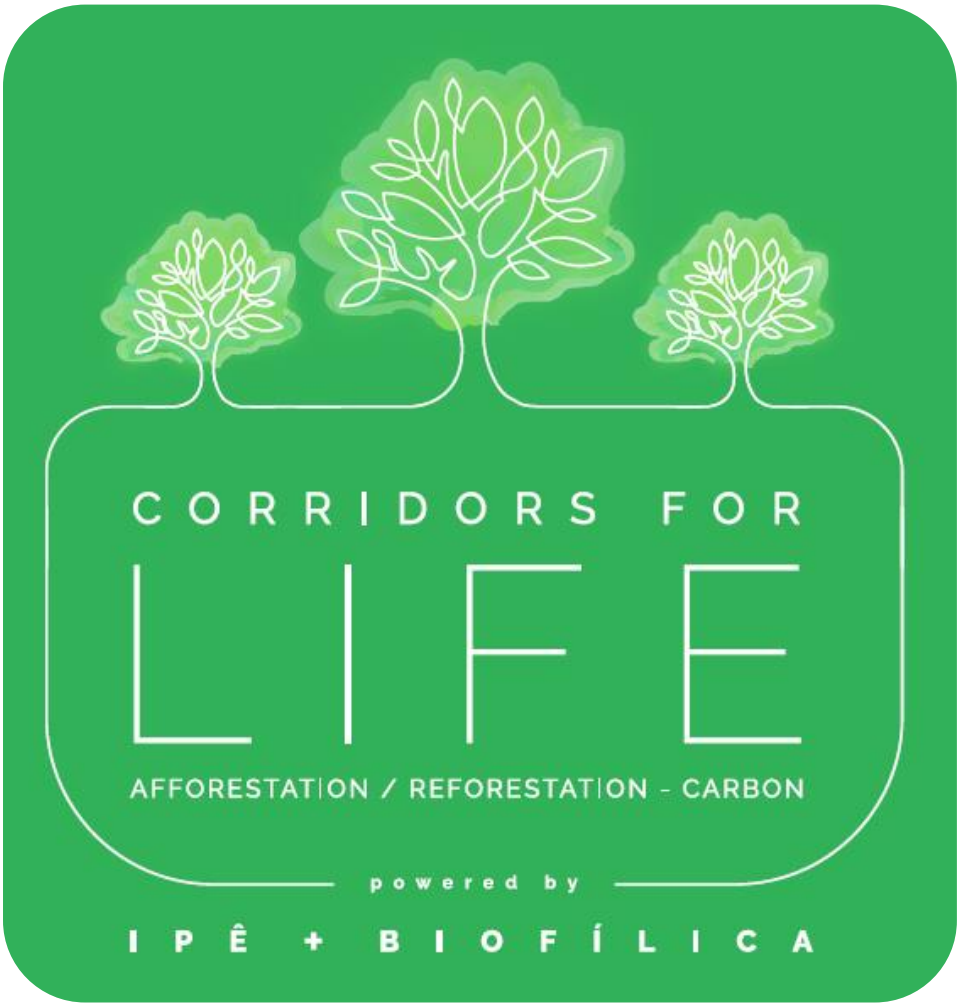
CORRIDORS FOR LIFE
ARR GROUPED PROJECT



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Project Title	Corridors for Life ARR Grouped Project
Version	1.0
Date of Issue	*21 October 2022*
Project Location	Brazil, State of São Paulo
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Project Lifetime	06 December 2021 – 05 December 2071; 50-year lifetime
GHG Accounting Period	06 December 2021 – 05 December 2071; 50-year lifetime
History of CCB Status	First validation attempt in December 2022
Gold Level Criteria	**Benefits of Biodiversity** The project generates exceptional benefits for biodiversity by connecting forest fragments and increasing habitat for fauna species that depend on large conserved and connected areas for their long term their survival and population viability, in particular jaguars (*Panthera onca*) and black lion tamarins (*Leontopithecus chrysopygus*), threatened with extinction in the Atlantic Forest.
Expected Verification Schedule	The first verification is expected to occur 3 years after validation.

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1 SUMMARY OF PROJECT BENEFITS

1.1 Unique Project Benefits

The Corridors for Life ARR Grouped Project aims at: mitigating climate change by planting of native trees that will remove carbon from the atmosphere; environmental and biodiversity conservation through the formation of ecological corridors that promote connectivity between the remaining forest fragments and that protect the soil and water resources; and the generation of employment and income through training and acquisition of products and services from local companies in the reforestation chain. With this, the project has the potential over its 50 years to restore 75,000 hectares and remove 565,678 tons of CO2e per year, generate 11,250 jobs, benefit 3,700 women and contribute to the conservation of 6 endangered species according to the Red List of the IUCN.

The summary results or impacts of benefits expected in the Corridors for Life ARR Grouped Project are in Table 1 below:

Table 1 - Summary of Benefits Expected in the Corridors for Life ARR Grouped Project

Outcome or Impact Estimated by the End of Project Lifetime	Section Reference
1) Expected Climate Benefits: it is expected that the Corridors for Life ARR Grouped Project, over its 50 years, will remove 28,283,928 tCO_2e from the atmosphere, which is equivalent to an average of 565,678 tCO_2e/year. This value is linked to the goal of restoring 75,000 hectares in within the Project Zone.	3
2) The benefits for the community located in the Corridors for Life ARR Grouped Project Zone and other stakeholders will be focused on the aspects of socioeconomic development, income generation and diversification, promotion of gender equity, opportunities for youth and women, technical training, environmental regularization, promotion of sustainable practices, and articulation of ways to educate people, environmentally speaking, about issues related to forest valuation and preservation, so that they can experience the benefits associated with human well-being, social and environmental harmony that the Project can provide.	4
3) Expected Benefits to Biodiversity: the Corridors for Life ARR Grouped Project will increase the native vegetation cover and connectivity between forest fragments of relevance to the Project Zone, through the implementation of reforestation via planting of native tree species and management of natural regeneration areas; improving population viability and, consequently, the conservation of species of fauna and flora, including those that are endemic, vulnerable, and threatened with extinction according to the IUCN Red List.	5

1.2 Standardized Benefit Metrics

Shown below are varied metrics for estimating the net benefit that the Corridors for Life ARR Grouped Project aims to achieve over the life of the Project (Table 2)

Table 2 - Estimated net benefit for different metrics over the lifetime of the Corridors for Life ARR Grouped Project.

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	28,283,928 t CO_2 eq.	3
	Net estimated emission reductions in the project area, measured against the without-project scenario	Not Applicable	-
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	Not Applicable	-
	For ARR[3] projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	75,000 hectares	2
Improved land management	Number of hectares of existing production forest land in which IFM[4] practices are expected to occurred as a result of project activities, measured against the without-project scenario	Not Applicable	-
	Number of hectares of non-forest land in which improved land management practices are expected to occurred as a result of project activities, measured against the without-project scenario	Not Applicable	-

[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
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	Potentially 11250 people	4
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	3700 women	4
Employment	Total number of people expected to be employed in project activities,[5] expressed as number of full-time employees[6]	11250 people	4
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	3700 women	4
Livelihoods	Total number of people expected to have improved livelihoods[7] or income generated as a result of project activities	To be defined	4
	Number of women expected to have improved livelihoods or income generated as a result of project activities	To be defined	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	11250 people	4
	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	3700 women	4

[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
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	11250 people	4
	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	To be defined	4
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	Not Applicable	-
	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	Not Applicable	-
Well-being	Total number of community members whose well-being[8] is expected to improve as a result of project activities	11250 people	4
	Number of women whose well-being is expected to improve as a result of project activities	3700 women	4
Biodiversity conservation	Expected change in the number of hectares managed significantly better by the project for biodiversity conservation,[9] measured against the without-project scenario	130.000 hectares	5
	Expected number of globally Critically Endangered or Endangered species[10] benefiting from reduced threats as a result of project activities,[11] measured against the without-project scenario	6 species	5

[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] 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
[10] Per IUCN's Red List of Threatened Species
[11] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 GENERAL

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Summary Description of the Project (G1.2)

The Corridors for Life ARR Grouped Project aims, through the remuneration of carbon credits, to enable large-scale reforestation of priority areas for environmental conservation in the Pontal do Paranapanema region, located in western São Paulo state in Brazil. The project strategy is based on the formation of ecological corridors to connect remaining forest fragments of the semideciduous Atlantic Forest through the planting of native trees in areas within private properties, which by law should be reforested (Brazilian Forest Code Law No. 12.651 of May 25, 2012), but that in practice do not happen due to barriers demonstrated in the analysis of additionality. Currently, these areas are mostly abandoned or unproductive and have in their surroundings extensive cattle raising and sugarcane production in partnership with large agribusinesses.

The Ecological Research Institute - IPÊ is an NGO that was founded for the conservation of the black lion tamarin (*Leontopithecus chrysopygus*), which is an endemic species of the Pontal do Paranapanema and threatened with extinction, and has been working for 30 years in the region of the grouped project developing science, training communities It has been working for 30 years in the region of the grouped project, developing science, training communities, articulating institutions, and promoting the structuring of companies in the reforestation chain to conserve biodiversity based on harmonious socioeconomic development between large farmers and rural settlers, who in the past had lived in a context of social conflict and environmental degradation. Throughout these years, the Map of Dreams was idealized, a mapping that shows the priority areas to be reforested in order to achieve IPÊ's objectives, but it only included 7 municipalities. With the partnership made with the Biofílica Ambipar Environmental Investments in 2020, the Map of Dreams was revised and expanded to 30 municipalities, encompassing an area of 1,750,453 hectares and delimiting the Project Zone. And it was through this partnership that it was possible to make forest restoration activities viable in the initial instances of the Corridors for Life ARR Grouped Project, which had its first seedling planted on December 6, 2021. The objective of the Project is to scale up the actions already carried out by the IPÊ in the region and reforest 75 thousand hectares in 20 years. With this goal, the Project has the potential to remove 568,174 tons of CO2e from the atmosphere per year, over the 50-year project period.

Within the Grouped Project Zone, some conservation units are present in addition to forest fragments in private areas, such as the Ecological Station (ESEC) Mico-Leão-Preto, the Private Natural Heritage Reserve (RPPN) Mosquito, the Peixe River State Park (PE), the Environmental Protection Area (APA) of the Paraná River Islands and Floodplains and, especially, the Morro do Diabo PE, which has 36,000 hectares and is the largest Atlantic Forest fragment in the interior of São Paulo, which demonstrates the environmental relevance of the project's operation. Finally, for reforestation for ecological purposes, which is an extremely complex and expensive operation, to be feasible in large scale, the project also focuses on promoting and training local companies that produce native forest seedlings and provide planting services. In this way, these companies, which are formed by people who have their values and background associated with life in the countryside, often marked by agrarian reform and rural extension, form the project's communities.

2.1.2 Project Scale

Project Scale	
Project	
Large project	X

2.1.3 Project Proponent (G1.1)

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2.1.5 Physical Parameters (G1.3)

Project Location

The Corridors for Life ARR Grouped Project is located in the west of the State of São Paulo (Brazil), in the region known as Pontal do Paranapanema, between the parallels 22°38'35.59"S & 22°15'43.18"S, meridians 53 °5'12.51"W & 52°0'26.30"W.

The Project Zone covers 1,750,453 ha and comprises 30 municipalities in the Presidente Prudente micro-region, including: Alfredo Marcondes, Alvares Machado, Anhumas, Caiabu, Caiuá, Emilianópolis, Estrela do Norte, Euclides da Cunha Paulista, Indiana , João Ramalho, Maraba Paulista, Martinópolis, Mirante do Paranapanema, Narandiba, Piquerobi, Pirapozinho, Presidente Bernades, Presidente Epitácio, Presidente Prudente, Presidente Venceslau, Rancharia, Regente Feijó, Ribeirão dos Índios, Rosana, Sandovalina, Santo Anastácio, Santo Expedito, Taciba, Tarabai and Teodoro Sampaio.

The landscape of the Project Zone is characterized by different contexts of land use and governance. The region has five Conservation Units (habitat reserves with different degrees of protection under the law 9.9835 of 2000): Environmental Protection Area (APA) Ilhas e Várzeas do Rio Paraná, Ecological Station (ESEC) Black-leão Mico, Reserva Private Natural Heritage (RPPN) Mosquito, Rio do Peixe State Park and Morro do Diabo State Park. In addition to these protected areas, the Project Zone features private rural properties and Agrarian Reform Settlements of the National Institute for Colonization and Agrarian Reform (INCRA), which are areas where its inhabitants have possession of land, which belongs to the government. The predominant land uses in the Project Zone are pastures and sugarcane plantations, with only 8.4% native forest cover.

Access to the Project Zone takes the following forms: - By land: via BR-374 (Rodovia Castelo Branco), SP-294 (Rodovia Comandante João Ribeiro de Barros) and SP-270 (Rodovia Raposo Tavares). The project properties can be accessed via SP-613 (Rodovia Arlindo Bettio) and SP-272 (Rodovia Olímpio Ferreira da Silva). By air: regular flights to Presidente Prudente state airport. Figure 1 shows the location of the Project Zone.

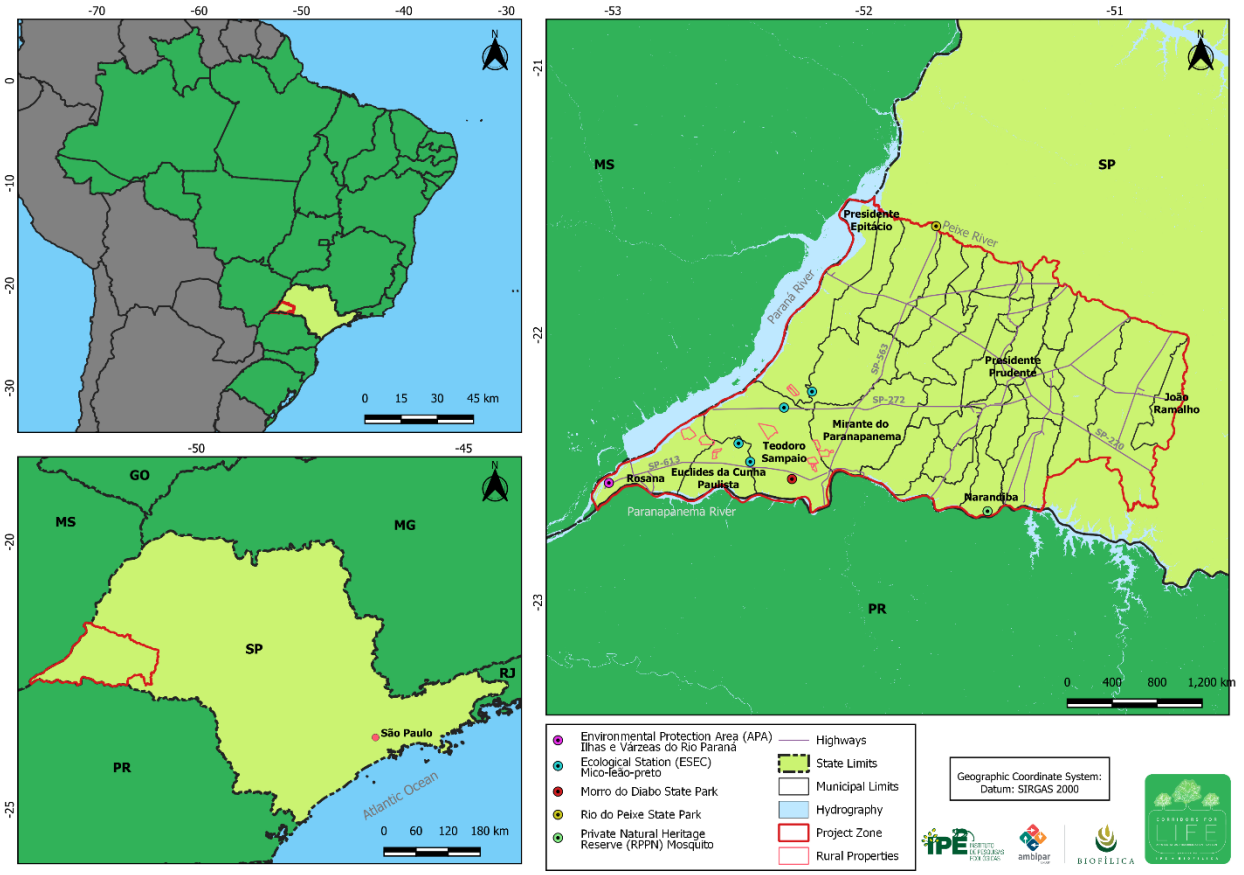

Figure 1 - Location of the Project Zone

Geological Aspects

The lithostratigraphic units outcropping in the Pontal do Paranapanema Region, where the Grouped Project Zone is located, belong, except for the Alluvial Deposits, to Groups located in the Bauru and Serra Geral basins. These units were formed in the Cretaceous Period (about 145 to 65.5 million years ago) and the Alluvial Deposits are more recent, formed in the last phase of the Neogene Period (Holocene, about 10,000 years ago). The most common Group in the Project Zone is the Bauru Group, followed by the Caiuá Group, both constituting the suprabasaltic neocretaceous sequence of the Bauru Basin.

In summary, the lithostratigraphic units need to be taken into consideration in order to evaluate their possible implications for the project's operational plan, mainly with regard to their erosion and flooding potentials. In this sense, part of the municipalities that are part of the Project Zone are located over rocks of the Bauru and Caiuá Groups, both formed by sandstones. This material gives rise predominantly to sandy and medium texture soils, some with an abrupt textural gradient, which, if combined with steep slopes, are highly susceptible to water erosion. The sandstones of the Bauru and Caiuá Groups are porous and constitute the Bauru Aquifer System, an open system whose groundwater recharge occurs through the hydrographic network. Due to the great porosity and the recharge system, this aquifer is susceptible to contamination from several sources, such as agrochemicals.

The Serra Geral Formation of the São Bento Group, on the other hand, due to the constitution of its matrix, gives rise to soils with a medium to clayey texture, more resistant to erosion. However, these soils often have an abrupt textural gradient and are located in regions of steeper relief, which favors the unleashing of the erosion process. In turn, the areas of Alluvial Deposits, due to their position in the relief (near the banks of streams) give rise to soils subject to periodic flooding, with upwelling of the water table. The indiscriminate use of these soils can lead to the contamination of surface and underground water.
The main characteristics of the Formations found in the Project Zone are described below, organized by Groups and in approximate chronological order, according to the Geological Map of the State of São Paulo (CPRM:2006).

São Bento Group

Serra Geral Formation

The Serra Geral Formation occurs in outcrops along the banks of the Paranapanema River, one of the main rivers in the Project Zone. It covers the municipalities of Mirante do Paranapanema, Sandovalina, Narandiba, Taciba, Regente Feijó, Rancharia and João Ramalho. According to the Geological Survey of Brazil (Marconato et al. 2006), the Serra Geral Formation constitutes, together with the Botucatu Formation, the Serra Geral Basin, corresponding to the Gondwana III Supersequence.

This formation is the result of intense fissural magmatism, represented in the form of a thick lava cover, about 1,500 meters thick near the central depositional area of the basin, associated with an extensive network of dikes and multiple levels of intrusion into the sedimentary stack. The spills settle over the eolic sandstones of the Botucatu Formation, with sub-horizontal inclinations of up to 5° towards the basin center. They are mainly composed of tholeiitic basalts and tholeiitic andesi-basalts, with augite and pigeonite, which make up about 90% of the total volume of the extrusive rocks. The basaltic rocks are composed of phenocrysts of augite, plagioclase, pigeonite, titanomagnetite and olivine, in a matrix composed of these same minerals. The intermediate rocks contain phenocrysts of augite, plagioclase, pigeonite and titanomagnetite. The acid rocks have plagioclase phenocrysts that can make up to 30% of the rock volume, besides others of augite, pigeonite and titanomagnetite in a matrix composed of quartz, alkali feldspar, plagioclase, pyroxenes, titanomagnetite and ilmenite.

Bauru Group

Vale do Rio do Peixe Formation

The Vale do Rio do Peixe Formation is the one that predominates in the Project Zone, outcropping in the highest portions of the relief, in the watersheds. It occurs in the municipalities of Teodoro Sampaio, Mirante do Paranapanema, Marabá Paulista, Presidente Epitácio, Presidente Venceslau, Caiuá, Piquerobi, Ribeirão dos Índios, Emilianópolis, Presidente Bernardes, Santo Anastácio Alfredo Marcondes, Santo Expedito, Caiabu, Presidente Prudente, Indiana, Álvares Machado, Tarabai, Pirapozinho, Sandovalina, Narandiba, Taciba, Anhumas, Regente Feijó, Martinópolis, Rancharia, and João Ramalho.

The Vale do Rio do Peixe Formation is the unit with the largest outcropping area of the Bauru Group, constituting its basal unit, resting directly on the basalts of the Serra Geral Formation. To the west and southwest it forms a gradual transition with sediments of the Santo Anastácio Formation, covering them. This formation consists of tabular layers of very fine to fine, brown, pink and orangey sandstones, dominantly exhibiting good to moderate selection. They may be massive or exhibit small to medium tabular and fluted cross-stratification or coarse planar-parallel stratification.

The sandstones are interlayered with sandy siltstones or sandy mudstones. Also interbedded are tabular layers of massive cream to brown siltstones. Locally, small cross-stratified lenses of conglomeratic sandstone containing clayey or carbonate intraclasts may occur. The depositional environment is primarily aeolian, consisting of sand sheets and small aeolian dunes, alternating with loess deposits. Locally deposited mudstones are related to shallow, ephemeral water bodies created during periods of rising water

levels. The fossiliferous content consists of bone fragments of reptiles, mollusks and arthropods. Root molds, caracaceous algae oogonia and small animal tubes also occur.

Presidente Prudente Formation

The Presidente Prudente Formation outcrops in the watersheds between the Peixe and Paranapanema basins. In the Project Zone, it occurs in the municipalities of Pirapozinho, Álvares Machado, Presidente Prudente, Anhumas, Regente Feijó, Indiana, and Martinópolis. This formation also covers the headwaters of rivers near the city of Presidente Prudente, being composed predominantly of very fine to fine sandstones and sandy mudstones. These lithologies are alternated with lens-shaped sandstones with channeled cross-stratification, tabular sandstones with internal sigmoidal stratification, sandstones to tabular siltstones with planar-parallel stratification and water-flow structures, and with massive clayey mudstones in tabular strata. The depositional environment is of meandering fluvial system with broad, shallow channels and marginal dike breakthrough deposits. Paleocurrents indicate southwestward flow. The fossiliferous content includes remains of reptiles, chelonians, invertebrates (bivalves, gastropods and crustaceans) and tubular features in floodplain lithofacies probably indicating root molds.

Caiuá Group

Paraná River Formation

The Paraná River Formation occurs strikingly in the lower region of the Pontal do Paranapanema, in the plains near the meeting of the Paranapanema and Paraná rivers. In the Project Zone, the Paraná River Formation outcrops in the municipalities of Rosana, Euclides da Cunha Paulista, Teodoro Sampaio, Mirante do Paranapanema, Sandovalina, Presidente Venceslau, and Marabá Paulista.

The Morro do Diabo State Park, in the municipality of Teodoro Sampaio, is located in this Formation, which composes, together with the Santo Anastácio Formation, the Caiuá Group, and presents thicknesses of about 250 meters. Its basal contact is non-conformity with the Serra Geral Formation, and the lateral contact is gradual with the Goio Erê Formation. This unit is composed of reddish-brown, fine to very fine, rarely medium to coarse quartz sandstones. Mineralogically they are supermature, with good textural maturity.

The internal selection of the laminae or strata is good, with well-rounded grains in the coarser fractions and little silty-clay matrix. It presents lamination or cross-layering formed by alternating bands of millimeter to centimeter thickness, of good internal selection and bimodal character, generated by grain fall. They exhibit medium to large tabular and tangential cross stratification, with sets of cuneiform geometry, limited by truncation surfaces. The sediments of the Paraná River Formation represent amalgamated deposits of large aeolian dunes (draas), components of a sand sea in a desert environment.

Santo Anastácio Formation

The Formation occurs markedly in the municipalities of the Project Zone, Teodoro Sampaio, Mirante do Paranapanema, Sandovalina, Estrela do Norte, Pirapozinho, Presidente Epitácio, Presidente Venceslau, Marabá Paulista, Caiuá, Piquerobi, Ribeirão dos Índios, Presidente Bernardes, Emilianópolis, Santo Expedito, Presidente Prudente, and Caiabu. The Rio do Peixe State Park lies over this formation.

