively homogenous, with low biodiversity. Guanaré/FAS 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.

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

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. Guanaré/FAS 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 "Santa Sofía", Garao, north of Plácido Rosas, province of Cerro Largo, there are complex ecosystems composed of primary swamp forests or "capones" associated to rain forests considered rare in the country and located in patches that add 186,9 ha. Since the end of 2013, this area has been considered of High Conservation Value since it is an area with exceptional characteristics, with relictual patches of flora from Brazil and mainly due to the diversity of flora species present.

Guanaré/FAS Project is FSC certified so it has a commitment with FSC values. One of these values is the prohibition of introduction of genetically modified organisms in forestry operations. The use of GMO´s is annually control during the FSC annual audits.

Regarding chemical products, Guanaré/Fas has implemented a Continuous Training Program addressed both to direct employees and contractors. Members of other forestry companies or of the communities located in the company's area of influence are also welcome to take part. The chemical products that are used in the plantation (herbicides and hormiguicides) are selected according to their efficacy proven by previous experiences for the type of control required. Only products that are permitted in accordance with current national regulations and the chemicals policy of the FSC® (Forest Stewardship Council®) are used.

4.1 Biodiversity Impact Monitoring

Biologists used different criteria for the categorization of forest properties in Guanare/Fas, pointing to the greater efficiency in the application of conservation measures and considering human and economic resources availability for their management and monitoring. Based on this 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 are applied over farms with HCVF or HCVF, presence of natural environments or species of particular study interest or farms with high species richness values. These studies involve annual

surveys, calculation of diversity indexes, spatial distribution, indicator species, wealth estimation, etc. The follow-up studies are 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.

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

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.

As an example, Figure 6 shows Margalef indexes results obtained from Guanare/Fas monitoring process from two representative farms/regions.

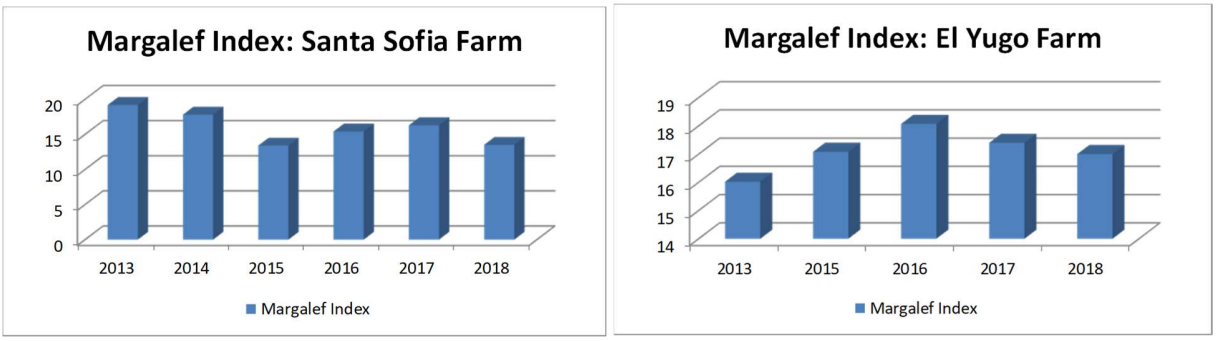

Figure 6: Margalef Indexes results obtained from Guanare/Fas monitoring process

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.

Also, during these biodiversity studies, biologists select different 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 is useful for diagnosing environmental quality because they have some important characteristics:

Table 2 shows the “indicator species” selected by Guanare/FAS biologists during the monitoring process

Table 2: Indicator Species selected by Guanare/FAS biologists.

Indicator Species	Indicator Area

Stephanophorus diadematus	natural environment conserved and slightly modified
Phylloscartes ventralis	natural environment conserved and slightly modified
Emberizoides ypiranganus	slightly modified environment quality
Bryconamericus iheringii	indicator of water quality, species intolerant to contaminated or modified natural environments
Syndactyla rufosuperciliata	natural environment conserved and slightly modified
Chyanocharax alburnus	natural environment conserved and slightly modified
Sittasomus griseicapillus	natural environment conserved and slightly modified

The fauna monitoring reports are done once a year in FAS/Guanaré representative farms, where biologists delivers detailed reports with detailed information.

Since 2012, FAS 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. Figure 7 shows front page of these publications:

Figure 7. Example of fauna and flora manuals

Different species that were observed by biologists during the monitoring process and that are included in groups like “rare specie”, IUCN Global Vulnerable or Near Threatened, IUCN Regional Vulnerable or Near Threatened or inside the “CITE” group, appendix 1.

Regarding flora studies, the works allowed to increase considerably the knowledge on flora of the country and especially of the northeast region.

The national herbarium collections of vascular plants were enriched thanks to numerous new collections, fruit of the surveys, samples that were deposited in the Herbarium of the Museum and Botanical Garden,

identified internationally with the acronym MVJB, with the scientific transcendence that it has, including publications in refereed journals.

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

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 follows:

a) Farms with AREAS OF HIGH VALUE OF CONSERVATION (AVC): "Santa Sofía "(Cerro Largo) by the presence of capons (swamp forests), sites that are characteristic and representative of those in the area - (AAVC1 due to the diversity of flora species).

b) Farms with areas of SPECIAL INTEREST FOR CONSERVATION: Native forest of "Las Cañas" and "El Yugo" (Cerro Largo), small capons and stony fields of "La Micaela", "Mederos", "Derley González", "Dellepiane", "Tacuarí", "Azotea de Ramírez" and" L.Barros ".