It presents gradual and recurrent passages to the Rio Paraná and Vale do Rio do Peixe Formations (Bauru Group), with maximum thicknesses of 70 to 100 meters. It is composed of subarcosean quartz sandstones, fine to very fine, poor selection and little silty-clay matrix. Usually massive, they may locally exhibit incipient planoparallel and small cross stratification. Grains are subangular to subrounded, matte covered by iron oxide film. Lamite and argillite intercalations rarely occur.

The depositional context is that of essentially dry sand sheet deposits, accumulated on extensive desert plains, situated at the edge of the large sand dune complexes of the Caiuá Desert. Rarely occurring deposits from sporadic torrential rains (wadis).

Alluvial Deposits

In the Project Zone, Alluvial Deposits are found along the margins of the Paraná River (Rosana, Mirante do Paranapanema, Marabá Paulista, and Presidente Epitácio), the Paranapanema River (Rosana, Euclides da Cunha Paulista, Mirante do Paranapanema, Teodoro Sampaio, and Sandovalina), and the final portion of the Peixe River (Presidente Epitácio, Presidente Venceslau, Caiuá, Piquerobi, Ribeirão dos Índios, Emilianópolis, and Santo Expedito). They constitute deposits on the banks, channel bottoms, and river flood plains, with sands, gravel, silts, clays, and, locally, peat, resulting from the processes of erosion, transport, and deposition from diverse source areas.

Geomorphological Aspects

The landscape of the Project Zone is characterized by the combination of shallow hills and slopes with altitude between 250 and 500 meters above sea level. The physical limits of the Pontal do Paranapanema Region are given to the north with the Peixe River, to the south with the Paranapanema River, to the west with the Paraná River and to the east with the Laranja Doce River and the Ribeirão dos Gaúchos Stream. The region is predominantly located on the Central Plateau of the Paraná Basin, with a strip closer to the Paranapanema River, characterized by river plains.

Most of the Project Zone is formed by gently sloping terrain, with broad, dissected hills or low hills, in addition to fluvial plains. With the exception of the latter, most of these terrains are associated with sandstones, which confers good drainage and medium to high susceptibility to erosion, depending on the slope.

On the other hand, in the fluvial plains and terraces, the position of the water level is shallow and water pumping is facilitated. However, in places where the water table rises or is located very close to the surface, drainage is slower, with low oxygenation and reduced potential for self-depuration, so they are more vulnerable to the concentration of contaminants from diffuse sources, such as sediments coming from the slopes, or point source, such as industrial effluents, domestic sewage dumping, etc. These more fragile areas are found on the banks of the Peixe, Paranapanema, and Paraná Rivers.

Next, based on the publication of the Geodiversity of the State of São Paulo (Peixoto et al. 2010), the main relief forms present in the Geomorphological Mapping of the State of São Paulo (IPT, 1981) are characterized, seeking to locate them spatially in the Project Zone, and relate them to the corresponding geological substrate, pointing out their potential and limitations regarding anthropic activities.
Dissected Hills and Low Hills

The Dissected Hills and Low Hills Domain is present in the Project Zone and is generally located in the upper (hilltops) and middle portions of the relief (slopes), with slopes that vary from 5 to 20º and with a topographic amplitude of 30 to 80 meters. This unit is associated with sandstones of the Marília, Presidente Prudente and Araçatuba Formations, of the Bauru Group, both formed by intercalations of sandy, silty-clayey sediments and shales; and of the Santo Anastácio and Vale do Rio do Peixe Formations, of the Caiuá Group, formed by thick sandstone packages of mixed (eolic and fluvial) deposition.

The association of this relief form with the Vale do Rio do Peixe Formation is the one with the largest occurrence in terms of area in the Project Zone. Such areas are favorable to pedogenesis, with a predominantly deep alteration mantle, generating excessively sandy, friable, permeable and very susceptible to erosion soils. Due to the fact that the original material presents, in its composition, sandstones with a high clay content and carbonate matrix, the soils originating from these sandstones present textural characteristics and fertility potential for intensive agricultural and mechanized use, even in regions with more undulated relief.

Gentle Broad Hills

The Broad and Gentle Hills Domain is located on the plains near the water courses and presents slopes that vary from 3 to 10º and topographic amplitude of 20 to 50 meters. This unit is associated with sandstones

of the Marília and Araçatuba Formations, of the Bauru Group, both formed by intercalations of sandy, silty-clayey sediments and shales; of the Santo Anastácio, Vale do Rio do Peixe and Rio Paraná Formations, of the Caiuá Group, formed by thick sandstone packages of mixed (eolic and fluvial) deposition; and of the Serra Geral Formation, of the São Bento Group, formed by igneous rocks (predominantly basalts).

Like the Dissected Hills and Low Hills, the association of the Soft Broad Hills unit with sandstone rocks favors pedogenesis, generating sandy, friable, permeable and susceptible to erosion soils, although this susceptibility is relatively lower in this unit due to the lower slope. The soils originating from these sandstones present textural characteristics and fertility potential for intensive and mechanized agricultural use, especially in regions with smoother relief.

Fluvial or Fluvio-Lacustrine Plains

The Fluvial or Fluvio-Lacustrine Plains occur in the final portion of the Peixe River (and its meeting point with the Paraná River), besides being found on the banks of the Paraná and Paranapanema rivers. This relief form is associated with sandstones of the Santo Anastácio Formation, of the Caiuá Group; with Alluvial Deposits in the margins of the Paraná River, in the city of Presidente Epitácio. In the city of Presidente Epitácio, the unit occurs on the banks of Paraná River and in Euclides da Cunha Paulista, Mirante do Paranapanema and Sandovalina it occurs on the banks of Paranapanema River.

In the municipalities of Teodoro Sampaio and Rosana, the unit occurs on the banks of both rivers. In summary, it is predominantly flat terrain (with slopes ranging from 0 to 3º), without topographic variation, with low density of drainage channels. Like the River Terraces unit, these terrains are characterized as recent alluvial plains, composed of unconsolidated sediments of variable thickness, very susceptible to flooding.

From the bottom to the top of these plains occur deposits of gravel, sand, and clay, with potential for mining activities. Due to periodic flooding and the sandstone parent material, these terrains have high porosity and often have soils of renewed natural fertility, rich in organic matter, with high nutrient fixing capacity. However, there is a risk of groundwater and surface drainage contamination by agrochemicals.

Fluvial Terraces

The Terraços Fluviais occur in the final portion of the Peixe River, immediately before it flows into the Paraná River, and are associated with the Santo Anastácio Formation and Paraná River, of the Caiuá Group. The terrain has slopes ranging from 0 to 3º and topographic amplitude from 2 to 20 meters, characterized as recent alluvial plains, composed of unconsolidated sediments of variable thickness.
From the base to the top of these plains occur deposits of gravel, sand, and clay, with potential for mining activities. These relief forms have poorly developed soils, acidic, with a high concentration of organic matter and with reduced drainage, being regions with great potential for the formation of long-term floods, especially if not protected by native vegetation.

Tabuleiros

The geomorphological unit of "Tabuleiros" occurs on hilltops on the eastern margin of the Project Zone, in the municipalities of Marabá Paulista, Presidente Bernardes, Presidente Epitácio, Santo Anastácio, Mirante do Paranapanema, Sandovalina and Teodoro Sampaio, associated with sandstones of the Vale do Rio do Peixe Formation, of the Bauru Group.

It is a flat to gently undulating terrain, with slopes that vary from 0 to 3º and topographic amplitude of 20 to 50 meters. Compared to the other units that occur in the region, they are considered to have low susceptibility to water erosion and natural mass movements, because the slope is gentle and the soils originating from these sandstones of eolic or fluvial origin have a high clay content and are generally deep. For these reasons, they are suitable for multiple uses such as more intensive and mechanized agriculture, as well as urban occupation.

Pedological Aspects

The Ecological Economic Zoning - ZEE of the State classifies 43% of the Pontal do Paranapanema region as unsuitable for agriculture, mainly because of its sandy soils and vulnerability to erosion. Pastures, subsistence crops and sugarcane plantations cover most of the landscape and the pedology is characterized by the extension of poor soils, with little availability of nutrients and excess of aluminum (IBGE, 2012).
The main pedological units of the Project Zone are described below (According to Figure 2), organized by Order and by Sub-Order, based on Rossi (2017) and the Brazilian Soil Classification System (Embrapa, 2006).

Argisols

These comprise soils composed of mineral material, whose main characteristic is the presence of a B textural horizon of low or high activity clay combined with low base saturation or allytic character. The B textural horizon (Bt) is located immediately below any type of surface horizon, except the hystic, without, however, presenting the requirements to be classified as Luvissolos, Planossolos, Plintossolos or Gleissolos (Embrapa, 2006). In the Project Zone, the suborders of the type Red-Yellow Argisol and Red Argisol occur in all the municipalities.

Latosols

These are soils composed of mineral material, with a latsolic B horizon immediately below any of the superficial diagnostic horizon types, except hysterical (Embrapa, 2006). They are highly weathered soils, highly evolved as a result of energetic transformations of the parent material, and therefore devoid of primary or secondary minerals that are less resistant to weathering. The sub-orders of Latosol present in Pontal do Paranapanema are of the type Red-yellow Latosol and Red Latosol, occurring in the areas of less rugged relief of all the municipalities in the Project Zone, with the exception of Álvares Machado, Presidente Prudente and Caiabu.

Nitosols

These are soils composed of mineral material, with a B to A horizon with clay of low activity or alitic character in most of the B horizon, within 150cm of the soil surface. They have a clayey or very clayey texture (clay content greater than 350g/kg of soil from the A horizon onwards, and a textural ratio equal to or less than 1.5). The Nitosols occur along the banks of the Paranapanema River, in the municipalities of Pirapozinho, Narandiba, Taciba, and Rancharia, presenting the suborder Red Nitosolo.

Neosols

These are soils composed of mineral material, or by organic material not very thick, that do not present expressive changes in relation to the original material due to the low intensity of action of the pedogenetic processes, either due to characteristics inherent to the original material, such as greater resistance to weathering or chemical-mineral composition, or due to the influence of other formation factors (climate, relief or time), which can prevent or limit the evolution of the soils. In the Project Zone the Litholic Neosols, Fluid Neosols and Quartz Neosols sub-orders are found.

Platosols

Mineral soils that are imperfectly or poorly drained, with a superficial or subsurface eluvial horizon, of lighter texture, that contrasts abruptly with the B horizon or with an abrupt transition combined with a marked difference in texture from the A horizon to the immediately underlying B horizon, dense, generally with a marked clay concentration, slow or very slow permeability, sometimes constituting a horizon responsible for the formation of an overlapping (suspended) water table, of periodic existence and variable presence during the year. In the Project Zone occurs the suborder of the Planossolo Háplico type.

Gleissols

These are hydromorphic soils, composed of mineral material, that present a glei horizon within 150cm of the soil surface, immediately below the A and E horizons (with or without gleisance), or of a hystic horizon with insufficient thickness to define the class of Organosols; not exclusively sandy or sandy loam in all horizons within the first 150cm of the soil surface or up to a lithic contact, nor veric horizon, or textural B horizon with abrupt textural change above or coincident with the glei horizon or any other type of diagnostic B horizon above the glei horizon. In the Project Zone a suborder of the type Gleissolo Háplico occurs.

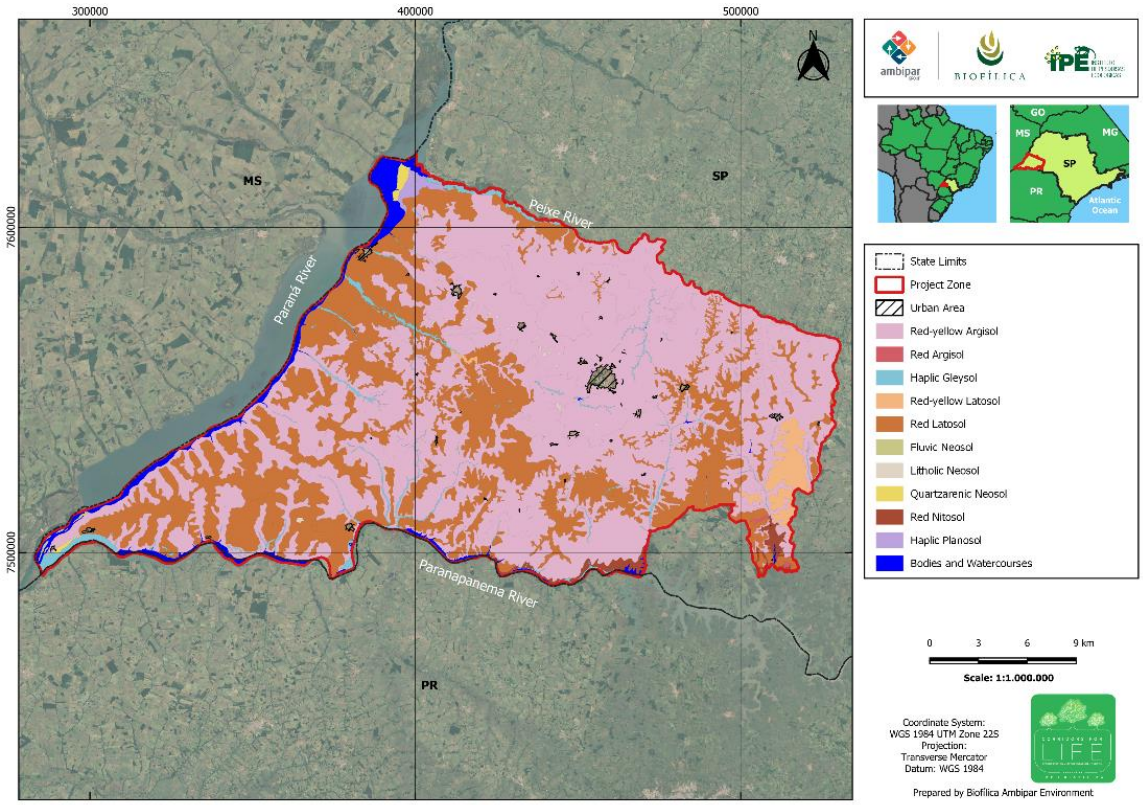

Figure 2 - Characterization of soils in the Project Zone

Climate Aspects

The climate of the western region of the state of São Paulo is type Aw, that is, humid tropical climate called savanna climate, with a dry winter (Sparovek et al. 2007). The rainy season is in the summer, from November to April. The average annual temperature is 21°C and the average temperature of the coldest month is above 18°C, presenting precipitation greater than 750 mm annually, reaching 1,300 mm (PEMD 2006).

As one moves westward and southward of the Project Zone, the tendency for total annual precipitation to increase (1,360.1 mm at Rosana) is observed. The distribution of rainfall throughout the year also changes according to geographic position, with the easternmost municipalities of the study area presenting drier months with rainfall below 30 mm (Presidente Bernardes). The municipalities further west, on the other hand, present precipitation in the driest month above 35 mm, with the highest value found for Rosana (44 mm in the month of July).

The temperature behavior also changes according to the geographic position, with higher average annual temperatures in the northern municipalities of the Project Zone (Presidente Bernardes, all above 23,8°C) and lower in the south (Marabá Paulista, Mirante do Paranapanema, Euclides da Cunha Paulista and Rosana, the latter with an average temperature of 23,1°C). Average minimum temperatures also decrease as one approaches the southernmost region of the Pontal do Paranapanema, the lowest temperature found for the month of July being in Rosana (13.3°C).

Hydrographic Aspects

The Project Zone is located between the mouths of two large rivers, which run practically parallel in the east-west direction in the State of São Paulo, flowing into the Paraná River, already on the border with the State of Mato Grosso do Sul, being the Peixe River and the Paranapanema River (Figure 3).

The Water Resources Management Units (UGRH) are geographic cutouts that adopt the hydrographic basin as the physical-territorial unit for planning and managing water resources. Due to its purpose, besides the geographic cutout, hydrological, environmental, socioeconomic, political and institutional characteristics are also considered as criteria for the division of UGRHIs (Braga, 2017).

Law No. 9,034/1994 divided the State of São Paulo into 22 UGRHIs. The Project Zone belongs to the Water Resources Management Unit 22 (UGRH-22) and has a drainage area of 12,395 km². Its rivers flow both in the east-west direction, flowing into the Paraná River, as is the case of the Santo Anastácio River, the Lagoa Stream and the Anhumas Stream, and in the north-south direction, flowing into the Paranapanema River, as the Pirapozinho Stream, the Anhumas Stream, the Bonito River, the Caiuá Stream, the Laranja Doce Stream, among others.

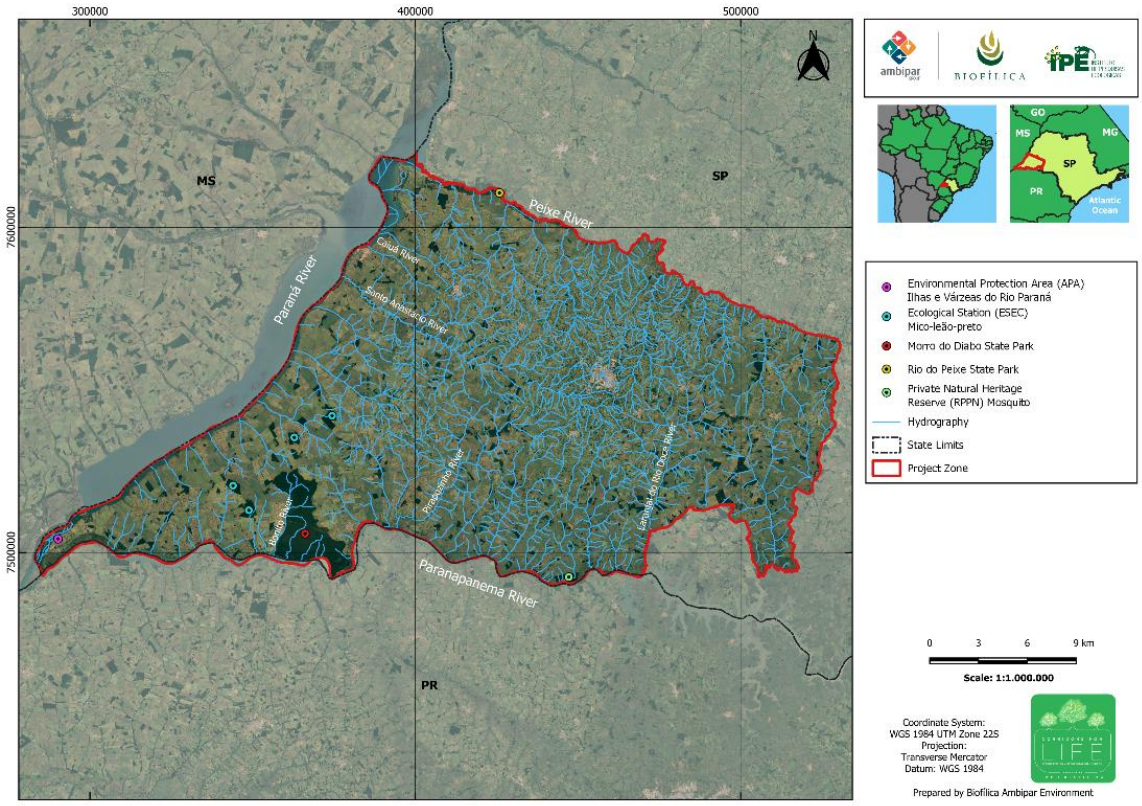

Figure 3 - Hydrographic characterization in the Project Zone

Vegetation Aspects

Originally, the Pontal do Paranapanema region was entirely covered by the Atlantic Forest biome, with some enclaves of Cerrado. Today, the landscape of the Project Zone is characterized by scattered and isolated forest remnants inserted in an agricultural landscape, being considered a priority area for conservation. The region has one of the lowest percentages of vegetation cover in the State and the largest Legal Reserve deficits (Rodrigues, 2006). Allied to this situation, the presence of isolated Conservation Units makes ecological sustainability fragile.

Among the protected vegetation remnants in Pontal do Paranapanema, there are two state Conservation Units (Morro do Diabo State Park and Rio do Peixe State Park) and two federal ones (Mico Leão-Preto Ecological Station and the Environmental Protection Area of Ilhas e Várzeas do Rio Paraná), representing islands of disconnected forests and within a region of low vegetation cover. The Morro do Diabo State Park represents the most representative Conservation Unit of the study area and the largest remaining continuous area of Semideciduous Forest that covers western São Paulo.

Despite the intense anthropization to which the entire area of West São Paulo was historically subjected due to the usable soils and favorable topography, this region presents different physiognomies depending on the soil and terrain conditions. In general terms, the Semidecidual Formations predominate in the Project Zone. This type of vegetation is conditioned by the double climatic seasonality, a tropical one with summer rainy seasons followed by accentuated droughts and a subtropical one without a dry period. It consists of phanerophytes with leaf buds protected from the dry period by scales, having deciduous sclerophyllous or membranaceous leaves, so that the percentage of deciduous trees in the forest is between 20% and 50%.

In addition, these forests are up to 20 meters tall, in addition to large emergent trees that can reach 30 meters. The stratification is consolidated with 3 to 4 strata, namely: sparse herbaceous, understorey, canopy, and emergent. The presence of climbers is abundant and epiphytes are rare.
Considering the Project Zone, phytophysiognomies of the Atlantic Forest and Cerrado were identified, among them the Alluvial Semidecidual Seasonal Forest, Submontane Semidecidual Seasonal Forest, Montane Semidecidual Seasonal Forest, Wooded Savanna, Forested Savanna, Pioneer Formation with River and/or Lake Influence, besides Secondary Vegetation coverings and Forestation/Reforestation (according to *Figure 4*). Below are described the main characteristics of each physiognomy, according to the classification of Veloso et al. (1991).

Alluvial Semidecidual Seasonal Forest

It is a formation found more frequently in depressions, on riverbanks and wetlands. In this formation there are several abundant species of the Tabebuia genus, besides the ecotypes *Calophyllum brasiliense, Tapirira guianensis, Inga sp., Podocarpus sellowii, Cedrela lilloi, Guarea guidonia*, among others.

It can occur in valley bottoms, due to specific edaphic conditions, and its vegetation varies from herbaceous in areas with an upwelling water table and permanently flooded to forest in areas that are periodically flooded. These formations include the Marsh Forests (permanently flooded) and the Riparian Forests (periodically or not flooded) (Rodrigues & Leitão Filho 2001). The most common species of forest physiognomy in areas under the influence of the water table are: *Croton urucurana, Cecropia pachystachya, Guadua sp., Nectandra megapotamica, Erythrina crista-galli, Inga laurina, Inga striata, Inga vera, Guarea guidonea, Ficus insipida, Syagrus romanzoffiana, Syagrus oleraceae, Mauritia flexuosa, Triplaris brasiliana, Allophylus edulis, Luehea divaricata* and *Tabebuia dura.*

Submontane Semidecidual Seasonal Forest

It is the predominant phytophysiognomy in the Project Zone, occurring in sandy areas and deciduous ecotones, with the occurrence of the genera *Hymenaea* (Jatobá), *Copaifera* (Óleo-vermelho), *Peltophorum* (Canafistula), *Astronium*, *Tabebuia*, *Aspidospenna*, with its ecotype *A. polyneuron* (Peroba-rosa), among others.

In these forests, the following species predominate in the tree stratum: *Anadenanthera colubrina, Aspidosperma polyneuron, Albizia niopoides, Cariniana estrellensis, Cedrela fissilis, Copaifera langsdorffii, Gallesia integrifolia, Hymenaea courbaril, Myracrodruon urundeuva, Ceiba speciosa, Handroanthus impetiginosus* and *Zeyheria tuberculosa*.
It also occurs in soils covering slopes and gently undulating terrain that are less deep and have a higher sand content. However, in these environments, it generally presents a lower height and greater predominance of *Machaerium spp*. and *Lonchocarpus spp*. species (Martins 1993).

Semidecidual Seasonal Montane Forest

These are formations established in areas above 500 meters of altitude, where the genera and ecotypes of wide dispersion predominate, among them *Cassia, Anadenanthera peregrina, Astronium* and others.

Wooded Savanna

This formation is characterized by presenting a sparse nannophanerophytic physiognomy and another graminoid hemicryptophytic, continuous, subject to annual fire. These dominant syncytia form a physiognomy on degraded land. The floristic composition, although similar to that of the Savanna Forested (Cerradão), has dominant ecotypes that characterize the environments according to the geographic space occupied, such as *Stryphnodendron astringens* (Barbatimão).

Forested Savanna

This formation occurs more frequently in sandy areas leached with deep soils, being characteristic of tropical seasonal climate. It presents woody synusia of tortuous micro- and nanophanerophytes with irregular branching, provided with perennial or semideciduous sclerophyllous macrophylls, rigid corticolous exfoliated rhytidome or massively suberous cortex, with underground reserve organs or xylopodium. It does not present a clear camphyllous synus, but rather a hemicryptophytic relief, permeated with stunted woody plants and dwarf palms. Its floristics is characterized by dominant typical phanerophytes, such as: - *Caryocar brasiliense* (Pequi), *Salvertis convallariodora* (Pau-decolher), *Boldichia virgilioides* (Sucupira-preta), *Dimorphandra mollis* (Faveiro), *Qualea grandiflora* (Pau-terra-de-folhas-grandes), *Qualea parviflora* (Pau-terra-de-folhas-miúdas), *Anadenanthera peregrina* (Angico-preto) and *Kielmeyera coriacea* (Pau-santo).

Pioneer formation with fluvial and/or lake influence

This formation consists of plant communities of alluvial plains that reflect the effects of river flooding in the rainy seasons or, alternatively, of permanent floodable depressions. In these floodable terrains, depending on the amount of standing water and the time it remains in the area, the plant communities range from cryptophytic swampy (hydrophytes) to temporarily floodable terraces.

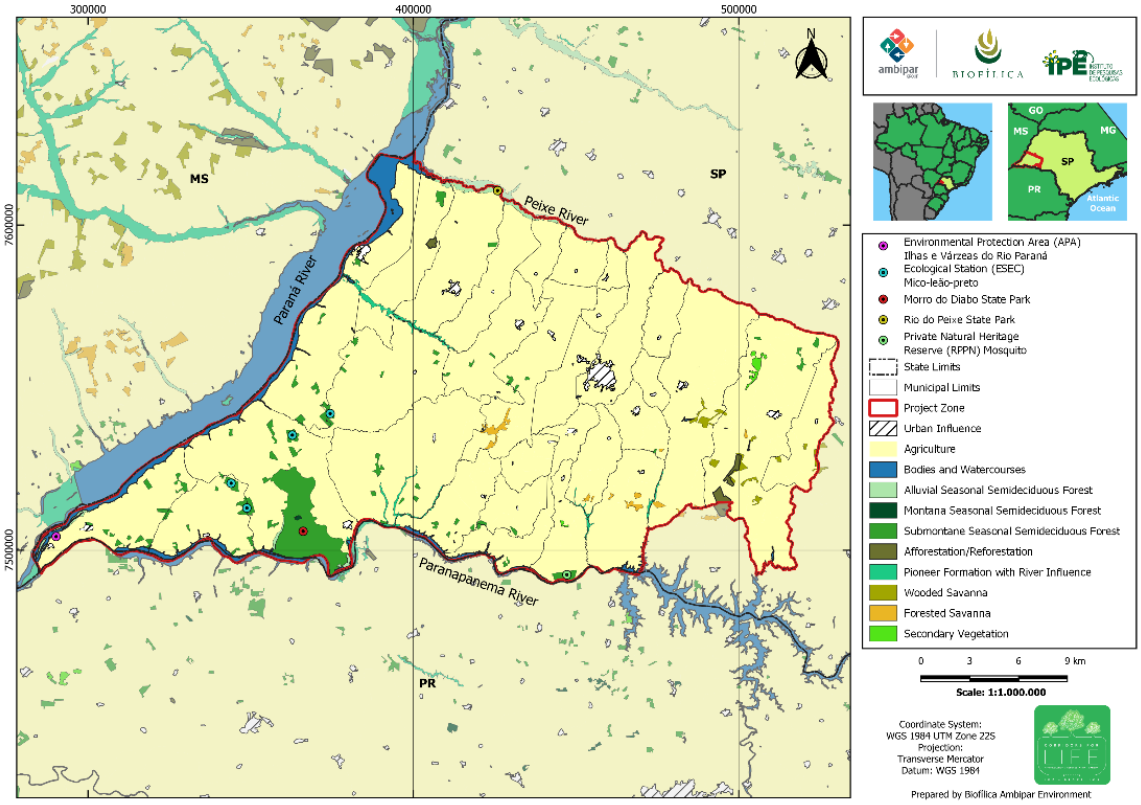

Figure 4 - Vegetation characterization in the Project Zone.

2.1.6 Social Parameters (G1.3)

This project is based in the region known as Pontal do Paranapanema, located in the State of São Paulo (SP), Southern Brazil. This region belongs to the administrative zone of the Presidente Prudente district and is bordered by the Parana River on the northwest and the Paranapanema River on the south. The project area encompasses thirty municipalities: Alfredo Marcondes, Alvares Machado, Anhumas, Caiabu, Caiuá, Emilianópolis, Estrela do Norte, Euclides da Cunha Paulista, Indiana, João Ramalho, Maraba Paulista, Martinópolis, Mirante do Paranapanema, Narandiba, Piquerobi, Pirapozinho, Presidente Bernades, Presidente Epitácio, Presidente Prudente, Presidente Venceslau, Rancharia, Regente Feijó, Ribeirão dos Índios, Rosana, Sandovalina, Santo Anastácio, Santo Expedito, Taciba, Tarabai, Teodoro Sampaio. The total size of the project area is approximately 1.752.371,00 hectares (Figure 5).

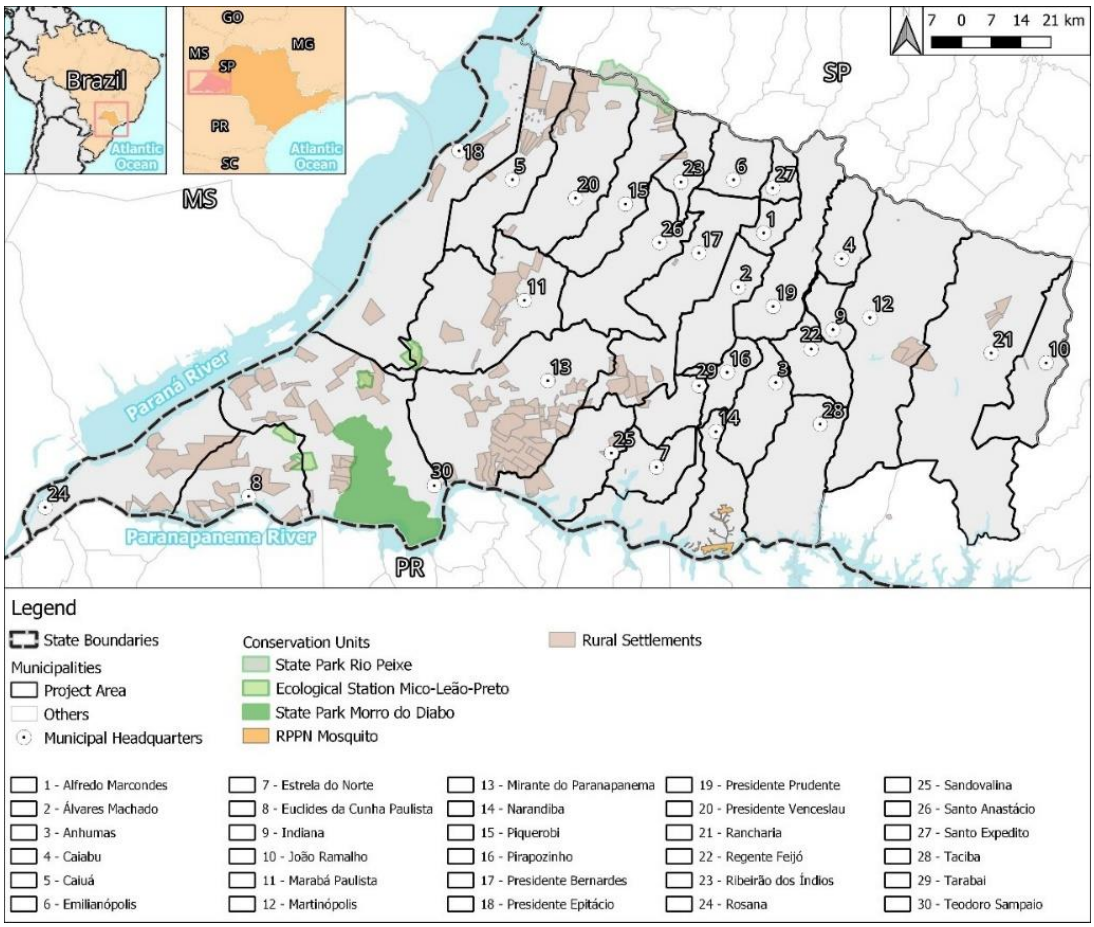

Figure 5 - Project Zone Municipalities

In the ending years of the nineteen century the Pontal do Paranapanema region initiate processes of intense transformation of the landscape because of the opening of pastures for raising cattle and, later, for planting coffee (which had its peak in the 1920s), causing deforestation and loss of biodiversity (VERGES, 2017). These economic activities were boosted by the construction of the Sorocabana Railway, in the 19th century, linking the region to the city of São Paulo, capital of the state, promoting a significant expansion of territorial occupation in addition to the unequal distribution of land (LEITE, 1998). The Figure 6 shows the estimated São Paulo Forest Cover in 1907, adapted from Victor *et al*., 2005.

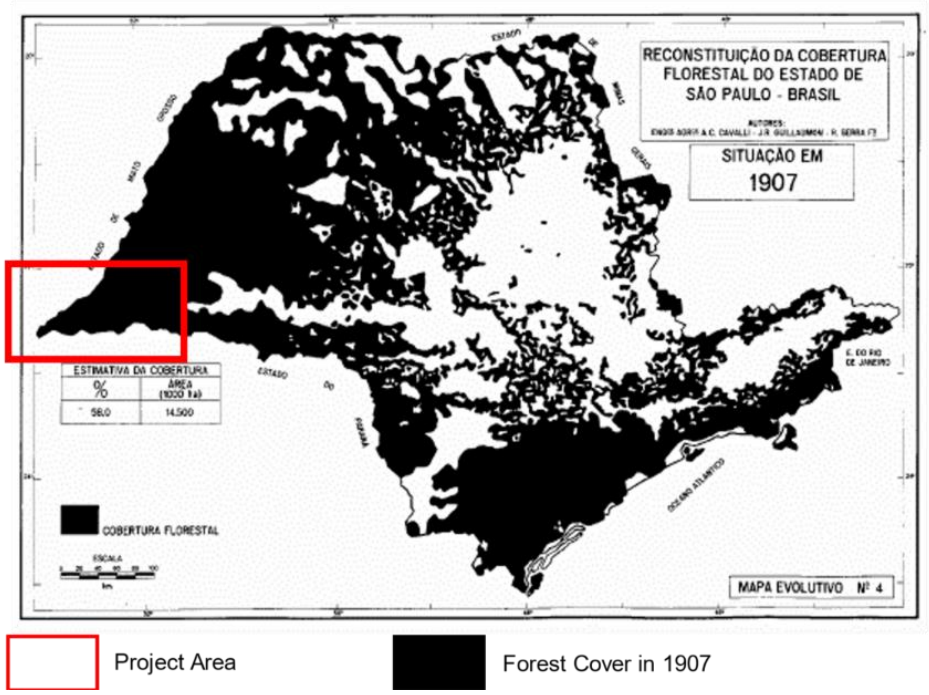

Figure 6 - São Paulo State Forest Cover in 1907 | Source: Victor et al. (2005).

Even though at the same period the region remained largely forested until 1942 when the first environmental policies emerged with the decreed of three reserves by the state of São Paulo as refuges to protect the unique flora and fauna of this Atlantic Forest subregion. The largest was the 260.000 ha Great Pontal Reserve (Chazdon et al., 2020). With the decline of coffee production, a new economic cycle was consolidated in the 1940s, based on cattle raising and cotton cultivation associated with the policy of free trade in land for the expansion of these activities, promoting population growth motivated by the search for free land. This period was also marked by the installation of companies and workers migratory processes. Therefore, problems arose with the land tenure structure, in addition to the intensification of deforestation (SILVA, 2018), promoting a major change in the regional socioeconomic organization and in the landscape. These wave of settlement from 1945 to 1965 was largely encouraged by the state government and led to deforestation of over 80% of the forest reserve to create large cattle ranching estates (Sobreiro Filho, 2012). The Figure 7 show the estimated São Paulo Forest Cover in 1935, adapted from Victor et al., 2005.

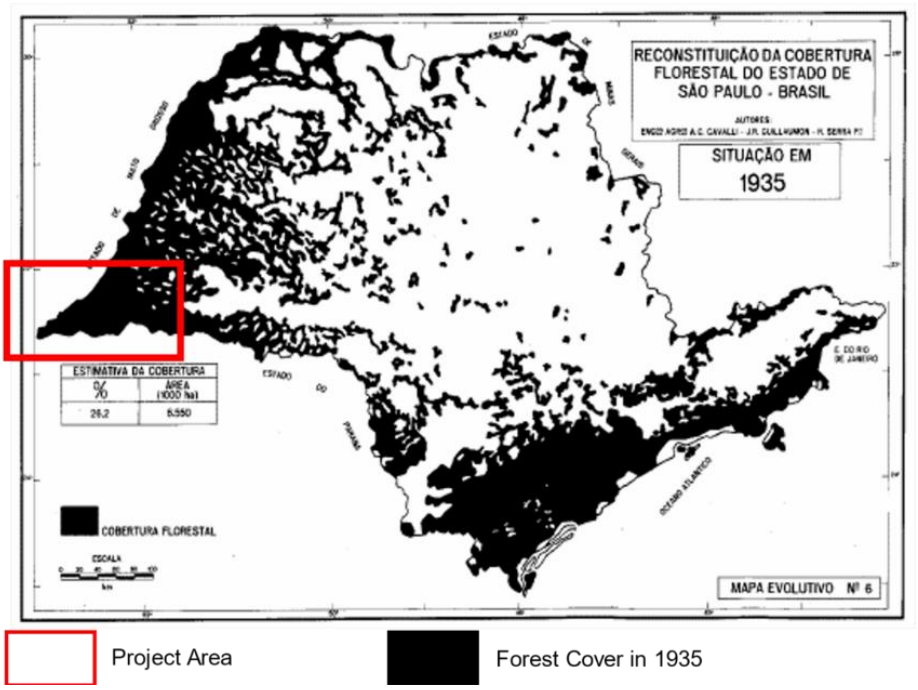

Figure 7 - São Paulo State Forest Cover in 1935 | Source: Victor et al., 2005.

In the 1970s and 1980s the milestones that characterize the territorial formation of Pontal do Paranapanema, and boosted its socio-environmental degradation, was the implementation of the National Alcohol Program (Proálcool) with the introduction of sugarcane and distilleries in the region and 04 large hydroelectric plants that directly affected forested and residential areas (SILVA, 2018). The Figure 8 show the estimated São Paulo Forest Cover in 2000, adapted from Victor et al., 2005.

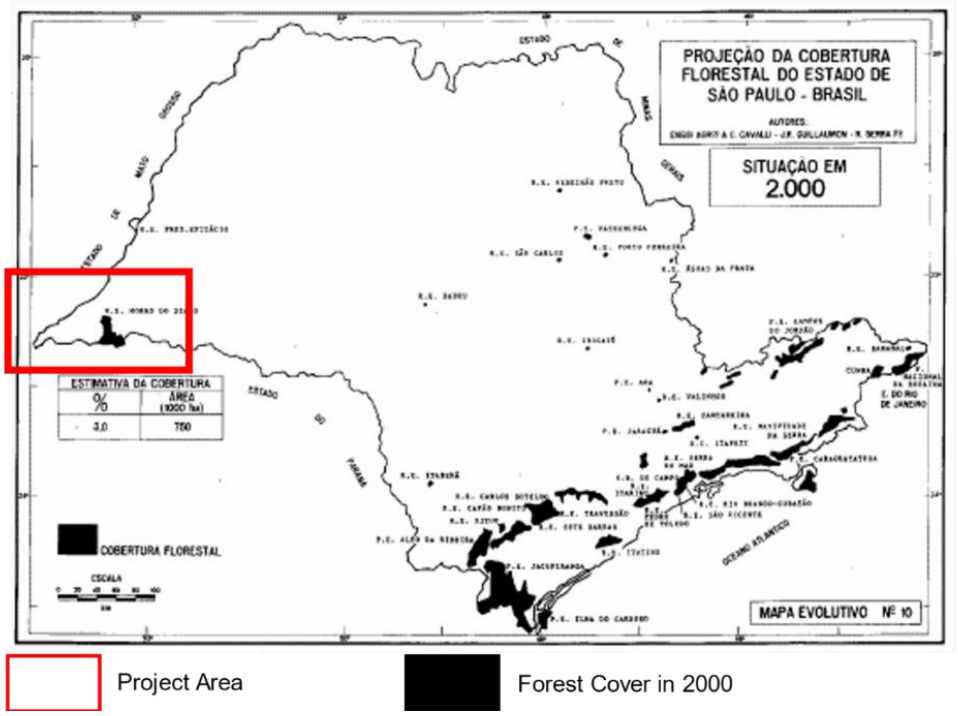

Figure 8 - São Paulo State Forest Cover in 2000 | Source: Victor et al., 2005

Given the scenario of systematic loss of native vegetation, the 1990s and 2000s were marked by the implementation of public environmental policies, with an emphasis on forest recovery, clean economic production, and agrarian reform, through the State Land Collection Plan, with the aim of regularizing the land tenure situation of rural settlements, encouraging the adoption of more sustainable agricultural practices and promoting forest recovery (SILVA, 2018)

Land Use

MapBiomas[12] is a collaborative network formed by NGOs, universities, and technology startups, which reveals the transformations in the Brazilian territory through science, making knowledge about land use accessible to seek conservation and combat changes in climate (Souza at. al., 2020). From the Landsat satellite imagery, the classifications that result in land cover and land use maps are carried out for each year and it has produced annual land cover and land use mapping since 1985. According to the land use map from 2020, *Figure 9*, the project zone is composed mostly of pastures for cattle, although agricultural crops such as sugarcane and soybeans has been replacing pasturelands gradually, as shown in Figure 9. Other productive activities are monospecific plantings of exotic trees for firewood and timber.

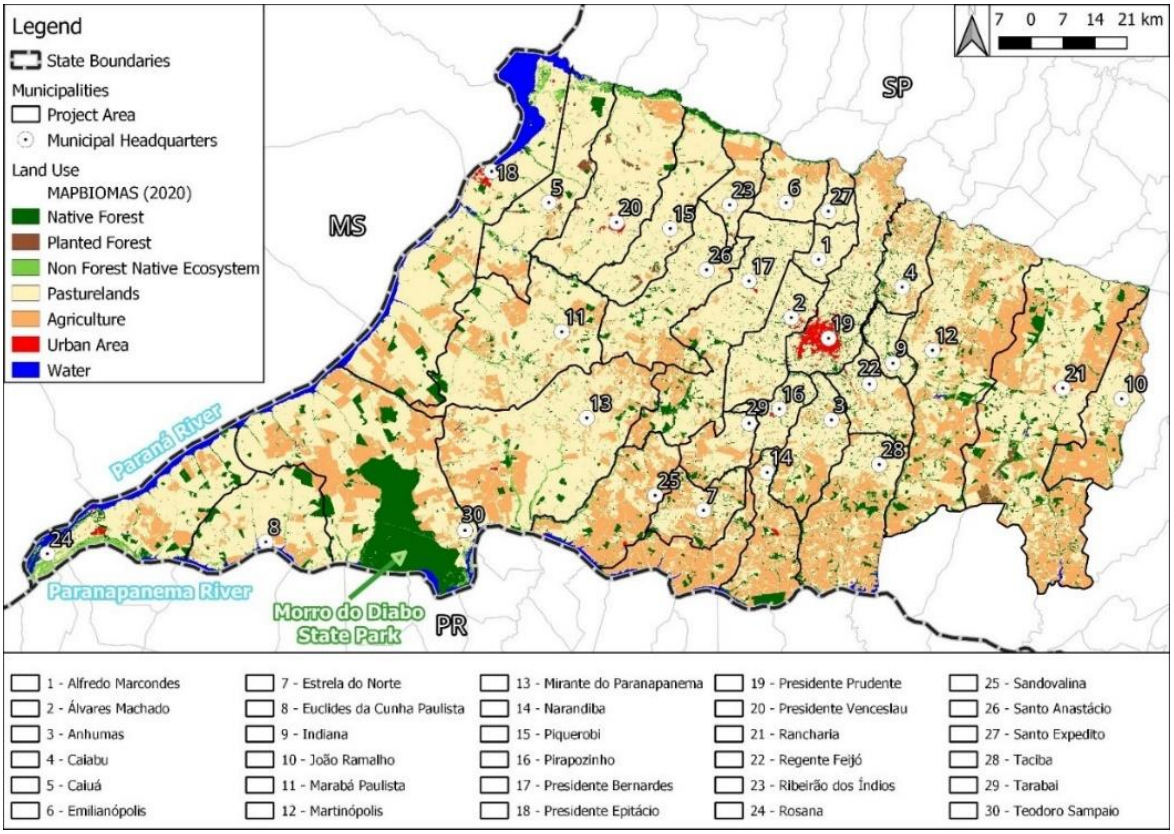

Figure 9 - Land Use in 2020 – Source: MAPBIOMAS[13]

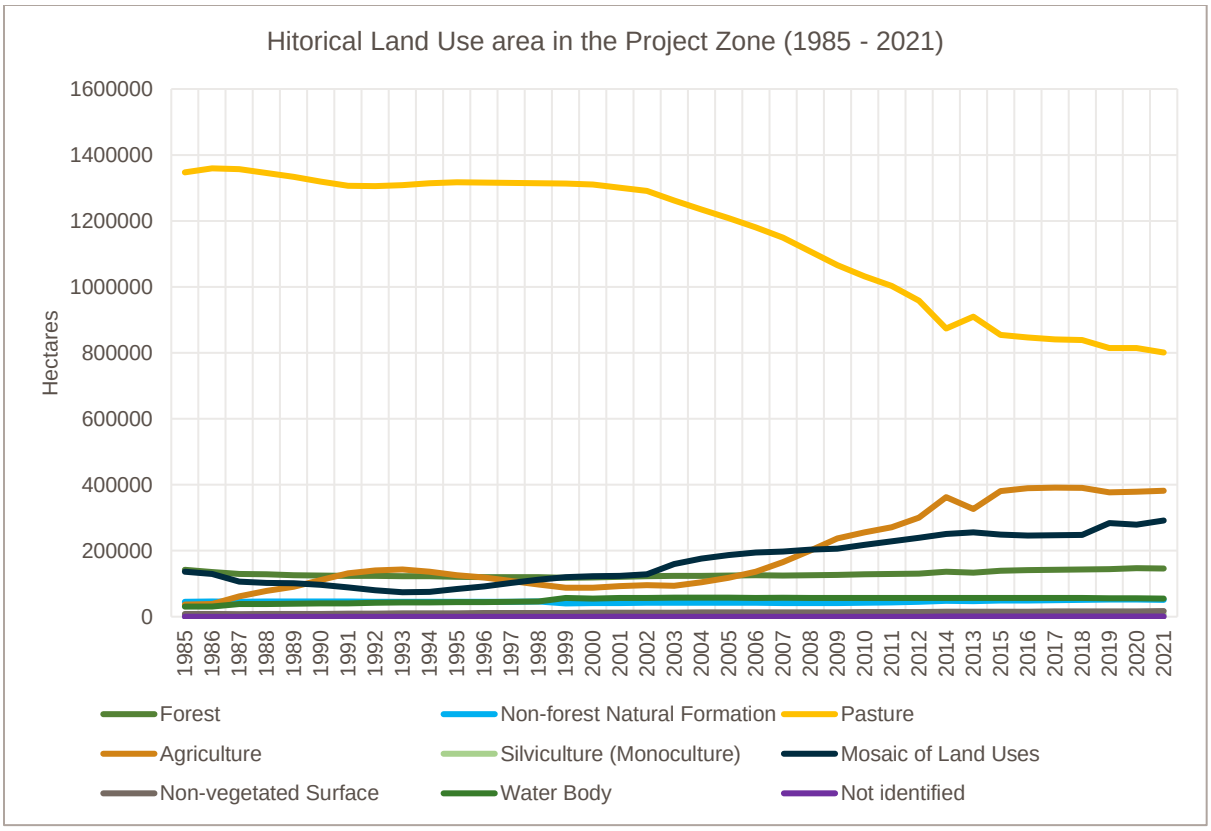

Figure 10 – Historical Land Use area in the Project Zone (1985 - 2020)[14]

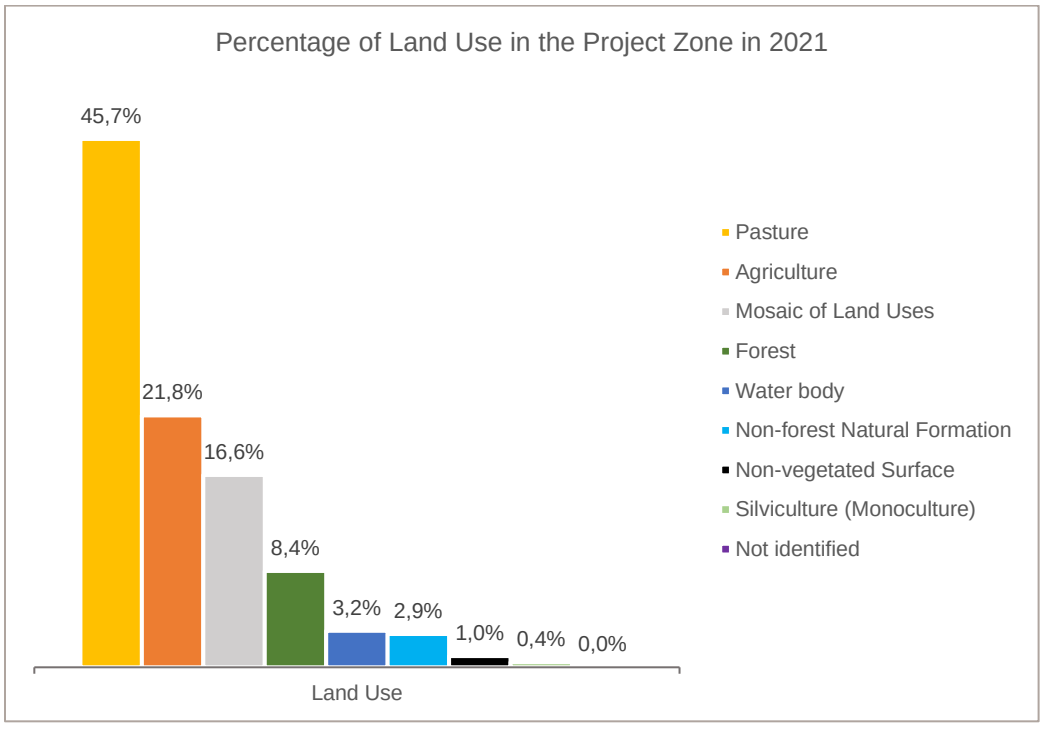

Figure 11 – Percentage of Land Use in the Project Zone in 2021

For the last 35 years, native forest cover has stagnated at only 8% of the cover in the project region, most of it in a single forest remnant, located in a Conservation Unit named Morro do Diabo State Park. There are also others restricted protected areas named State Park Rio Peixe, Ecological Station Mico-Leão-Preto and Private Reserve of Natural Heritage named Mosquito. These conservation units are presented in Figure 12.

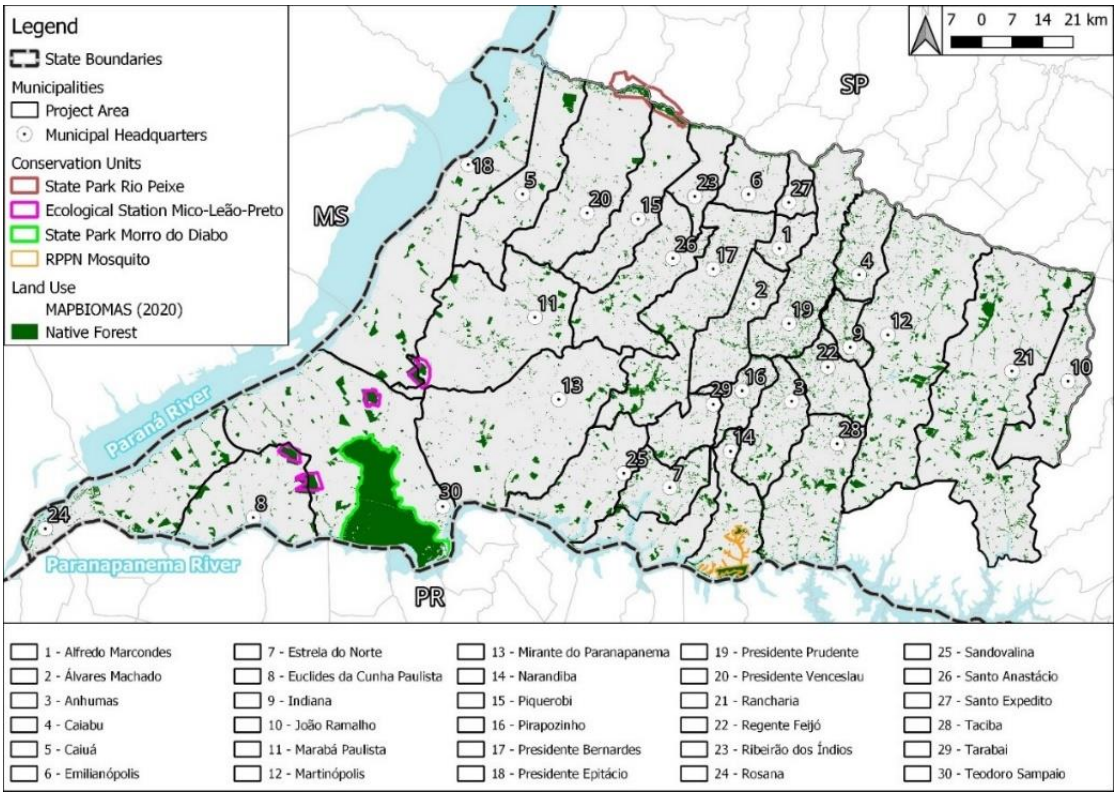

Figure 12 - Conservation Units in the Project Zone

The socioeconomic characterization of the municipalities in the project area is based on data collected and made available by the Brazilian Institute of Geography and Statistics (IBGE15) and by the State System of Data Analysis Foundation (SEADE). IBGE is the main provider of socioeconomic data for Brazilian municipalities, meeting the demands of various segments of civil society and of the municipal, state and federal governments. However, some data have been without updates for 10 years and cannot be replaced, others will be updated based on information from Fundação SEADE16

According to Fundação SEAD data, the total estimated population for the project area is 574,381 inhabitants, with Presidente Prudente standing out with a population of 222,807 inhabitants, while the other municipalities have a population between 3,000 and 25,000 inhabitants. The total population of this area represents 1.22% of the population of the state of São Paulo, represented by 45,147,891 inhabitants in 2022, characterizing this region as one of the least populated in the state. The proportion between men and women is balanced in all the municipalities, with the exception of Marabá Paulista, which has a larger male population (62%) than female (38%). Figure *13* presents the spatialization of the population estimate by municipalities in the project area.

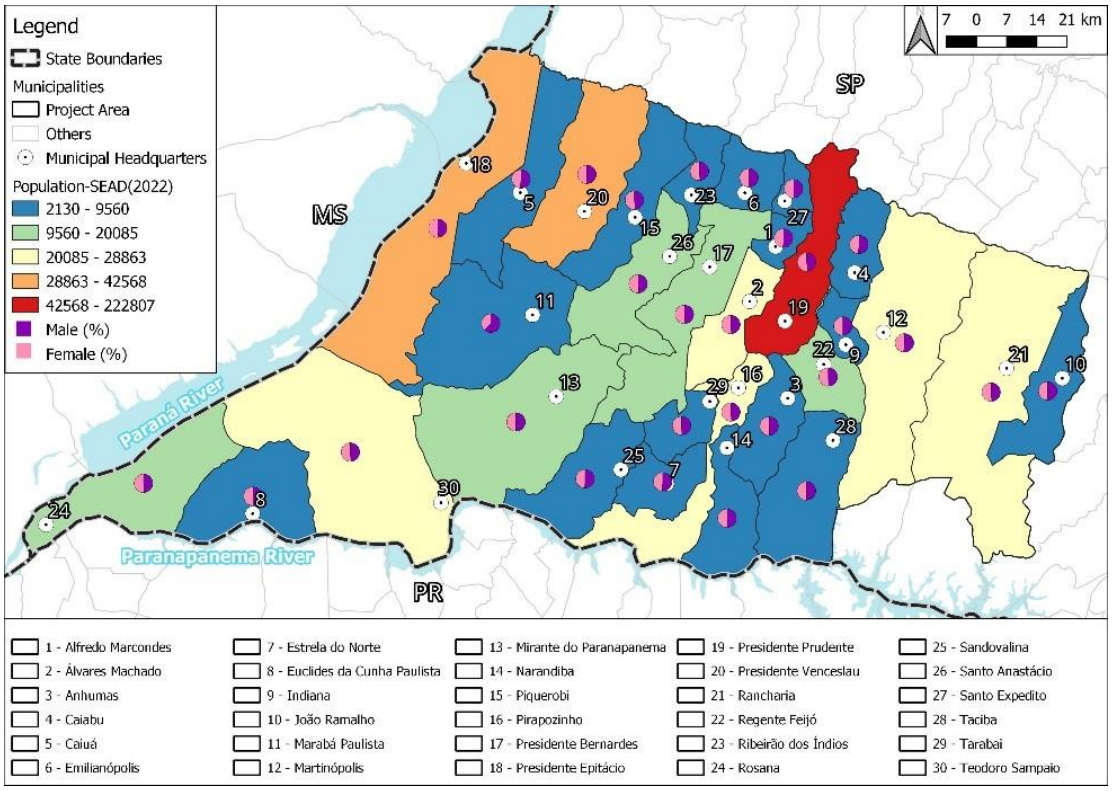

Figure 13 - Population in 2022 | Source: SEADE (2022*)*

The population by age bracket presents similar distributions in all the municipalities, with most of the population in the 30 to 59 age bracket. The only exception is the municipality of Marabá Paulista, which presents a larger proportion of younger population, in the 15 to 29 age bracket. Figure *14* presents the spatialization of the population by age group in the municipalities of the project zone.

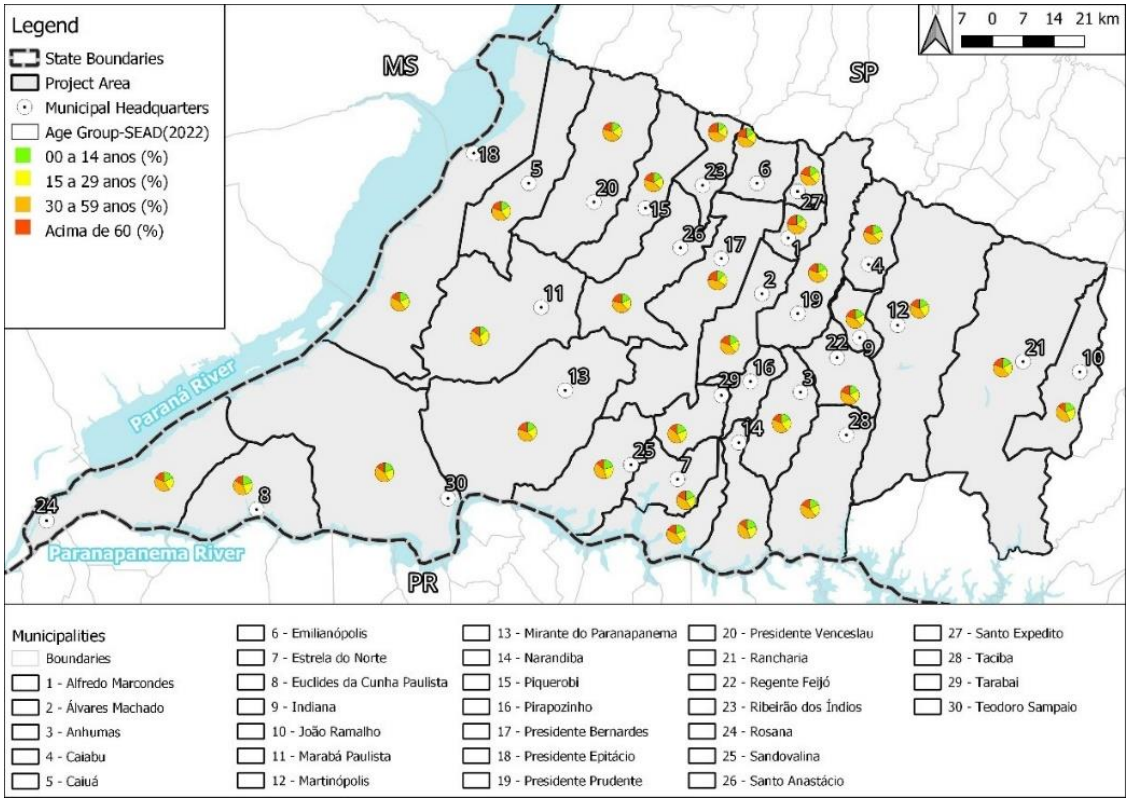

Figure 14 - Age group | Source: SEAD (2022)

The ethnic characterization of the region's inhabitants (Figure 15) is based on the data declared in the 2010 Census, when in most municipalities, more than 50% of the population declared themselves "White". The second category that appears most is "Parda", with emphasis on the municipality of Euclides da Cunha, where this category appears in more than 50% of the population. The categories that presented less than 10% of the declarations in all municipalities were "Black", "Yellow", and "Indigenous". This distribution follows the proportion found in the state of São Paulo, where 64% of the inhabitants of São Paulo declared themselves white, 29% brown, 6% black, 1% yellow, and 0.1% indigenous.

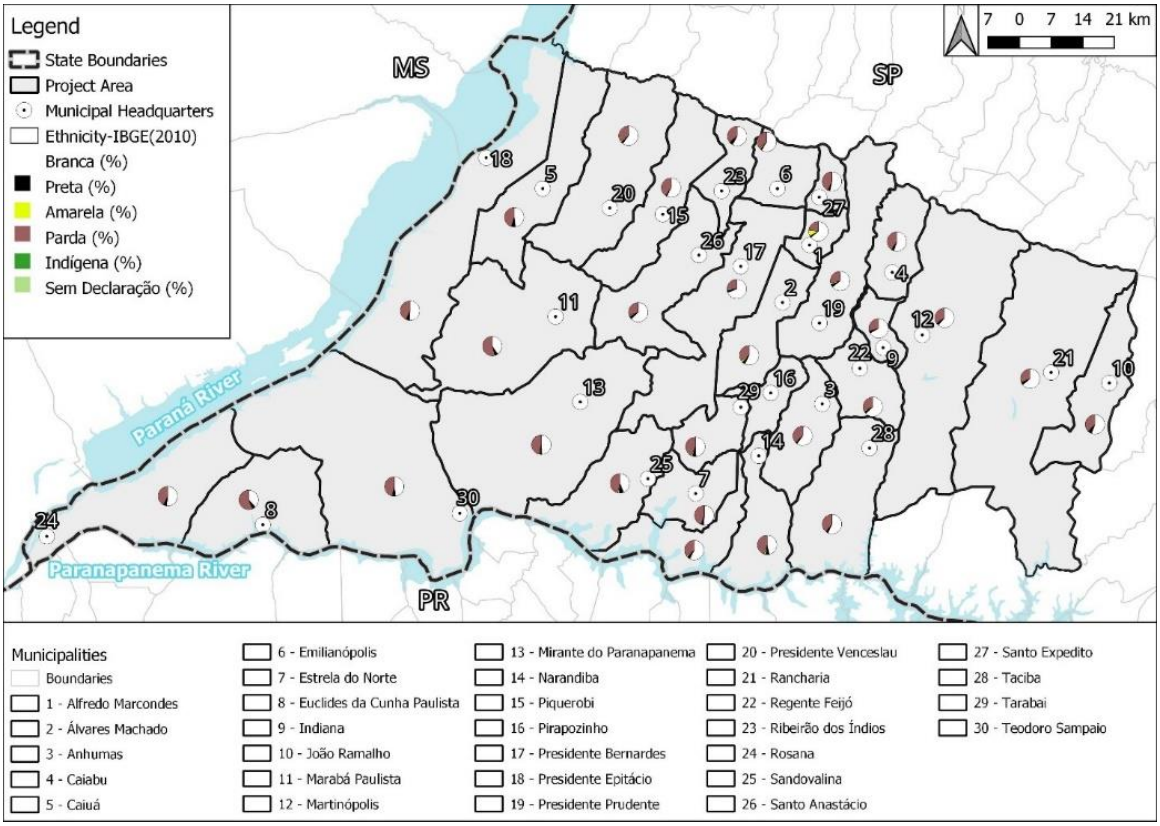

Figure 15 - Ethnicity | Source: IBGE Census (2010*)*

Regarding the distribution of the population in the territory, the demographic density of the region is below the state average, estimated at 181.9 hab/km² in 2022. The only exception is the municipality of Presidente Prudente, which stands out with a value of 395.9 hab/km². The municipalities with the lowest density, below 12.5 hab/km², are Anhumas, Caiuá, Estrela do Norte, João Ramalho, Marabá Paulista, Ribeirão dos Índios, Sandovalina and Taciba. Figure *16* presents the spatialization of the demographic density in the municipalities of the project.

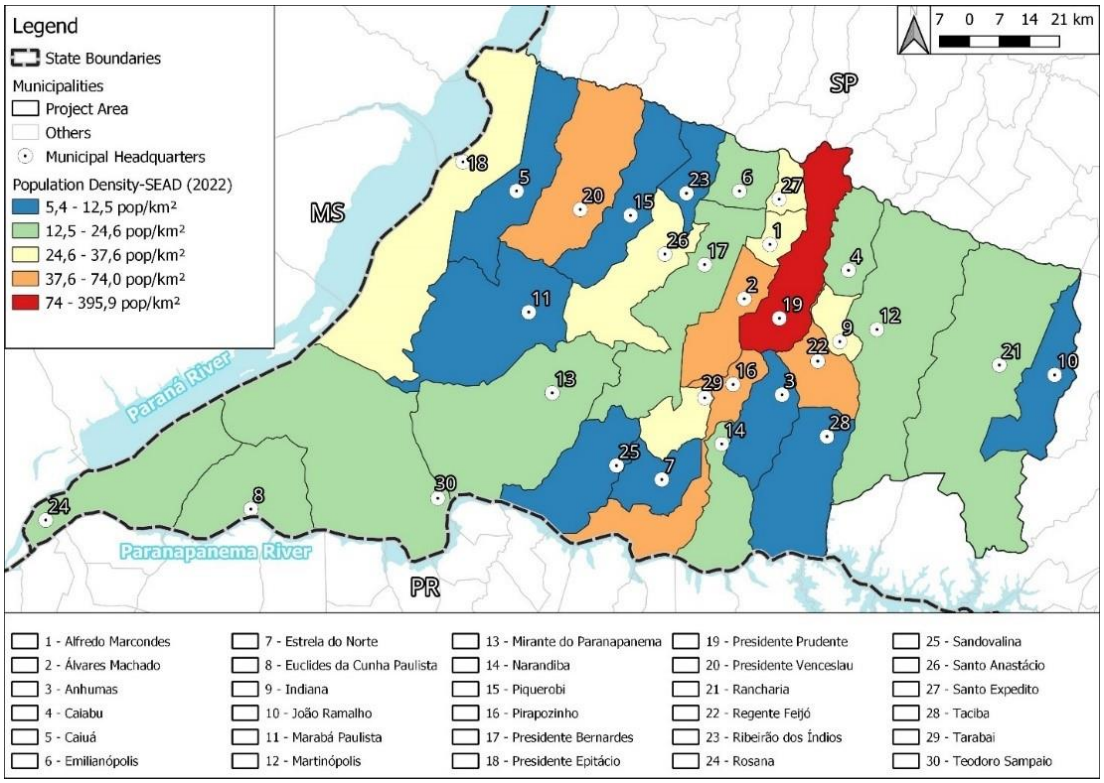

Figure 16 - Demographic density in 2022 | Source: SEAD (2022)

The largest percentage of this population lives in urban areas, although the municipalities of Caiuá and Marabá Paulista stand out for their low degree of urbanization, which is below 40%. Most of the other municipalities present values above 80%, with Presidente Prudente standing out, which presents a value of 98%, above the state average for 2022, which is 96.6%. Figure 17 presents the spatialization of the degree of urbanization by municipalities in the project area.

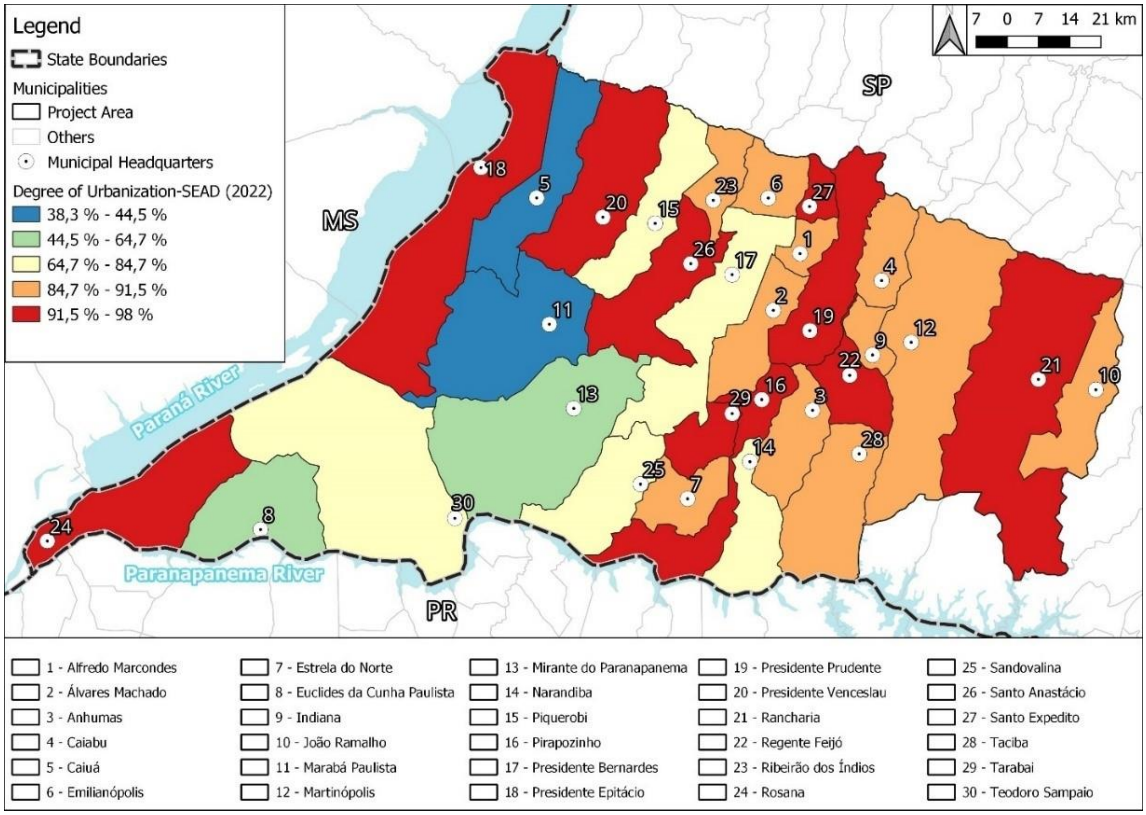

Figure 17 - Degree of Urbanization in 2022 | Source: SEAD (2022)

Table 3 - Estimates of resident population

Population by sex, degree of urbanization and population density.							
Municipalities	Population	Male		Female		Urbanization Degree	Demographic Density
		Total	%	Total	%	%	pop/km²
São Paulo State	**45.147.891**	**21.971.497**	**49**	**23.176.394**	**51**	**96,6**	**181,9**
Alfredo Marcondes	3.920	1.997	51	1.923	49	91,5	33,1
Álvares Machado	23.867	11.707	49	12.160	51	91,5	68,7
Anhumas	4.004	1.992	50	2.012	50	88,6	12,5
Caiabu	4.107	2.104	51	2.003	49	86,2	16,2
Caiuá	5.686	2.930	52	2.756	48	38,3	10,3
Emilianópolis	3.068	1.533	50	1.535	50	88,6	13,7
Estrela do Norte	2.670	1.357	51	1.313	49	87,8	10,1
Euclides da Cunha Paulista	9.560	4.759	50	4.801	50	64,7	16,6
Indiana	4.766	2.383	50	2.383	50	88,6	37,6
João Ramalho	4.422	2.244	51	2.178	49	89,6	10,7

Marabá Paulista	4.954	3.092	62	1.862	38	44,5	5,4
Mirante do Paranapanema	17.894	8.953	50	8.941	50	58,9	14,4
Narandiba	4.937	2.482	50	2.455	50	82,7	13,8
Piquerobi	3.529	1.715	49	1.814	51	80,5	7,3
Pirapozinho	27.638	13.480	49	14.158	51	96,1	57,8
Presidente Bernardes	13.706	6.679	49	7.027	51	84,7	18,3
Presidente Epitácio	42.568	20.688	49	21.880	51	94,1	33,8
Presidente Prudente	222.807	107.113	48	115.694	52	98,00	395,9
Presidente Venceslau	37.957	18.923	50	19.034	50	97,2	50,2
Rancharia	28.863	14.116	49	14.747	51	92,2	18,2
Regente Feijó	19.621	9.671	49	9.950	51	94,2	74
Ribeirão dos Índios	2.130	1.047	49	1.083	51	89,3	10,9
Rosana	18.251	8.953	49	9.298	51	97	24,6
Sandovalina	4.304	2.175	51	2.129	49	81,7	9,5
Santo Anastácio	20.085	9.759	49	10.326	51	94,5	36,4
Santo Expedito	2.999	1.496	50	1.503	50	94	31,8
Taciba	6.108	3.030	50	3.078	50	88,4	10,1
Tarabai	7.384	3.656	50	3.728	50	94	37
Teodoro Sampaio	22.576	11.141	49	11.435	51	83	14,5
Total	574.381	281.175		293.206			

Source: SEAD Foundation (2022)

The living conditions of this population were analyzed from the São Paulo index of social responsibility (IPRS). This index is calculated by the SEADE Foundation (FUNDAÇÃO SEADE, 2019a) and is based on the same human development terms considered by the Human Development Index - HDI. The IPRS values range from 0 to 100 and are categorized into wealth, education, and longevity, and serve as a parameter for measuring the degree of human development of municipalities, presented in Figure 18.

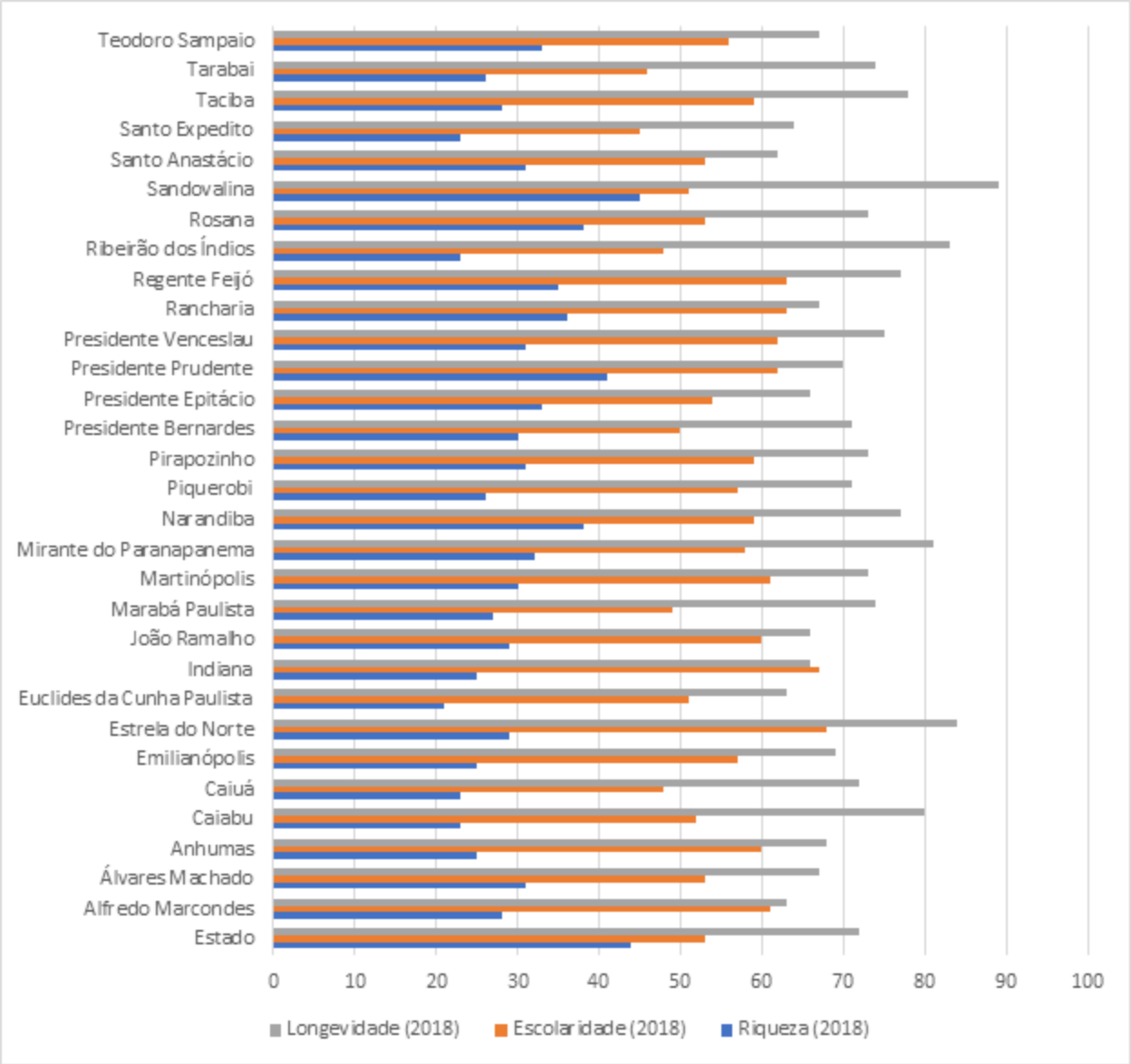

Figure 18 - IPRS 2018. | Source: SEADE17

As observed in Figure 18, all municipalities presented in 2018 Schooling and Longevity values equivalent or above the state average. However, for the Wealth index, most municipalities presented values below the state average.

According to the methodology created by Fundação SEADE (2019b), from the values presented in the aforementioned indexes, each municipality is classified into one of the Groups:

- Dynamic: High values for the Wealth indices, and Medium or High for Longevity and Schooling;
- Unequal: high values for Wealth and unequal for Longevity and Schooling;
- Equitable: Low values for Wealth and Medium or High for Longevity and Schooling;
- In Transition: low values for Wealth and unequal between Longevity and Schooling;
- Vulnerable. Low values for the three indexes, Wealth, Longevity and Schooling;

Table 4 presents the criteria for this classification.

Table 4 - IPRS groups.

Groups	Wealth	Longevity	Schooling
Dynamic	High	Medium or High	Medium or High
Unequal	Alta	Low	Medium or High
		Medium or High	Low
Equitable	Low	Medium or High	Medium or High
In transition	Low	Low	Medium or High
		Medium or High	Low
Vulnerable	Low	Low	Low

Source: Fundação SEADE (2019b)

Figure 19 shows the classification of the municipalities of the project zone in the IPRS Groups. Presidente Prudente stands out for being the only one in the Dynamic Group, for presenting high values for all three IPRS indices. Most of the other municipalities were classified as Equitable or In Transition, showing average values for the three indexes. Only the municipality of Sandovalina was classified as Unequal, for presenting high values for Wealth and low or medium values for Longevity and Schooling. Euclides da Cunha Paulista and Santo Expedito stand out for their classification in the Vulnerable Group for presenting low values for the three IPRS indexes.

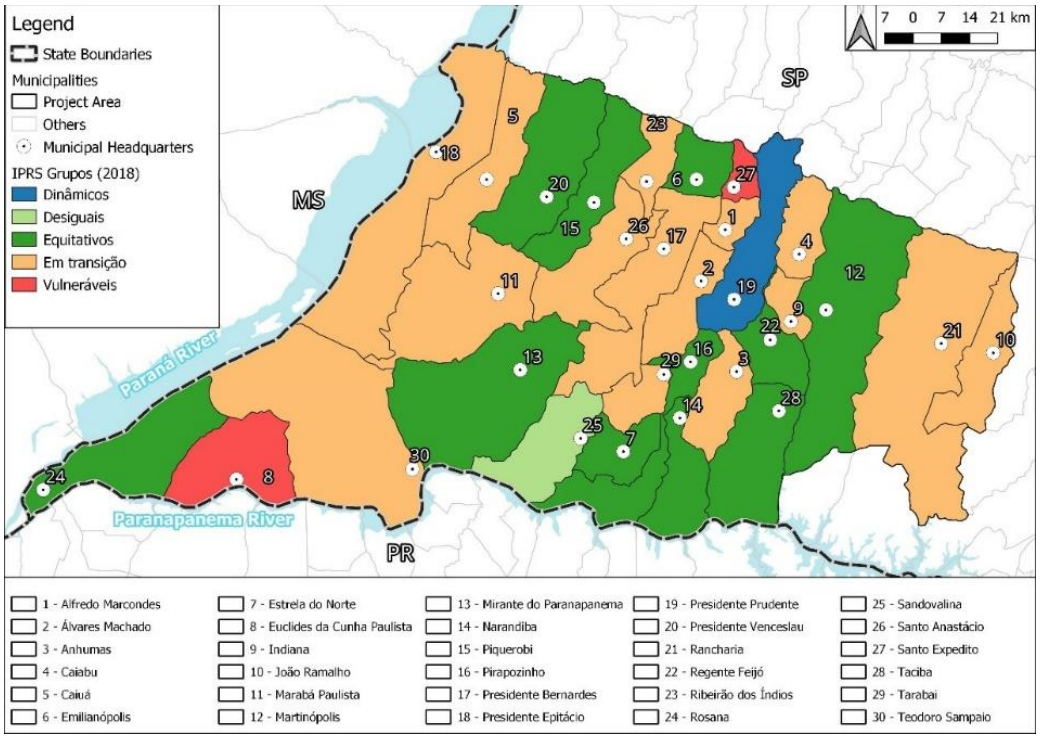

Figure 19 - IPRS 2018. | Source: SEADE18

The Gross Domestic Product (GDP) is an indicator that reflects the sum of goods and services produced in a given period and in a given municipality, categorized into Agriculture and Livestock, Industry, and Services. The GDP per capita shows the GDP value divided by the number of inhabitants in a region. Figure

20 shows the values of GDP per capita, and the proportions of the GDP of each category for the municipalities in the project area, considering the year 2019.

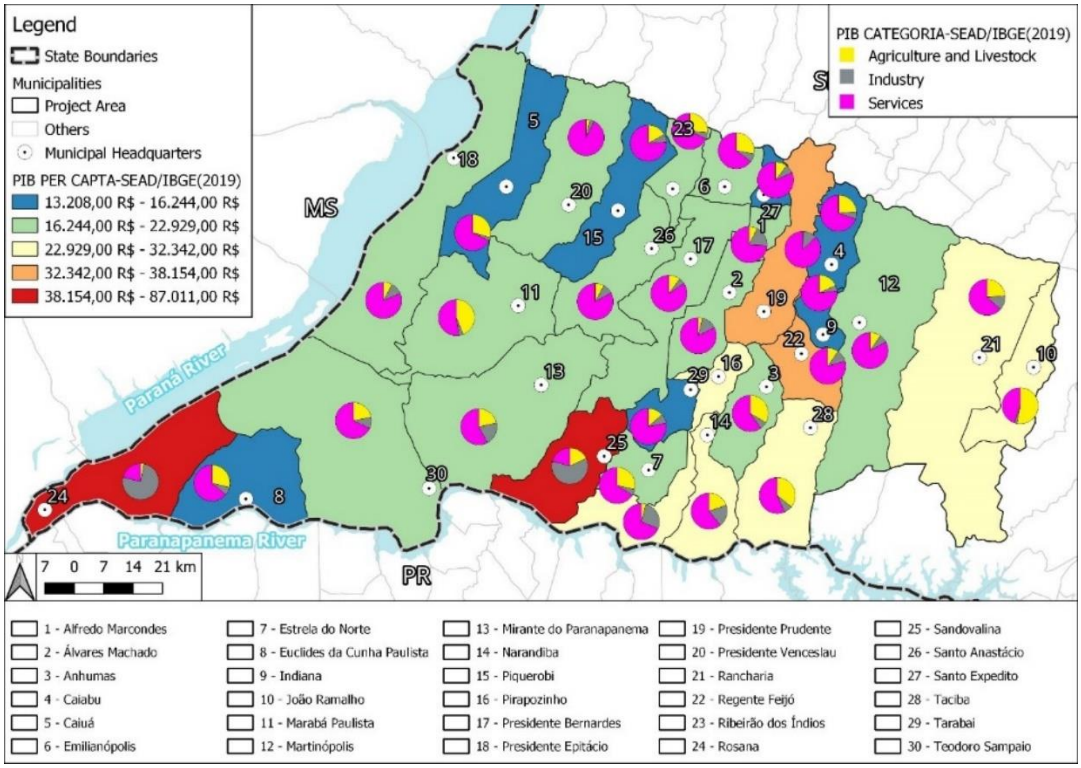

Figure 20 - GDP 2019. | Source: SEADE

As presented in Figure 20, in 2019 most municipalities have a GDP per capita below the state value (52,992.00 R$) and the predominance of the participation of the Services category in the composition of the municipal GDP. The municipalities of Rosana and Sandovalina stand out with the highest values of GDP per capita in 2019, 81,545.00 R$ and 87,011.00 R$ respectively, and also by the high participation of Industry. These values are a reflection of the ethanol production and hydroelectric power industries present in these municipalities, and low population values. It is worth mentioning that this high GDP is not followed by the Schooling and Longevity indexes, as shown in figure 14. The industrial sector also has an important participation in the economies of Mirante do Paranapanema, Narandiba, Piraposinho, Presidente Epitáfio and Teodoro Sampaio. In relation to the Agriculture and Husbandry sector, it has an important participation in the economies of the municipalities of João Ramalho, Marabá Paulista, Taciba and Anhumas.

According to the data on Municipal Agricultural Production (PAM)19, organized and made available by the IBGE, sugar cane stands out as the main production in most of the municipalities. Soy production also stands out, as it is an important export product. These data are spatialized in Figure 21, where several crops, such as corn, cotton, sweet potato, madioca and others, were grouped in the category "Others".

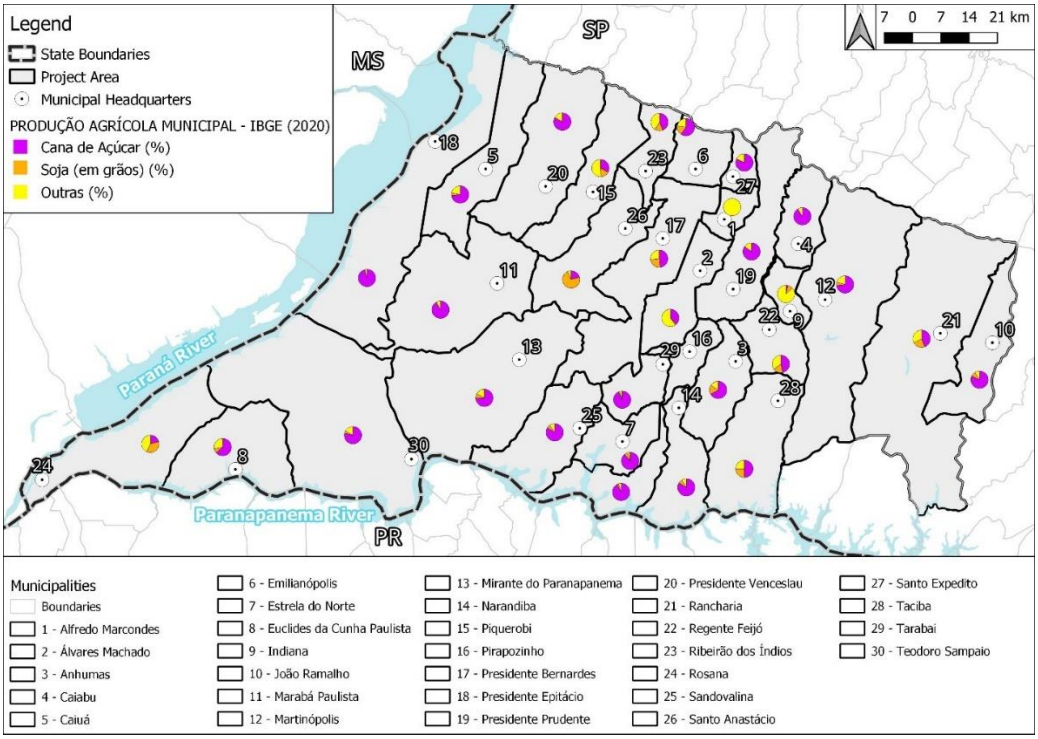

Figure 21 - Municipal Agricultural Production (MAP) | Source: IBGE (2020)

Sugarcane has been an important economic product since the beginning of Brazilian colonization, with the first plantations occurring in 1532 along with the implementation of sugar mills (Brazil, 2018). Sugar was the main product from sugar cane, until the 1970s when Brazil started to invest in ethanol through the Proálcool (National Alcohol Program) as an alternative to fossil fuels, due to the oil crisis.

The data presented in the Federal Government report (Brasil, 2018), show that in the 2017/2018 harvest, around 8 million hectares of this crop produced about 37.9 million tons of sugar, and 27.7 million m³ of ethanol. Of this production, 27.8 million tons of sugar and 1.4 million m³ of ethanol were destined for export, which resulted in a revenue of US$ 11.4 billion dollars (Brazil, 2018).

The project region stands out in this context for both production and logistics infrastructure (Brasil, 2018). According to São Paulo (2015), investment in sugarcane crops between 2002 and 2012 resulted in a significant increase in the composition of municipal GDP. In 2012 sugarcane accounted for 76.6% of the value of agricultural and livestock production in the region's municipalities. Moreover, in the same year, alcohol and sugar manufacturing activities were the two largest employers in this sector, accounting for 29.03% of formal jobs (São Paulo, 2015).

In addition to agricultural production, agriculture and cattle ranching still has great relevance in the region, as already presented in Figure 6. This production is predominantly extensive with most of the cattle sustained on pasture, however, according to Dias-Filho (2011), the way these pastures are managed intensifies their degradation, reducing the production potential of these areas. In this context, the Pasture Research Center of the Image Processing and Geoprocessing Laboratory (Lapig) of the Federal University of Goiás (UFG) mapped and qualified the Brazilian pastures20. For the project area, the results of this mapping in the year 2020 are presented in Figure *22*, where we note the significant occurrence of pastures with severe degradation mainly in the municipalities in the western portion of the Project Zone.

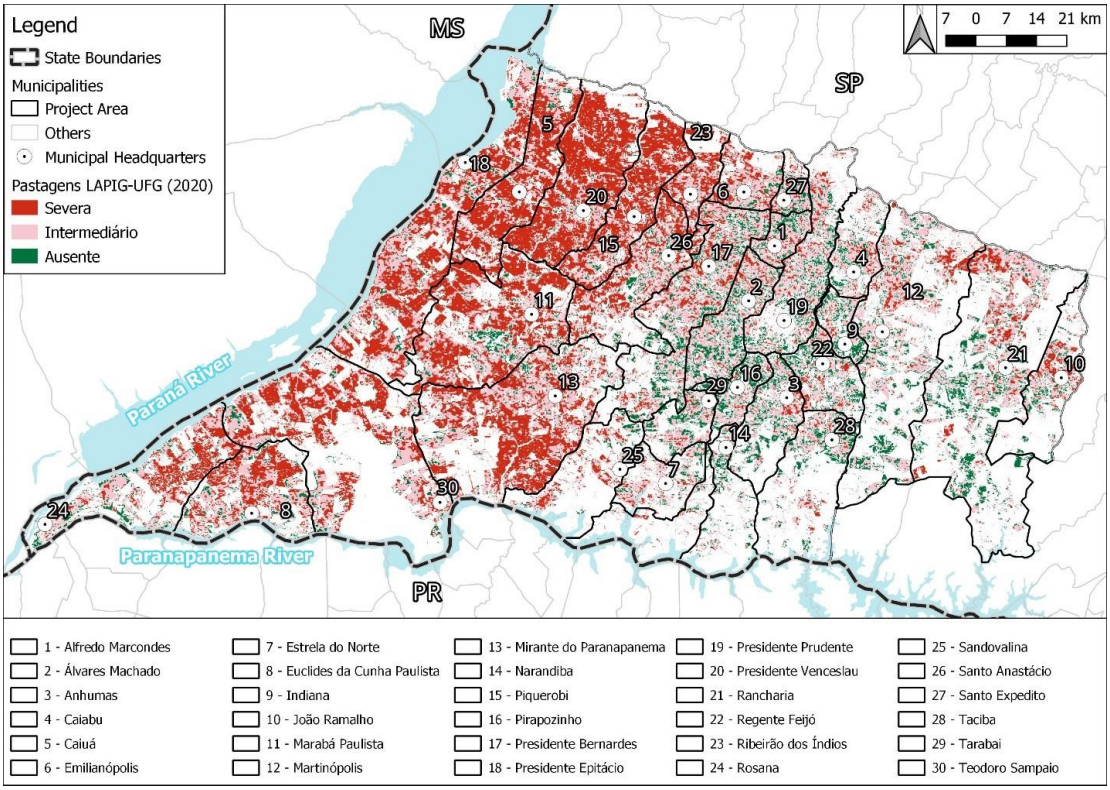

Figure 22 - Atlas of Pastures | Source: LAPIG-UFG (2020)

Land Ownership

In this diagnosis, rural properties in the Pontal do Paranapanema region are characterized from the classification of Settlements and Private Farms declared in the Rural Environmental Registry (CAR),

illustrated in Figure 23. The CAR is regulated by the Native Forest Protection Law (Law No. 12.651/201221), and is a national electronic public registry, mandatory for all rural properties.

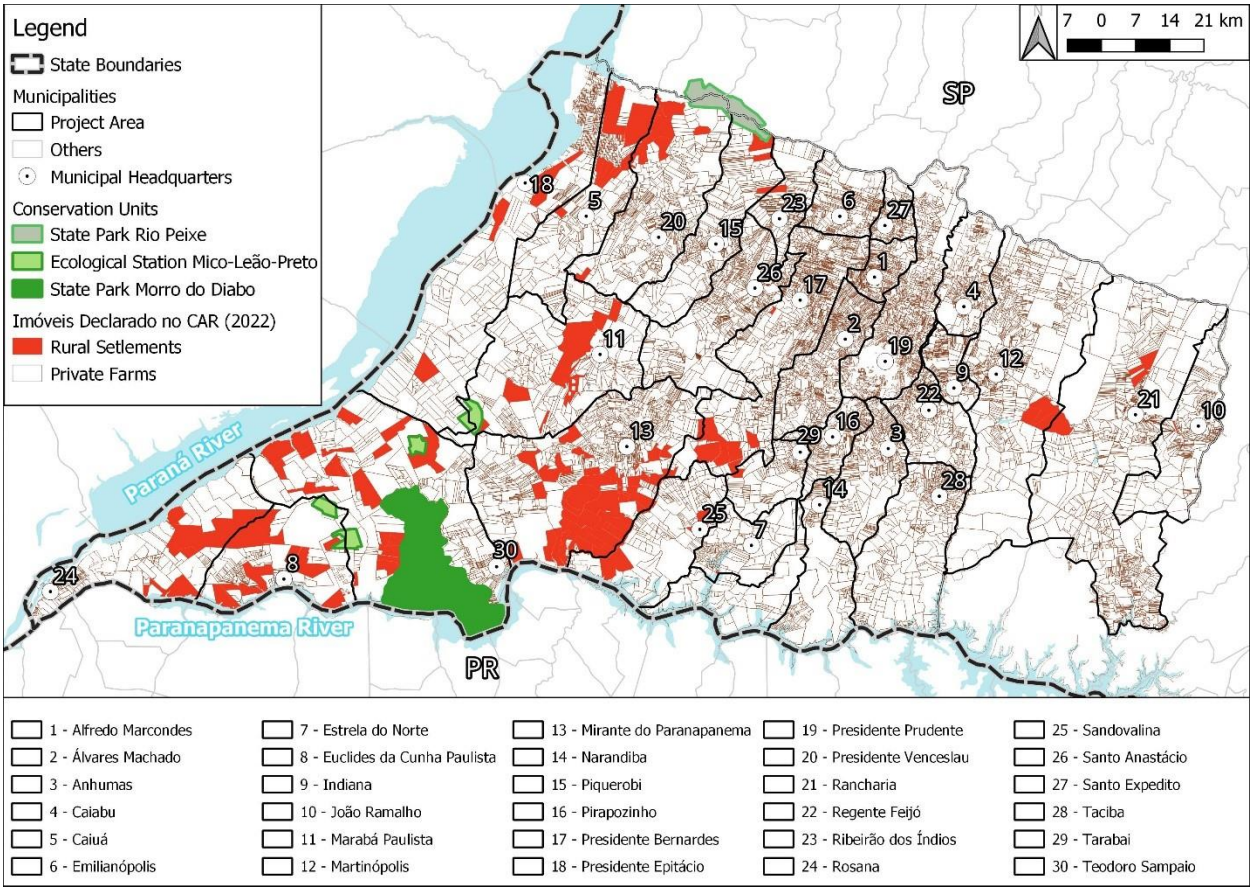

Figure 23 - Rural Settlements and Private Farms | Source: CAR(MAPA)[22]

Table 5 was prepared based on data from the CAR, consulted on 08/10/2022, and for each municipality it shows the number of properties, the smallest and largest areas declared, as well as the average of these areas. As observed in the data presented, the municipalities with the largest number of private farms are Presidente Prudente, Presidente Bernardes, Álvares Machado, Rancharia and Mirante do Paranapanema. In relation to the average areas, the municipalities with the highest values are Marabá Paulista, Sandovalina, and Teodoro Sampaio.

Table 5 - Number and area of private farms declared in the CAR.

Municipalities	Private Farms (n°)	Smaller Farm area (ha)	Farm Area Average (ha)	Biggest Farm Area (ha)
Alfredo Marcondes	544	0,14	21,75	716,58
Álvares Machado	1.162	0,10	27,46	896,88
Anhumas	485	0,89	63,64	3.392,45
Caiabu	499	1,20	44,64	2.607,42
Caiuá	413	0,78	105,90	2.542,89

Emilianópolis	375	0,86	60,36	1.342,88
Estrela do Norte	207	2,03	118,98	3.006,54
Euclides da Cunha Paulista	247	0,25	125,44	9.080,46
Indiana	374	0,80	36,22	929,15
João Ramalho	315	2,00	150,17	4.651,11
Marabá Paulista	335	0,46	263,14	3.664,70
Martinópolis	929	0,92	122,00	6.803,94
Mirante do Paranapanema	1.010	0,51	82,95	6.416,67
Narandiba	262	2,01	178,42	8.637,91
Piquerobi	381	1,33	109,97	1.538,88
Pirapozinho	469	0,50	82,31	1.650,43
Presidente Bernardes	1.325	0,93	49,24	2.691,83
Presidente Epitácio	742	0,40	115,73	3.921,44
Presidente Prudente	1.418	0,17	32,98	2.775,76
Presidente Venceslau	614	0,25	106,57	2.767,53
Rancharia	1.074	0,33	153,51	14.378,77
Regente Feijó	666	0,53	40,24	3.101,08
Ribeirão dos Índios	281	1,89	63,88	2.718,44
Rosana	390	0,01	170,01	13.948,74
Sandovalina	208	2,00	262,22	12.958,76
Santo Anastácio	892	1,24	64,25	3.720,57
Santo Expedito	210	0,31	42,67	949,85
Taciba	508	0,39	168,83	26.709,43
Tarabai	243	1,05	86,25	2.428,96
Teodoro Sampaio	348	2,03	252,47	7.698,65

In the history of occupation and economic development of Pontal do Paranapanema, the land property occurred through forgery and violence. Even with known legitimacy problems, the occupation of large rural properties in possession of a few occurred with the encouragement of the state (Leite, 1981). In this context, Sobreiro-Filho (2012) highlights that private property has established itself as a synonym for concentration of wealth, power, and production, having as consequences unequal development, which culminated in conflicts over land ownership. Currently this region is known for the largest numbers of violent conflicts in the struggle for land (Sobreiro-Filho, 2012).

Starting in the 1980s, popular movements that occupied so-called unproductive areas with irregular titles intensified, trying to guarantee land tenure for families willing to produce, but unable to acquire the property by legal means. Despite the constant conflicts with landowners, these movements were organized and grew, giving rise to what is now known as the Landless Movement (MST) (Fernandes, 1994). The 1980s, 1990s, and 2000s were marked by intense confrontations between the MST, landowners, and the state.

In Brazil, agrarian reform policy is the set of measures conducted by the public authorities with the aim of promoting the distribution of land among rural workers, as established by the Land Statute - Law n°4.504/6423. This policy is conducted nationally by the National Institute of Colonization and Agrarian Reform (INCRA), and in the state of São Paulo by the Foundation Institute of Land of São Paulo (ITESP). As a response to the confrontations mentioned in the previous paragraphs, INCRA and ITESP, within the agrarian reform program, created several rural settlements for families of landless workers.

The rural settlement is a set of plots, or lots, installed in a rural property, and each one of these plots is destined to a family that cannot afford to buy a property. According to data available on INCRA24, of the 247 rural settlements in the state of São Paulo, 115 are in the Pontal do Paranapanema region and serve 5,909 families. Table 5 and figure 19 show the number of settlements and families served per municipality.

As shown, of the 30 municipalities in the project, 15 have at least one settlement in their territory, and the municipalities of Mirante do Paranapanema and Teodoro Sampaio stand out with almost half of the total number of settlements in the region.

In these rural settlements, the families develop agropastoral activities and cannot sell their lots to third parties. Cooperation between workers from different plots is common in the planning and implementation of crops, as well as in the sales strategy to reach potential markets in the region.

Table 6 - Settlements and families per municipality.

Municipalities	Rural Settlements (n°)	Families (n°)
Caiuá	8	443
Euclides da Cunha Paulista	9	491
João Ramalho	1	26
Marabá Paulista	6	255
Martinópolis	2	121
Mirante do Paranapanema	35	1.534
Piquerobi	3	83
Presidente Alves	2	56
Presidente Bernardes	8	250
Presidente Epitácio	4	335
Presidente Venceslau	8	369
Rancharia	2	174
Rosana	4	739
Sandovalina	2	190
Teodoro Sampaio	21	843
Total	**115**	**5.909**

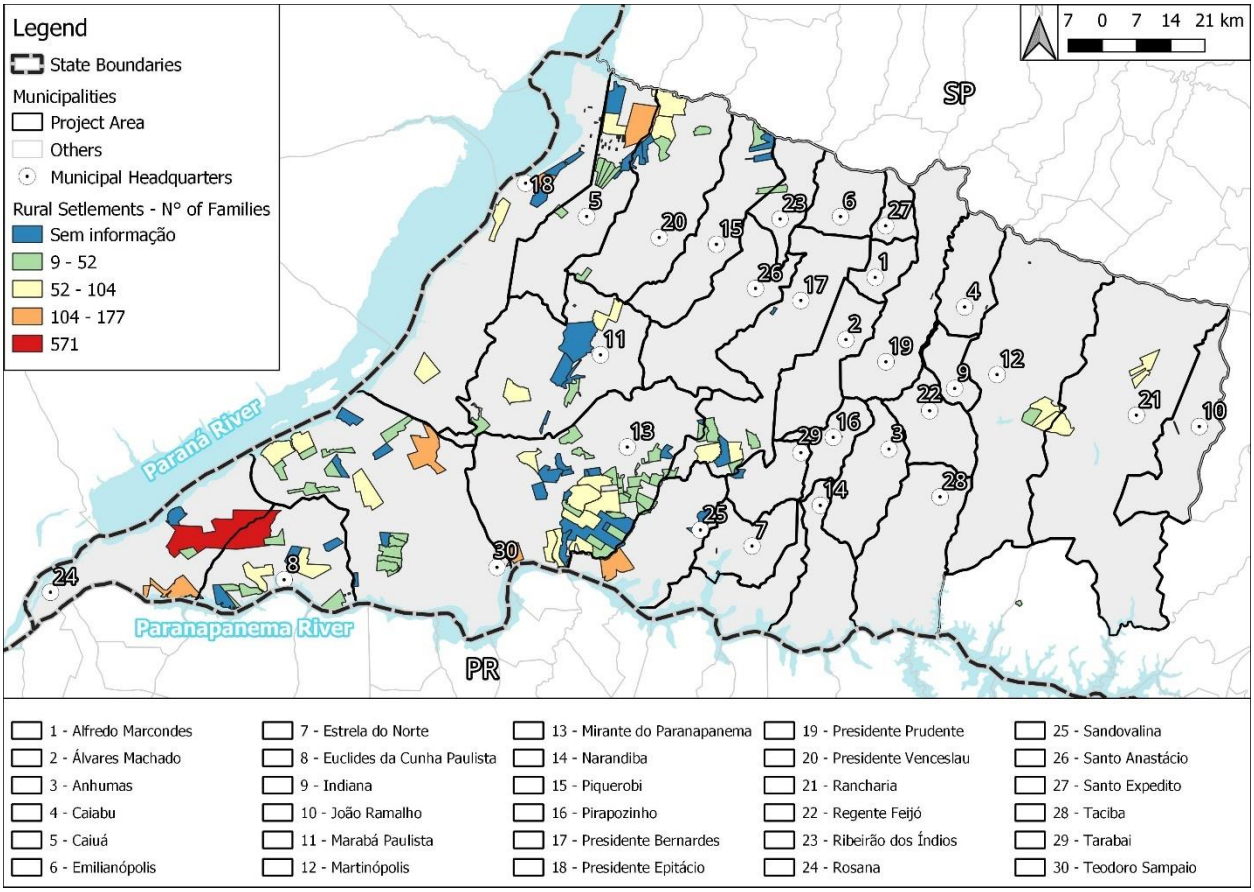

Figure 24 - Rural Settlements and number of families. | Source: CAR(MAPA)[25]

In Silva's Master's dissertation (2008), socioeconomic data from the Teodoro Sampaio settlements were analyzed, and will be presented below. Agricultural production in these settlements occupies 43% of the productive area, and the predominant crops are sugarcane, manioc, cotton, corn, banana and napier grass. The remaining productive areas are destined to pastures for dairy cattle. The settled families have a low level of schooling, with an average age between 25 and 37 years old. Almost all of the settled families are originally from the countryside and more than half are made up of 5 people. The number of men is slightly higher than the number of women, and their ethnic composition is made up of white and brown people. Based on the value of production, the author estimated the average income of the settled families at 1.5 minimum wages/month or R$ 622.00 reais in 2008.

These social and economic characteristics are recurrent in all settlements in the region. In the Master's dissertation by Moal (2013), when studying settlements in the Mirante de Paranapanema municipality, the author points to milk production as the main economic activity, followed by cassava and coffee crops. About the internal organization, the author highlights as a particularity in the Margarida Alves settlement, the great participation and influence of women in the choices and leadership of the settlement.

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

The Figure below determines the boundary of the Project Zone including: the groups that form the project communities (Field Workers, Nursery and Technical Assistance and Rural Extension Team), the area of rural properties, the area of ARR activities on the rural properties and the expansion potential of ARR activities in the Project Zone, considering the priority areas for the allocation of forest corridors present in the Map of Dreams (Figure 25).

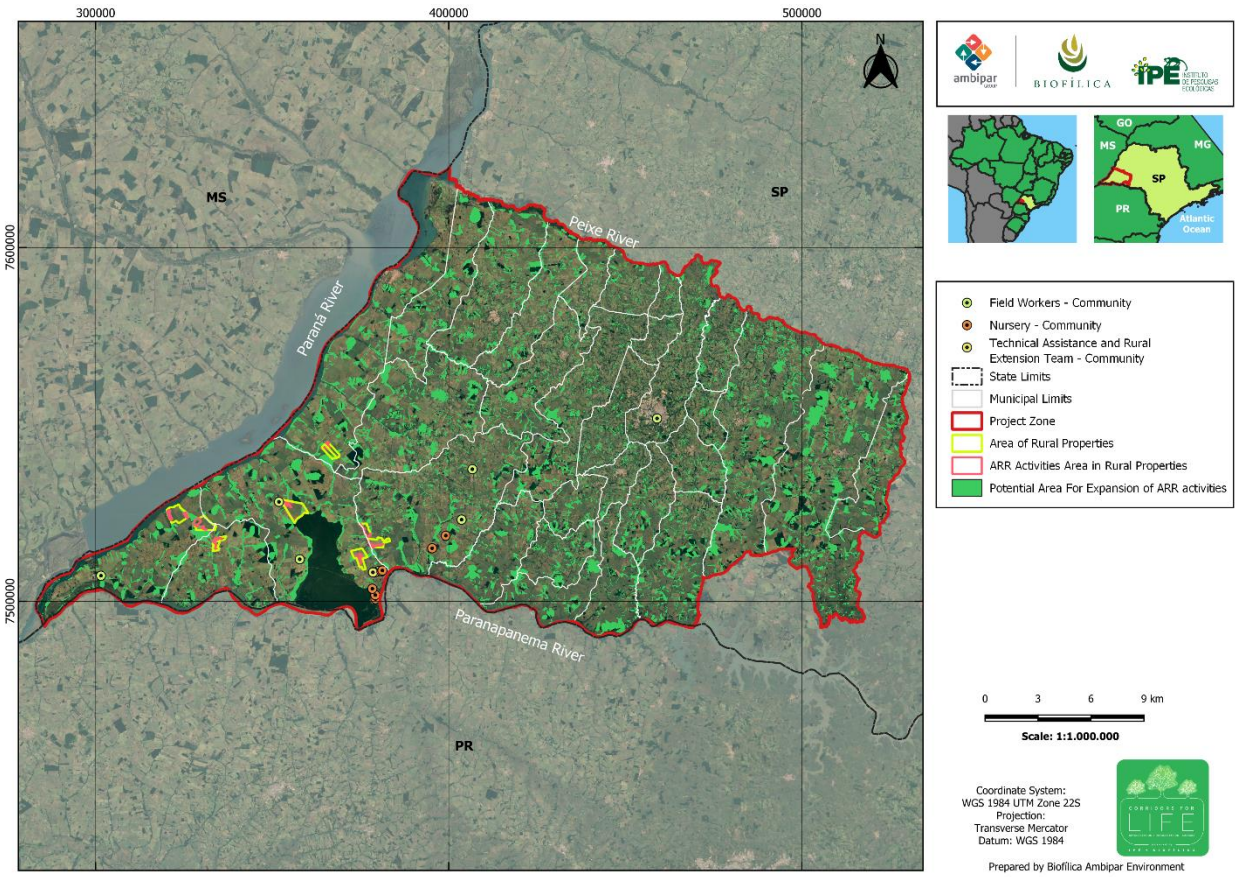

Figure 25 - Project Zone Map - Corridors for Life ARR Grouped Project

2.1.8 Stakeholder Identification (G1.5)

Explain the process of stakeholder identification and analysis, which should include an assessment of rights, interests and relevance to the project, used to identify communities, community groups within them, and other stakeholders. When dealing with stakeholders were performed throughout the project when mentioning to identify stakeholders, differentiate between the categories of stakeholders and investigate the relationships between stakeholders, all steps for the analysis of stakeholders following the literature proposed by Reed et al. (2009). The identification of stakeholders in the Corridors for Life ARR Grouped Project occurred through the "snowball method", facilitated by the history of IPÊ in the region of Pontal do Paranapanema as described by Chazdon et al. (2020).

The "snowball method" is described as the interaction of individuals from stakeholder categories who are initially interviewed and identify new stakeholder categories and contacts to be inserted into the project (Reed et al., 2009).

One of the proponents of the Corridors for Life ARR Grouped Project, Ipê more specifically, has been active for over 30 years in several integrated initiatives in the Pontal do Paranapanema region, from the conservation of endangered animal species to the restoration of landscapes in the Atlantic Forest (Chazdon et al., 2020). Since 1994 to the present day, the institute has developed communication, mobilization and community involvement actions with different types of local actors, including agroforestry actions with farmers and landowners, biodiversity researchers with government agencies, NGOs, and research institutions, environmental education actions involving women and young settlers, students and teachers, advisory boards and funding agencies for water, tourism, environmental protection, etc. Besides the performance of the institution promoting and participating in events to develop socio-environmental improvements for the Pontal do Paranapanem region, the institute also promotes the creation of public

policies to expand, guarantee and inspire the improvements achieved with the conservation of the biodiversity, landscape and quality of life of the local residents.

The Corridors for Life ARR Grouped Project then held face-to-face meetings composed of the project proponent team that aimed to carry out the initial general identification of all stakeholders in the area that had adherence to the project since the signing of contracts with landowners. Two meetings were held among the proponents in Piracicaba - SP (July 26th and August 2nd, 2022) discussing the stakeholder's profile and their adhesion to the project. The third meeting occurred at the IPÊ HUB in Teodoro Sampaio - SP for the validation of stakeholders by the IPÊ field team highlighting the characteristics and relationships of communities and stakeholders with the project. Different stakeholders were listed, ranging from landowners who have contracts with the proponents for forest restoration, nurserymen who provide seedlings to the project, public institutions and Non-Governmental Organizations, etc.

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

As described in section 2.1.6, the Project Zone presents diverse social groups with complex and conflicting historical interactions. The communities benefited by the project are composed of rural settlers and small traditional producers who were established in the colonization and land reform process developed by the Brazilian government mainly in the early 1980s. The rural settler communities are vulnerable due to their low income and reduced institutional support to develop agricultural activities. Thus, the project activities and the activities developed by IPÊ historically aimed mainly at capacity building and employment and income generation in these communities, as detailed in *Table 7*.

The communities identified in the Corridors for Life ARR Grouped Project are:

Forest Nurseries: nurseries owned and managed by rural settlers and small local producers, who were fostered and trained by IPE in seed collection and seedling production as an alternative income and to supply seedlings for reforestation activities and other demands for forest seedlings in the region. Currently, nine nurseries supply seedlings to the project, four of which are managed by local rural settlers and five depend mainly on income from reforestation activities in the project area.

Technical Assistance and Rural Extension Team: a team of extensionists and restoration specialists made up of local inhabitants and rural settlers who work directly with the IPE coordinating and monitoring project activities, as well as communicating and extending project activities to other stakeholders.

Service Providers: companies founded by rural settlers and local inhabitants that, with the technical support and training of the IPE over the years, develop and benefit from the activities of implementation and maintenance of reforestations, through the generation of income and employment.

Besides the communities, other stakeholders were identified, being:

Rural Landowners: landowners who received or descend from farmers who received government land in the past, or who acquired land in the project area. In general, they are owners of large private properties (>300 ha) whose main activities are livestock farming, leasing and planting sugar cane, soybean and peanut cultivation. Although their activities and teams are developed in the Project Zone, the majority do not reside in the Project Zone.

Institutions of TARE and Land and Environmental Regularization: These are State and Public Institutions that are responsible for Technical Assistance and Rural Extension, credit application and infrastructure

management and the development of the settlement areas. They also carry out the regularization of rural and urban properties.

Private Sector: Companies responsible for energy production installed in the region in the hydroelectric, sugar and ethanol, and agribusiness sectors.

NGOs and Other Social Movements: NGOs are institutions that care for the environment, socio-cultural resources, biodiversity conservation, and natural resources. Social Movements are characterized as being movements for the struggle for land and social inclusion.

Public Bodies: Public-Private Partnerships and support for the implementation of actions and projects of a social, environmental, and economic nature.

Research and Extension Institutions: Several Brazilian teaching and research institutions, such as the Superior School for Environmental Conservation and Sustainability (ESCAS), the University of São Paulo (USP), and the Getúlio Vargas Foundation (FGV) collaborate to monitor the project's activities and research for the development of scientific knowledge.

All interested parties should be invited to take part in the discussions of the Corridors for Life ARR Grouped Project, with the purpose of having a space for articulation and communication between the proponents and the communities and other stakeholders involved in the Project.

Table 7 - Description of the actors involved in the Corridors for Life ARR Grouped Project

Group of actors involved in the Project	Rights in relation to the Project	Interests in your participation in the Project	Relevance of Project participation
Rural Owners	They have the right to own and operate the area, as well as to decide on the location of the reforestation within the property when it comes to the Legal Reserve.	Regularize the rural property by restoring the APPs and RLs, thereby increasing the value of the property.	High - Provide eligible areas for reforestation, and thereby job and income opportunities for the communities.
ATER - Technical Assistance and Rural Extension Team	Articulate and act with rural landowners and project proponents for the environmental and land title regularization of rural properties.	Contribute to meeting the objectives of the environmental agendas and commitments, strengthening legal security and production chains.	High - These are the actors officially responsible for enabling and approving requests for environmental and land regularization.
Private Sector: Sugar and Alcohol Plants and	Not applicable.	To environmentally adapt rural properties and promote the maintenance of natural resources.	Medium - Facilitate the prospecting of areas by influencing landowners in the environmental regularization of their properties and IDP

Group of actors involved in the Project	Rights in relation to the Project	Interests in your participation in the Project	Relevance of Project participation
Hydroelectric Power Plants			(Research, Development and Innovation) financiers.
NGOs and Other Social Movements	Possible future service providers and seedling producers.	Contribute to meeting the objectives of the environmental agendas, elaboration of public policies, expansion of action and improvement of local governance, production and dissemination of knowledge. Participate, represent and articulate policies to enhance the good standing of rural settlements and family agriculture as a whole.	Medium to High - Influence the development of public policies and support the structuring of the restoration chain.
Public Agencies	Articulate with other actors in order to improve the implementation and permeability of public policies, and support complementary actions to implement the Project.	Bring the government closer to community demands and strengthen governmental relations, which currently present themselves as fragile. Contribute to meeting the objectives of the environmental agendas, promoting job creation, expanding the action and improving local governance, producing and disseminating knowledge, and mitigating environmental risks.	Medium to High - These are the actors officially responsible for developing and implementing socio-environmental and economic public policies.
Research and Extension Institutions	Develop research and extension actions related to the scope of the project.	Develop research to contribute to professional training, scientific advancement, biodiversity	Medium - Contribute to the monitoring, generation of scientific information for the project, and sharing of the knowledge produced.

Group of actors involved in the Project	Rights in relation to the Project	Interests in your participation in the Project	Relevance of Project participation
		conservation, and socioeconomic development.	
Technical Assistance and Rural Extension Team	Beneficiaries of the project activities.	To benefit socially, economically and environmentally, such as income generation, improvement of environmental quality and community engagement, as well as the feasibility of the project's implantation and achievement of its objectives.	High - Enable the implementation of the project activities through operational capacity building and dialogue and engagement between stakeholders and project proponents.
Forest Nurseries	Beneficiaries of the project activities.	Technical training and socio-economic benefits (employment and income generation) from seedling production	High - Responsible for producing native seedlings that are supplied for reforestation in a viable and scalable way
Service Providers	Beneficiaries of the project activities.	Technical training and socioeconomic benefits (generation of employment and income) related to the implementation and maintenance of reforestation	High - Responsible for implementing and maintaining reforestation in a viable and scalable way

2.1.10 Sectoral Scope and Project Type

This Bundled Project is eligible under the VCS Program for sectoral scope 14. (AFOLU, Agriculture, Forestry and Other Land Uses) within the project category of Afforestation, Reforestation and Revegetation (ARR), as it will increase carbon sequestration by restoring native vegetation cover through planting and assisted natural regeneration of woody vegetation.

- Sectoral scope: 14 - Agriculture, Forestry and Other Land Use (AFOLU);

- Project Category: Afforestation, Reforestation, and Revegetation (ARR);

- This is a Grouped Project.

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

For the design of the Corridors for Life ARR Grouped Project, the results chain guided the use of the Theory of Change and was considered a crucial step in the process of developing and defining the strategic activities, proposed from the problems identified in the Project Zone.

Thus, the Corridors for Life ARR Grouped Project seeks to promote joint actions in the Climate, Community and Biodiversity scopes; aiming to generate net benefits for the three purposes. Thus, the activities outlined by the project will seek, predominantly, to promote the increase of forest cover through the planting of native trees and the conduction of regeneration, the conservation of the biological diversity of fauna and flora, the protection of natural resources, the removal of greenhouse gases, local socioeconomic development, social inclusion, the stimulation of research, the engagement and involvement of stakeholders, and the promotion of assertive and adaptive governance and management.

This set of interconnected strategies will allow the generation of financial resources, especially from the commercialization of ARR credits registered in the VCS (Verified Carbon Standard) associated with social development and biodiversity conservation, seeking to ensure appropriate funding for the compliance and achievement proposed in this PDD, as well as to allow the maintenance of the carbon project throughout its life cycle.

For this purpose, the implementation and development of the following activities proposed by the Corridors for Life ARR Grouped Project were designed and defined after thorough assessment of the knowledge accumulated for the Project Zone by its proponents, valuing local understandings. Thus, the initiatives foreseen by this carbon project for the Climate, Community and Biodiversity scopes are: "Reforestation through seedling planting and regeneration conduction", "Training of local communities in the reforestation chain and environmental awareness", "Acquisition of native forest seedlings and hiring of local communities' forest restoration and maintenance services", "Research, development and innovation of the project's activities", and "Research and management of endangered fauna species". And they will be better explained below:

Reforestation by planting seedlings and conducting regeneration

Reforestation through seedling planting and regeneration is associated with the Climate, Community and Biodiversity scopes. Considering the current situation of rural properties in the Project Zone, environmentally unsuitable under current legislation, the forest restoration initiative in Permanent Preservation Areas and Legal Reserves of these properties will promote the legal suitability of rural properties under the Native Vegetation Protection Law (Law N° 12.651/2012), the consolidation of the reforestation chain in the Project Zone, the removal of GHGs from the atmosphere by the growth of trees, the increase of native vegetation cover, increased connectivity of the landscape and conservation of species of fauna and flora in situ.

For this, forest restoration techniques will be applied in the field, widely disseminated and conceptualized in the sector, according to the particular characteristics of each site to be recovered. Depending on the diagnosis and local resilience, the technique to be implemented will be based on the active planting of seedlings of native tree species or the association of active restoration with the conduction of natural regenerants. This strategy will ensure more effective actions, ensuring that these areas become self-sustaining in the long term, favoring the structural and ecological rehabilitation of the landscape. In association, aiming for more appropriate results, management practices and maintenance of these areas will also be expended; in particular control of competing exotic grasses and combating leaf-cutting ants. These actions will provide the adequate development of the arboreal individuals so that they can grow properly, contributing to the increase of the vegetation cover and the removal of GHGs from the atmosphere. As well as for the protection of soil and water resources, and the creation of a safe habitat for

the conservation of fauna and flora species; especially those that are endemic and threatened with extinction.

At the same time, the development of this activity in the mapped instances will also enable impacts on local communities, especially on the emergence of demand for services associated with reforestation, and the consequent generation of job opportunities in the sector.

Capacity building of local communities in the reforestation chain and environmental awareness

The initiative to train local communities in the reforestation and environmental awareness chain consists, essentially, in providing, expanding and sharing knowledge and know-how regarding reforestation activities and the importance of standing forest conservation. For this reason, this action is closely related to both the Community and Climate and Biodiversity scopes.

For its implementation and development, lectures, workshops, training sessions and workshops will be provided, focusing on local communities and other stakeholders, about forest restoration techniques, good practices and innovation in reforestation, the relevance of environmental recovery, conservation of standing forest, and maintenance of natural resources. With this, it is expected the constancy and increase of skills of local communities for the appropriate and qualified development of the initiatives of reforestation implementation and maintenance, expansion of the local labor market through the gain of scale of environmental recovery actions, professional qualification for access to job opportunities, contribution to the improvement of the perception of the population of the Project Zone about the forests and their resources, stimulation of critical sense for a more sustainable society, and strengthening of the promotion of equity for young people and women.

At the same time, this initiative will also seek to strengthen the governance and engagement of all stakeholders so that the chances of success of reforestation activities are enhanced, reducing the risk of non-permanence of the Project Area. This collective commitment, besides helping to achieve the important objective of this carbon project which is the removal of GHGs from the atmosphere, the environmental education foreseen for the local population will also help on biodiversity, mainly regarding the preservation of the native vegetation cover and the conservation of fauna and flora species, especially those threatened with extinction, from the understanding of the relevance of the importance of forests.

Acquisition of native forest seedlings and contracting forest restoration and maintenance services from local communities

This activity is focused, exclusively, on the socioeconomic development of the local community. Based on the growing demand for reforestation and natural regeneration areas for the regularization of private rural properties linked to this carbon project, the project foresees an increase in the need for inputs and labor, especially seedlings and service providers, for the adequate implementation and maintenance of reforestations. Thus, in order to properly meet this imminent expansion, the project will value and enhance the performance and knowledge of local communities, expanding and stimulating the social and economic development of the Project Zone.

In this sense, associated to the qualification provided by the initiative of training the communities and other stakeholders, with the gain in scale of the planting of native tree species and the management of areas with environmental resilience coordinated by the proponents of the Corridors for Life ARR Grouped Project, it is expected the expansion of community nurseries, the consolidation of technical assistance and rural extension organizations and the emergence of new companies for the implementation and maintenance of forest areas. Thus, it is expected the strengthening of the local economy by promoting new jobs in the labor market, equal access to opportunities for young people and women, increased income for the local population, encouragement of entrepreneurship, and improvement in the quality of life of the population in the Project Zone.

In addition to socio-economic development, this strategy will also contribute to a better perception by local communities and other stakeholders of the relevance of reforestation for generating opportunities, fostering direct and indirect social benefits, and enabling the prosperity of a sustainable society.

Research, development and innovation of project activities

The research, development and innovation initiative of the project activities is linked to the Climate, Community and Biodiversity scopes. Considering the relevance of this carbon project for the region, the activities that will foster the increase of forest cover, the maintenance of natural resources (e.g. soil and water resources), conservation of the biological diversity of fauna and flora species, mitigation of climate change, environmental education and socioeconomic development; will be frequently monitored in partnership with universities and research centers for the generation of scientific articles, studies and technical manuals, and Course Conclusion Works/Master's Dissertations/Theses; publicly available and made available to local communities, other stakeholders, and civil society.

Besides generating a vast and robust database with a vigorous diversity of information about the Project Zone, which will be transparent and communicable, this activity also foresees the training of human resources for the development of research and innovation, including the improvement of seedling production techniques and other practices associated with reforestation for continuous improvement of the project activities and its directly related actions.

With this, relying on the collective engagement of all interested parties, including proponents, local communities, and other stakeholders, this initiative seeks the adequate and effective achievement of the objectives sought by this carbon project. Based on the analysis of the results of these surveys and studies, it is up to the project to make strategic decisions for the adaptive management of the project in order to guarantee the climatic, social, and biodiversity benefits required in the Corridors for Life ARR Grouped Project. Thus, in addition to the achievement of the desired objectives, this database will also be able to support the development of public policies, the expansion of reforestation initiatives, and the continuous improvement of these actions.

Research and management of endangered fauna species

Considering the relevance of the Project Zone on the High Conservation Value Areas and to the biodiversity of the region, in association with the activity explained above, research focusing on fauna species, especially those endemic and threatened with extinction, will be encouraged and developed by this carbon project.

As demonstrated in previous sections, in the Project Zone there is a vast presence and diversity of fauna and flora species that use the forest fragments and areas under restoration as habitat. Thus, with the increase of the native vegetation cover and the increase of forest connectivity, it is expected an improvement in the population conditions of the species present in situ, both fauna and flora, including those that are endemic, vulnerable and threatened with extinction. Therefore, scientific research, studies and surveys that include a partnership with academia, will promote the construction of a robust database on the ecology and behavior of fauna and flora species in the Project Zone, through field expeditions to collect useful data that will foster an understanding of the population viability of these species.

With regard to the biological diversity of fauna and flora species threatened with extinction, the results of these surveys and research will enable strategic decision making for the integrated management of the metapopulation; fostering the conservation of endangered species, the long-term population viability of biological diversity, and the reduction of threat levels according to the IUCN Red List.

Table 8 below provides a description of the activities and key outputs and impacts that will contribute to a hieving the Corridors for Life ARR Grouped Project anticipated Climate, Community and Biodiversity benefits.

Table 8 - Activities, outputs and relevance of activities planned by the Corridors for Life ARR Grouped Project for Climate, Community and Biodiversity.

Theme			Activity Description	Expected Outcomes for Climate, Community, and Biodiversity			Relevance to the Project Goals
Climate	Community	Biodiversity		Short Term	Medium Term	Long Term	
X	X	X	Reforestation through seedling planting and regeneration conduction	- Increase in native forest cover and in situ conservation of dozens of native species, including vulnerable species; - Generation of reforestation services and consequently new jobs.	- Create habitat for fauna; - Contribute to the protection of water resources from the impacts of surrounding human activities, through the reforestation of riparian areas; - Providing native tree seeds for community nurseries; - Contribute to the protection of the soil through forest cover.	- Removal of GHG from the atmosphere; - Increased connectivity between forest remnants, favoring gene flow and consequently the conservation of flora and fauna in the landscape; - Environmental and productive regularization of rural properties.	<u>Climate</u> - Removal of GHGs from the atmosphere by the growth of trees from reforestation activities. <u>Community</u> - Encouragement of the reforestation chain; - Source of seeds for community nurseries; - Environmental compliance of rural properties according to the Law 12.651/2012. <u>Biodiversity</u> - Increase of native forest cover and habitat for fauna; - Increased connectivity between forest remnants; - In situ conservation of native tree species; - Contribution to the conservation of endangered species.
X	X	X	Capacity building of local communities in the reforestation chain and environmental awareness	- To promote, expand, and share knowledge about reforestation activities; - Disseminate the	- Maintain and increase the skills of local communities in developing activities in the chain of production and	- Contribute to improving the perception of the population in the project area about the importance of forests and the opportunities	<u>Climate</u> - Capacity building and training increase the chances of success of reforestation activities and consequent GHG removal;

				importance of reforestation and environmental conservation; - Capacity building in best practices and innovation in reforestation.	maintenance of reforestation; - Promote the gain of scale of the reforestation activities.	generated by reforestation activities; - Stimulate a critical sense for a sustainable society.	- Strengthened stakeholder engagement and reduced risk of non-permanence in project areas. <u>Biodiversity</u> - Training for seed collection and production of various native tree species, favoring the species richness of the plantations. <u>Community</u> - Support and encouragement for entrepreneurship in the reforestation chain; - Qualification for access to professional opportunities - Actions to strengthen the promotion of equity for young people and women; - Communication of project results and stakeholder engagement.

	X		Acquisition of native forest seedlings and contracting forest restoration and maintenance services from local communities	- Empowerment of local communities through the expansion of existing community nurseries, technical assistance and rural extension companies, and forest planting and maintenance companies; - Generation of employment and income for local communities through involvement in reforestation activities.	- Encouraging the establishment of new enterprises and jobs.	- Stimulating the reforestation market in the region and empowering community initiatives, making them independent from the project; - Contribute to improving the perception of the population in the project area about the importance of forests and the opportunities generated by reforestation activities.	<u>Community</u> - Income and employment generation for local communities; - Empowerment of local communities; - Promoting gender equity and opportunities for youth; - Strengthening the regional economy.
X	X	X	Research, development and innovation of project activities	- Training of human resources and structuring of funds for research, development and innovation; - Development and improvement of techniques for seedling production and reforestation.	- Enhancement of project activities and monitoring protocols; - Adaptive management recommendations for the project; - Consolidation of database and communication of results.	- Guarantee in the achievement of the project's objectives; - Guidelines for public policies.	<u>Climate, Community and Biodiversity</u> - Continuous improvement and adaptive management of the project; - Contribution to conservation of endangered species.

		X	Research and management of endangered wildlife species	- Information about the ecology and behavior of the species.	- Understanding species population viability.	- Integrated metapopulation management.	<u>Biodiversity</u> - Contribution to the conservation of endangered species; - Long-term population viability of endangered species; - Reduction of threat levels according to IUCN.

2.1.12 Sustainable Development

Goal 1. End poverty in all its forms everywhere		
1.4	By 2030, ensure that all men and women, particularly the poor and vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technologies, and financial services, including microfinance	
The activities planned by the project associated with the "Acquisition of native forest seedlings and hiring of local communities' forest restoration and maintenance services" and "'Training of local communities in the reforestation chain and environmental awareness" will assist local communities in accessing professional opportunities, improving income by engaging in reforestation activities, promoting equity of young people and women to enter the labor market and strengthening the regional economy. These socio-economic benefits are in line with the project's goals; that seeks to enable large-scale reforestation initiatives by prioritizing the acquisition of local resources and labor; stimulating the establishment of new enterprises and jobs to guarantee the benefits to the communities targeted by the project.		
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all		
4.4	By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent work, and entrepreneurship	
4.7	By 2030, ensure that all learners acquire the knowledge and skills necessary to promote sustainable development, including, but not limited to, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity and of culture's contribution to sustainable development	

The project promotes and encourages access to inclusive, equitable and quality education through training in the environmental and socioeconomic areas, with a special focus on reforestation activities, best practices and innovation; the importance of forest recovery and conservation of standing forests; and entrepreneurship. For this, it counts on the support and collaboration of specialized partners, including those from ATER, to ensure the effectiveness of the proposed qualifications and the engagement of all stakeholders. These activities associated with education and training promoted by the ARR project will foster critical thinking for a sustainable society, qualification for access to professional opportunities, income and employment generation for local communities, empowerment of local communities, promotion of gender equity and opportunities for youth, and strengthening of the regional economy. In addition, the ARR Project will also encourage the scientific training of human resources for the development of research and innovation, leading to continuous improvement and adaptive management of the project, as well as the contribution of biological diversity in the Project Zone.		
Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all		
8.3	Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro, small and medium-sized enterprises, including through access to financial services	
Certain project activities, in particular, "Acquisition of native forest seedlings and contracting of forest restoration and maintenance services from local communities" combine the socioeconomic demands of local communities with the opportunities triggered by the implementation of the reforestation project in the Project Zone. The growing need for resources and manpower for the activities of planting seedlings of native species and conducting areas of natural regeneration will trigger an incentive for the establishment of new enterprises and jobs through the expansion of community nurseries and the increase of forestry planting and maintenance; improving income, inclusion and equity in the Project Zone. At the same time, the qualification provided by the activity of "Training local communities in the reforestation and environmental awareness chain" will also help the community to access professional opportunities.		
Goal 12. Ensure sustainable consumption and production patterns		
12.2	By 2030, achieve sustainable management and efficient use of natural resources	
12.8	By 2030, ensure that people everywhere have relevant information and awareness for sustainable development and lifestyles in harmony with nature	

The project provides for the environmental awareness of all interested parties regarding sustainable development, the importance of reforestation and conservation of the standing forest, and the value of the rational use of natural resources. To this end, it will promote, expand and disseminate knowledge about the relevance of forests and the opportunities generated by reforestation activities; stimulating critical thinking for a more sustainable society. Thus, the project will ensure the conservation of species of fauna and flora, including those threatened with extinction; as well as the protection of soil and water resources.		
Objetivo 13. Take urgent action to combat climate change and its impacts		
13.2	Integrate climate change measures into national policies, strategies and plans	
13.3	Improve education, raise awareness and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	
13.b	Promote mechanisms for capacity building for climate change-related planning and effective management in least developed countries, including with a focus on women, youth, local and marginalized communities	
In general, all activities foreseen by the project seek to foster initiatives to mitigate climate change and its impacts and, consequently, reduce environmental degradation in the Project Area. In this sense, in addition to "Reforestation through the planting of seedlings and conduction of regeneration", which will promote the increase of native vegetation cover and, consequently, the removal of GHGs from the atmosphere by the growth of trees; it will also promote capacity building and training for local communities and other stakeholders so that the chances of success of reforestation plantations and conduction of areas in natural regeneration are enhanced. In addition, the project proponents will strive to encourage and strengthen participatory and engaged governance by stakeholders over project strategies, reducing the risk of non-permanence of project reforestation areas.		
Objetivo 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss		
15.1	By 2020, ensure the conservation, restoration and sustainable use of inland terrestrial and freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in accordance with obligations under international agreements	
15.2	By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	
15.3	By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, droughts and floods, and strive to achieve a land degradation neutral world	

15.5	Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of endangered species	
15.8	By 2020, implement measures to prevent the introduction and significantly reduce the impact of invasive alien species on terrestrial and aquatic ecosystems, and control or eradicate priority species	
15.a	Mobilize and significantly increase, from all sources, financial resources for the conservation and sustainable use of biodiversity and ecosystems	
Taking into account the relevance of the Project Zone to local biodiversity, the project makes efforts to increase forest cover through the incorporation of regional native species in reforestation areas; promoting connectivity between forest fragments, both recovering and remaining; providing the creation of habitat for species of fauna and flora and favoring gene flow. This initiative, in addition to encouraging the conservation of in situ species, especially those threatened with extinction, will also promote the protection of soil and water resources. In parallel, the project provides for the engagement, involvement and awareness of all stakeholders regarding the importance of biological biodiversity in the provision of ecosystem services, maintenance of native vegetation cover, control of environmental degradation and limitation of excessive use of resources. natural resources through environmental education initiatives. In association, the incentive to "Research and management of endangered species of fauna", through periodic monitoring, will also consolidate a robust data base that will help in the conservation of endangered species and in the making of strategic decisions so that the positive impacts on biodiversity in the Project Area are guaranteed.		

2.1.13 Implementation Schedule (G1.9)

The timeline with the main dates and milestones for the development of the Corridors for Life ARR Grouped Project has already been presented above and can be seen in Table 9. The summarized chronogram of these activities can be found in the table below (*Table 9*).

Table 9 - Detailed schedule of development and implementation of the main activities related to the Corridors for Life ARR Grouped Project.

Date	Milestone(s) in the project's development and implementation
1 to 1.5 years before validation	Formalizing the Partnership Contract
	Construction of the Map of Dreams
	Elaboration of the economic model
	Operational Planning
	Formalization of Agreements with Landowners in priority areas

	Beginning of Planting in priority areas
	Definition of baseline strata
	Determination of baseline and potential for credit generation
	Survey of studies, records and diagnostics
	Definition of monitoring procedures and indicators
In the year of validation	Consolidation of the project, management plan and preparation of the project description document
	Public consultation with communities and other stakeholders
	Feedback with Communities and other stakeholders
	Selection and hiring of validator/verifier and credit registry platform
	Validation Audit
	Registration and Certification
Years 3 to 30	Development and monitoring of environmental and social activities
	Credit verification (Selecting and hiring the verifier; Producing the Monitoring Report for the Verification process; Field audit follow-up; Credit registry)
	Conducting credit marketing processes

2.1.14 Project Start Date

The start date for the Corridors for Life ARR Grouped Project has been set for December 6, 2021, as this is the day when planting activities for the Project began.

2.1.15 Benefits Assessment and Crediting Period (G1.9)

The start date of the crediting period for the Corridors for Life ARR Grouped Project is December 6, 2021. It will end on December 5, 2071, completing a 50-year period. There will be ongoing monitoring of climate, community and biodiversity benefits and verification with the CCB preferably every 3 years for the duration of the Project.

2.1.16 Differences in Assessment/Project Crediting Periods (G1.9)

There will be no difference between the evaluation period and the crediting period for the Corridors for Life ARR Grouped Project.

2.1.17 Estimated GHG Emission Reductions or Removals

Year	Estimated GHG emission reductions or removals (tCO_2e)	Year	Estimated GHG emission reductions or removals (tCO_2e)
Dec/2021-Dec/2022	5,380	Dez/2046-Dez/2047	913,584
Dez/2022-Dec/2023	45,057	Dec/2047-Dec/2048	900,175
Dec/2023-Dec/2024	87,993	Dec/2048-Dec/2049	887,413
Dec/2024-Dec/2025	123,069	Dec/2049-Dec/2050	875,433
Dec/2025-Dec/2026	182,699	Dec/2050-Dec/2051	864,346
Dec/2026-Dec/2027	233,004	Dec/2051-Dec/2052	851,580
Dec/2027-Dec/2028	281,982	Dec/2052-Dec/2053	823,922
Dec/2028-Dec/2029	331,222	Dec/2053-Dec/2054	789,358
Dec/2029-Dec/2030	404,666	Dec/2054-Dec/2055	755,814
Dec/2030-Dec/2031	466,322	Dec/2055-Dec/2056	712,614
Dec/2031-Dec/2032	527,919	Dec/2056-Dec/2057	670,294
Dec/2032-Dec/2033	588,555	Dec/2057-Dec/2058	628,756
Dec/2033-Dec/2034	648,175	Dec/2058-Dec/2059	587,900
Dec/2034-Dec/2035	706,749	Dec/2059-Dec/2060	537,029
Dec/2035-Dec/2036	764,269	Dec/2060-Dec/2061	486,684
Dec/2036-Dec/2037	820,750	Dec/2061-Dec/2062	436,792
Dec/2037-Dec/2038	876,228	Dec/2062-Dec/2063	387,286
Dec/2038-Dec/2039	930,754	Dec/2063-Dec/2064	338,112
Dec/2039-Dec/2040	984,392	Dec/2064-Dec/2065	289,221
Dec/2040-Dec/2041	1,037,213	Dec/2065-Dec/2066	240,574
Dec/2041-Dec/2042	984,968	Dec/2066-Dec/2067	192,138
Dec/2042-Dec/2043	970,629	Dec/2067-Dec/2068	143,885
Dec/2043-Dec/2044	956,169	Dec/2068-Dec/2069	95,790
Dec/2044-Dec/2045	941,738	Dec/2069-Dec/2070	47,834
Dec/2045-Dec/2046	927,490	Dec/2070-Dec/2071	0
Total estimated ERs			**28,283,928**
Total number of crediting years			**50**
Average annual ERs			**565,679**

2.1.18 Risks to the Project (G1.10)

Through the tool "AFOLU Non-Permanence Risk Tool v3.2", the probable natural and human induced risks to climate benefits were verified, reported in the Non-Permanence Risk Report of the Corridors for Life ARR Grouped Project, as summarized in the table below (Table 11). The non-permanence risk analysis through the mentioned tool generated a buffer of 10%.

Table 10 - Final non-permanence risk score for the Corridors for Life ARR Grouped Project

Category	Score
Internal Risk	0
External Risk	3
Natural Risk	0,5
Overall Score (a + b + c)	10

2.1.19 Benefit Permanence (G1.11)

All activities planned and proposed by the Corridors for Life ARR Grouped Project, and their short, medium and long-term positive impacts have been designed according to their relevance to the project's objective, as well as the prospect of becoming self-sustaining over time.

Thus, to implement, maintain, and enhance the net benefits to climate, community, and biodiversity over the project's lifetime and beyond, the project's planned activities focus on empowering local communities, raising environmental awareness among stakeholders, strengthening the local economy, stimulating research, and improving management and governance capacity. These initiatives will have short, medium and long-term impacts and therefore will assist all stakeholders in appropriate engagement and decision-making to achieve the climate, community and biodiversity benefits targeted in this PDD beyond the life of this project.

The strategies associated with each activity for the benefits to occur during the life cycle of the Corridors for Life ARR Grouped Project and beyond are:

- Reforestation through seedling planting and regeneration conduction: the project aims to increase native forest cover and connectivity between forest fragments through field implementation of forest restoration techniques widely accepted and widespread in environmental suitability programs. In parallel, it will promote training for local communities and other stakeholders on the importance of reforestation and preservation of standing forest, demonstrating that in addition to the benefits for climate change mitigation and conservation of species of fauna and flora, forest restorations can also generate jobs and improve income.

- Capacity building of local communities in the reforestation chain and environmental awareness: the promotion, dissemination and sharing of knowledge about reforestation activities, and their directly associated opportunities, will help to spread the understanding of the relevance of forest restoration and conservation of standing forest to strengthen the local economy, create jobs, and improve the quality of life

of the population. Training and capacity building will jointly promote the maintenance and increase of skills so that community members and other stakeholders can gain scale in the chain of production and maintenance of reforestations, stimulating entrepreneurship and the equity of professional opportunities. In association, environmental education will also contribute to a more sustainable society that helps conserve the biological diversity of the regional flora and fauna.

- Acquisition of native forest seedlings and hiring of forest restoration and maintenance services from local communities: from the growing demand for environmental regularization through reforestation of private rural properties associated with the carbon project, there will be the need to acquire a progressive number of seedlings, inputs and labour for the development of forest restoration implementation and maintenance initiatives. With this, the project will encourage the expansion of community nurseries, the emergence of technical assistance and rural extension organizations, and the creation of companies specialized in forest restoration. This activity, besides strengthening the local economy; along with the qualification and environmental awareness of the population about the importance of reforestation and its opportunities, will also help in the empowerment and improvement of the lives of local communities.

- Research, development and innovation of project activities: the project foresees the encouragement of scientific work, studies and research focused on the proposed strategies for climate, community and biodiversity; especially with regard to the biological diversity of fauna and flora, which use the reforestation areas. This activity will promote stakeholder engagement for the development and improvement of seedling production and reforestation techniques in order to ensure continuous improvement for the project through strategic and assertive decision-making, taking into consideration the adaptive management of such. The results generated by these initiatives, besides promoting the innovation of techniques and best practices for forest restoration and the training of human resources, will also help in the construction of a robust database for a better understanding of the effectiveness of the actions employed, both for the communities and for the biodiversity in the project area; allowing its long-term sustainability.

- Research and management of endangered fauna species: In line with the activity mentioned above, the project will stimulate scientific research specifically focused on endangered fauna species in the Project Zone, considering the biological importance of this region for local biodiversity. This initiative, besides promoting the academic qualification of stakeholders from universities and research centers, will also promote the generation of a vast and in-depth volume of information about the ecology and behaviour of the populations of endangered species. Thus, in the long term, the understanding derived from this database will assist in effective recommendations and initiatives for management of fauna populations, conservation of endangered species, and their population viability.

2.1.20 Financial Sustainability (G1.12)

The proponents of the Project have a solid partnership signed in 2020 with the objective of scaling reforestation in the Project Zone through the commercialization of environmental assets. The Corridors for Life ARR Grouped Project will be an initiative that should enable in the medium and long term the continuous investment of resources aimed solely at reforestation, conservation and sustainable development in the region.

Considering the current premises of the carbon market and the potential for generating GHG Emission Reductions, the financial flow of the Corridors for Life Project presents solid financial sustainability. Information related to the financial analysis of the Corridors for Life ARR Grouped Project and financial

health statements of the partner institutions (project proponents) are considered commercially sensitive information and will be shared with the audit team on a confidential basis

2.1.21 Grouped Projects

1) Eligibility Criteria for Grouped Projects (G1.14)

The following are the eligibility criteria for the bundled project:

- Adopt and apply the project activities, technologies, and/or measures in the same manner as specified in the project description documentation.

- Meet the applicability conditions set out in the methodology.

- Are subject to the same community and biodiversity without project scenarios as determined for the project.

- Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.

- Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area (e.g., the new instances of the project activity have financial, technical and/or other parameters consistent with the initial instances, or have the same investment, technological and/or other barriers as the initial instances).

- Are subject to the same stakeholder engagement processes described in Section 2.3 and respect for rights to lands, territories, and resources, including free, prior, and informed consent described in Section 2.5.

- Have similar monitoring elements.

- Not be included in another GHG program.

The following conditions will be met for the inclusion of any new eligible areas as willing instances to participate in the proposed groupeded project, after validation of the Corridors for Life ARR Grouped Project:

(a) be within one of the designated geographic areas specified in the project description (section 2.1.5 and 2.1.7);

b) Meet the following eligibility criteria:

1. all areas to be incorporated into the grouped project must meet the applicability conditions set forth in the methodology required of the project:

(a) the area of the pooled project instance has not been deforested from native ecosystems in the 10-year period prior to the project start date. This criterion will be proven by soil survey, satellite images, aerial photographs, official maps or land use records;

b) The area of the bundled project instance was not forested at the time of planting. This criterion will be proven by soil surveys, satellite images, aerial photographs, official maps or land use records;

c) The grouped project instance is not located on organic soils;

d) The grouped project instance does not fall into the category of wetlands as defined by the IPCC;

e) The burlap will remain on site and will not be removed;

(f) Any site preparation involving plowing/shoveling/scarifying, implemented as part of the groupeded project instance activity, will be:

- Done in accordance with appropriate soil conservation practices;
- Limited to the first five years from the year of initial site preparation; and
- Not repeated, if at all, within a 20-year period.

2. The project activity must be under the control of the project participants;

3. Are subject to the baseline scenario determined in the project description for the specified project activity (reforestation);

4. The new instances should have additionality characteristics consistent with the initial instance for the specified project activity and geographic area. The "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities" will be used to demonstrate the baseline and additionality for each new project instance.

c) Be included in the monitoring report with sufficient technical, financial, geographic, and other relevant information to demonstrate compliance with the applicable set of eligibility criteria;

d) Be validated at the time of verification against the eligibility criteria described in point b;

e) Have proof of right of use, in relation to each instance of the project activity, held by the project proponent as of the respective start date of each instance of the project activity.

f) Have a start date that is equal to or later than the start date of the bundled project;

g) Be eligible for credit from the instance start date to the end of the project credit period.

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

The scalability of the Corridors for Life ARR Grouped Project is limited to the eligible properties identified by the Map of Dreams, in the Pontal do Paranapanema region, that have environmental liabilities throughout the life of the project. Each owner of these lands will be responsible for carrying out management activities and ensuring the sustainability of the plantations. Associated with this, the scalability of the project will also be restricted, essentially, by financial resources. The strategy for gaining scale of the Corridors for Life ARR Grouped Project will thus be based on field prospecting of areas eligible for forest restoration in the scope of the Map of Dreams, and negotiations for enabling investments that foster the activities proposed by the project. The addition of new instances to the project must have a financial plan and a schedule for implementation of activities to ensure the effective development of the project instance and that it achieves the expected climate, social and biodiversity benefits.

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

The risks associated with the non-continuity of benefits will be minimized by involving areas with owners who are committed to the project's objectives and meet the eligibility criteria.

2.2 Without-project Land Use Scenario and Additionality

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

See Section 3.1.4 (Baseline Scenario), which contains the description of the baseline scenario

2.2.2 Most-Likely Scenario Justification (G2.1)

The most likely without project land-use scenario in the Project Zone is the continuation of the pre-project land use: mostly unmanaged grasslands and some annual croplands, as detailed described in Section 3.1.5 (Additionality). Under the without-project scenario, tree-related CO_2 sequestration increases would not have happened because of the continuation of pre-project activity. In other works, with the continuation of the pre-project scenario, unmanaged pasturelands of invasive grasses and some annual croplands (mostly sugarcane), would be the dominant land use, accumulating less CO_2e than the areas under forest restoration implemented by the project.

2.2.3 Community and Biodiversity Additionality (G2.2)

This section is under development and will be presented in the final version of the pre-validation document.

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

The Corridors for Life ARR Grouped Project aims to produce only compensation related to Emissions Removal through Reforestation, as described in Section 3 – Climate.

2.3 Stakeholder Engagement

2.3.1 Stakeholder Access to Project Documents (G3.1)

The availability of the full description of the Corridors for Life ARR Grouped Project documentation PDD and the monitoring report will be available to the community and other stakeholders throughout the life of the project, both via the internet and available in hard copy in locations near the project. At any time during the life of the project individuals or institutions interested in the documents will be able to access the project documents and consult them free of charge.

2.3.2 Dissemination of Summary Project Documents (G3.1)

Stakeholder access to the summary of the Corridors for Life ARR Grouped Project documents will be available physically and online for any individual or institution interested in accessing the documents free of charge. In the physical form, copies of the project documents and monitoring reports will be distributed in printed form in places of greater circulation of stakeholders, such as nurseries, IPÊ, Mico-Leão-Preto Ecological Station, Morro do Diabo State Park in the municipality of Teodoro Sampaio and distributed to partners interested in acting in planting and reforestation and to landowners, as contracts for new areas for planting are signed. In the online modality, digital copies of the project documents and monitoring reports will be made available through the Biofílica and IPÊ websites, sent via Message App channels and e-mail to the region's watershed committees and other bodies involved. The main project documents will also be disseminated in events open to the public, workshops and consultations ("*ECOnsultation*") organized by

the project management team. Other forms of dissemination can also be used to give full transparency to the project such as Message App channels, social networks, stickers and informative folders.

2.3.3 Informational Meetings with Stakeholders (G3.1)

Meetings, workshops, and meetings between the proponents to discuss the planning and structuring of the Corridors for Life ARR Grouped Project actions with local residents take place before and during the project in the planning, execution, and monitoring phases. The meetings, workshops, and gatherings will take place more intensively in the first years of the project among the project team. Specifically, besides the usual Friday With Science meetings of the project (event with an informative character about the project for the community) there will be the ECOnsultation event (public consultation with interested and involved parties in the project, with time set aside for feedback from the interested parties) previously and widely informed to individuals, groups and other stakeholders involved in the project directly and indirectly, and later the feedback to the stakeholders involved in the project. Whenever necessary, informative meetings and workshops will take place between the proponents of the Corridors for Life ARR Grouped Project, nursery owners, landowners and other stakeholders. All the planning of the meetings will be previously disclosed in Teodoro Sampaio - SP with hand delivery of invitations to the public, and for other cities via mail, e-mail, Message App and calls.

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

Discussions about the potential costs, risks and benefits of the project to the community will be held during the ECOnsultation. There will be a presentation of the Corridors for Life ARR Grouped Project information by the project proponents, including its concepts, activities, and risks to the stakeholders. Subsequently a SWOT matrix will be constructed, for analysis in a participatory and transparent manner, between the project proponents and the community (nurserymen, farmers, service providers, project workers) and other stakeholders of the project. All pertinent information will be provided to the community in adequate time and media so that key decisions can be made.

2.3.5 Information to Stakeholders on Validation and Verification Process (G3.3)

The community and other stakeholders will be informed about the audit process during the periodic events of “Friday With Science”. The schedule during the audit process and the auditor's agenda will be informed through the websites (IPÊ and Biofílica), e-mail, telephone and Message App. Other forms of communication may also be adopted, if possible and necessary.

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

As previously reported, there will be opportunities for conversation among the stakeholders, the community, and the external auditor, with regard to the visit to the project site. The audit by the audit team during the field visit to the project will be previously informed to the community and stakeholders, and vice-versa, always using appropriate level language to all involved for a better understanding of the reality of the project. The following means of communication will be used for prior information about the audit visit: invitation letters, local newsletters, emails, phone calls, and Message App.

2.3.7 Stakeholder Consultations (G3.4)

A general analysis was conducted by the project team for a general overview of all stakeholders and communities in the area. Four face-to-face meetings were held, two of them at the proponents' work HUB in Piracicaba - SP (July 26th and August 02nd, 2022) for in-depth discussion about the stakeholders' profile and their adhesion to the project. The third meeting, held at the IPÊ HUB in Teodoro Sampaio - SP, included validation of stakeholders and communities by the IPÊ field team, focusing mainly on the characteristics and relationships of communities and stakeholders with the project. The fourth meeting included consultation with stakeholders and communities with the presentation of the project by the Corridors for Life ARR Grouped Project team in Teodoro Sampaio - SP.

The list of invited stakeholders and communities included:

Nurseries in Teodoro Sampaio, São Paulo

- Viveiro Alvorada
- Viveiro Campos Alvorada
- Viveiro Floresta
- Viveiro Mata Nativa
- Viveiro Viva Verde
- Viveiro Manaain
- Viveiro Sol Nascente
- Viveiro Quarteto Florestal
- CA Manutenção e Serviços Florestais
- Cícero Natércio da Silva
- Bispo Serviço de Restauração Ecológica Ltda
- A M Engenharia e Soluções Ambientais Ltda
- Mafran
- Floresterra Consultoria Ltda
- ZC Reflorestamento - Carvalho Reflorestamento Ltda
- 3M Soluções Ambientais Ltda
- Equipe Mico-leão-preto

Others Stakeholders n Teodoro Sampaio, São Paulo

- Associação de Produtores de Mudas e Sementes (APMS)
- Fundação para a Conservação e a Produção Florestal do Estado de São Paulo (Fundação Florestal) – núcleo Teodoro Sampaio
- Corpo de Bombeiros – Base de Teodoro Sampaio
- Secretaria Municipal de Meio Ambiente de Teodoro Sampaio
- Secretaria Municipal da Agricultura e Abastecimento de Teodoro Sampaio
- Coordenadoria de Assistência Técnica Integral (CATI) - núcleo Teodoro Sampaio
- Fundação Instituto de Terras do Estado de São Paulo (ITESP) - núcleo Teodoro Sampaio
- Ministério Público do Estado de São Paulo - núcleo da Promotoria de Justiça de Teodoro Sampaio
- Polícia Militar Ambiental 3° Pel/3ª cia/2°Batalhão da Política Militar Ambiental- núcleo Teodoro Sampaio

Others Stakeholders in Presidente Prudente, São Paulo

- Fundação Instituto de Terras do Estado de São Paulo (ITESP) - núcleo Presidente Prudente

Others Stakeholders in Mirante Do Paranapanema, São Paulo

- Delegacia de Ensino – Região Mirante do Paranapanema
- Corpo de Bombeiros - Base de Mirante do Paranapanema

- Secretaria Municipal de Meio Ambiente de Mirante do Paranapanema (Divisão de Meio Ambiente e Reforma Agrária)
- Secretaria Municipal da Agricultura de Mirante do Paranapanema (Divisão de Agricultura)
- Coordenadoria de Assistência Técnica Integral (CATI) – núcleo Mirante do Paranapanema
- Fundação Instituto de Terras do Estado de São Paulo (ITESP) - Mirante do Paranapanema
- Ministério Público do Estado de São Paulo – núcleo da Promotoria de Justiça de Mirante do Paranapanema
- Atvos - Usina Conquista do Pontal
- Polícia Militar Ambiental 3° Pel/3ª cia/2°Batalhão da Política Militar Ambiental - núcleo Mirante do Paranapanema (ou teodoro?)
- Cooperativa de Mulheres Assentadas (COOPER AMAS)
- Associação de Desenvolvimento dos Assentados do Pontal (ADAP)

Others Stakeholders in Euclides Da Cunha Paulista, São Paulo

- Secretaria Municipal de Meio Ambiente de Euclides da Cunha Paulista
- Secretaria Municipal da Agricultura de Euclides da Cunha Paulista
- Coordenadoria de Assistência Técnica Integral (CATI) - núcleo Euclides da Cunha Paulista
- Fundação Instituto de Terras do Estado de São Paulo (ITESP) - núcleo Euclides da Cunha Paulista
- Ministério Público do Estado de São Paulo - núcleo Euclides da Cunha Paulista
- Polícia Militar Ambiental - núcleo Euclides da Cunha Paulista
- Associação Produtores Rurais e Aquicultores Novo Tempo

Institutions and Social Movements

- Ministério Público do Estado de São Paulo - Grupo de Atuação Especial de Defesa do Meio Ambiente (GAEMA)
- Instituto Brasileiro do Meio Ambiente e Recursos Naturais Renováveis (IBAMA)
- Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio)
- Comitê de Bacias Hidrográficas
- Coordenadoria de Assistência Técnica Integral (CATI), especificamente Departamento de Sustentabilidade Agroambiental
- Companhia Ambiental do Estado de São Paulo (CETESB)
- Secretaria do Meio Ambiente de SP
- Instituto Nacional de Colonização e Reforma Agrária (INCRA) – núcleo São Paulo
- Escola Superior de Conservação Ambiental e Sustentabilidade (ESCAS) do Instituto de Pesquisas Ecológicas (IPÊ)
- Universidade Estadual de São Paulo (UNESP)
- Universidade de São Paulo, Escola Superior de Agricultura “Luiz de Queiroz” (USP/ ESALQ
- Universidade do Oeste Paulista (UNOESTE)
- Movimento dos Trabalhadores Rurais Sem Terra (MST)
- FNL

Rural Properties

- Fazenda Vida
- Fazenda Daniel
- Fazenda Santa Rosa
- Fazenda Matuto
- Fazenda Santa Marina
- Fazenda São Paulo
- Fazenda Santa Amalia
- Fazenda Nossa Senhora Aparecida
- Fazenda São Diego

- Fazenda Santa Maria

NGOs

- Associação em Defesa do Rio Paraná, Afluentes e Mata Ciliar (APOENA)
- Casa da Floresta Assessoria Ambiental
- Fundação SOS Mata Atlântica

The entire process of engagement of communities and stakeholders with Ipê has been built over the past 30 years and predates the initial phase of the Corridors for Life ARR Grouped Project Project. This factor intensified and helped the implementation of the project in the area due to the proximity of the community and stakeholders.

During the ECOnsultation between the project proponents, the community and the stakeholders that took place on September 16th, 2022, there were 54 total participants, as can be seen in the attendance list. The invitations to the stakeholders and community were delivered in person, by mail, and online, through e-mails, Message App and by phone calls.

The day's activities began with the presentation of the Corridors for Life ARR Grouped Project by the project proponents and were discussed together with the community and project stakeholders. Afterwards, a workshop was held for each stakeholder group present to identify their weaknesses, threats, strengths, and opportunities in relation to the Corridors for Life ARR Grouped Project using the SWOT matrix.

2.3.8 Continued Consultation and Adaptive Management (G3.4)

The Corridors for Life ARR Grouped Project has been implemented through a process of continuous consultation between the project proponents and the other stakeholders about the project. According to the communication and interaction strategy of the project with the community and other stakeholders several activities will be developed throughout the project life cycle, including continuous communication, community consultations, and receiving suggestions from members and adaptations to the project context when necessary.

The following activities involving consultation and adaptive management are planned on an ongoing basis throughout the life cycle of the Corridors for Life ARR Grouped Project:

- "Friday with Science";

- Communications through IPÊ's communication channels (website, Instagram, Linkedin, Twitter);

- Workshops;

- Message App group;

More details about these activities can be found in other parts of this document.

2.3.9 Stakeholder Consultation Channels (G3.5)

The channels used in the stakeholder consultation process were face-to-face meetings by the project team that aimed to conduct a general overview of all stakeholders and communities in the area, highlighting the

main cultural and regional characteristics of the population. The first two meetings of the proponents in Piracicaba - SP (July 26th and August 2nd, 2022) were held to discuss in depth the stakeholders profile and their adhesion to the project. The third meeting, held at the IPÊ HUB in Teodoro Sampaio - SP occurred for the validation of stakeholders and communities by the IPÊ field team highlighting the characteristics and relationships of communities and stakeholders with the project.

The invitations to stakeholders and communities were delivered in person and by mail, and online, through e-mails, Message App and by phone calls. In the fourth meeting (ECOnsultation) the stakeholders and communities were consulted based on the presentation of the project by the Corridors for Life ARR Grouped Project team in Teodoro Sampaio - SP and on the workshop with SWOT analysis to hear potentialities and challenges of the project by the stakeholders and communities.

Besides the means of communication with the stakeholders listed above, IPÊ is in Teodoro Sampaio, São Paulo State, having already held face-to-face meetings with some stakeholders to sign contracts with landowners, for example. The history of IPÊ in the region of the project occurs before the conception of this project, approximately 30 years and by the proponents of the project, IPÊ is available to stakeholders for any possible need for consultation, suggestions and clarification of doubts in person.

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

Stakeholder participation in decision making will be fully provided by the Corridors for Life ARR Grouped Project through direct contact between the project community, stakeholders and project proponents. Different cultural values and gender issues will be respected in the implementation of participatory methodologies (posters, records of contributions, plenaries, and round tables), always reinforcing the importance of event moderation for the unfolding of these activities among stakeholders, communities, and project proponents.

2.3.11 Anti-Discrimination Assurance (G3.7)

The Corridors for Life ARR Grouped Project has an anti-discrimination policy for all its project management staff, including contractors and partners. Discriminatory practices will not be tolerated within the scope of the project. These include discriminatory practices, moral harassment, sexual harassment, offense, intimidation or humiliation, fraud, active or passive corruption or acts of improbity, conduct harmful to the reputation, ethical and moral principles, and to the project's assets, conduct harmful to other species or to any other element of living and non-living nature or that may bring material, psychological and spiritual harm to present and future generations. It also encourages anti-corruption training for collaborators and third parties in order to avoid bribery, embezzlement, and the granting of undue advantages, as well as the concealment of these acts and the hindering of investigation and inspection activities.

Preventive and combative measures against any type of conduct characterized as discriminatory will be adopted by the Corridors for Life ARR Grouped Project, such as:

- Anti-discriminatory and anti-racist informational training for all members involved in the project - Signing a term of commitment to good anti-discriminatory practices and prejudicial conduct, in all aspects

- Opening of an anonymous communication channel to report and register anti-discrimination, anti-racist and prejudicial conduct complaints

- Dissemination of good practices aimed at educating about anti-discrimination, anti-racist and prejudicial conduct actions in all the project's communication channels (Friday with science, e-mails, Message App groups and web pages)

- Receive suggestions of other measures suggested by the community and other stakeholders involved aiming to combat discriminatory, racist and prejudicial conducts within the scope of the project.

2.3.12 Feedback and Grievance Redress Procedure (G3.8)

The Corridors for Life ARR Grouped Project has a policy for feedbacks and grievance redress throughout the project's existence. This policy includes steps to demonstrate the formalization of grievances for disputes with communities and other stakeholders that may arise during project planning, implementation and evaluation considering factors such as prior, free, and informed consent, rights to lands, territories and resources, benefit sharing and participation.

The following processes are considered within the grievance feedback and redress policy: receipt, analysis, response and attempt to resolve within a reasonable timeframe to the grievance, making use of traditional methods used by the community and other stakeholders for conflict resolution whenever possible. Complaints will initially be received through an ombudsman channel and physically through a notebook for registration, in an anonymous way. The complaints will be formalized by an institutional committee made up of stakeholders so that decisions can be taken regarding resolution attempts.

There will be time limits for the feedbacks and complaints to be considered with a greater conflict resolution effort in the first stage of the three different stages that comprise: attempted resolution, mediation, and trial in courts. In cases where there is no resolution at the first stage, there will be mediation attempt and if this is not efficient for resolution after neutral consultation of the parties involved there will be arbitration as a last resort, applied in extreme cases with trial.

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

The Corridors for Life ARR Grouped Project will adopt the receipt of feedbacks and complaints through an ombudsman channel, through the project's website containing the entire history of the complaint and its unfolding into procedures and decision-making, and physically in a notebook for registration at the headquarters of IPÊ, in Teodoro Sampaio, São Paulo State. In both channels for receiving feedbacks and complaints, all records will be anonymous, except in cases where individuals require identification. The registration of feedbacks and complaints will be made in writing, by e-mail, telephone, and other available channels. The responses to these complaints will be public knowledge, disclosed in a transparent way and filed in the ombudsman folder within IPÊ. The time limit for feedback will be 7 days for urgent cases and 30 days for less urgent cases.

2.3.14 Worker Training (G3.9)

The Corridors for Life ARR Grouped Project will utilize local labor from the community in the area, with a primary focus on the participation of youth and women in the community. With a total of 720 people, the project area has 216 women being directly impacted by the planned activities.

Dissemination of the training opportunities will be directed primarily to the project workers and residents of the project area, who will be communicated through invitation letters and Message App. The trainings will be carried out by means of training the project's workers and comprehensive informative lectures for the entire community by means of video lessons, which are also objective and didactic for the dissemination of knowledge.

The target audience will be able to request access to the training records and their respective contents, as well as to suggest topics for training and informative lectures throughout the life span of the Corridors for Life ARR Grouped Project.

Traditional knowledge should be maintained by sharing experiences and incorporated into the trainings, such as, for example, breaking the dormancy of seeds of the “Mutambo plant”, which community workers already know.

A knowledge maintenance activity is planned for the training of the former employee and team to the new employee, where the old employee and his team pass on their knowledge acquired over time to the newly hired community workers. Finally, all these procedures and relevant information about the topic will be registered in the "Logalto" database, containing records about the status of the projects' activities and other relevant information.

2.3.15 Community Employment Opportunities (G3.10)

The Corridors for Life ARR Grouped Project proponents, through IPÊ, will carry out training based on the supply and demand of vacancies in the project and monitoring of the expertise of the people trained. All people from the community will have equal opportunities to complete all job positions as long as the requirements for the jobs are met and to consolidate their own businesses through forest restoration independently. XX job positions are expected initially. Workers will be selected for positions through fair and transparent selection processes based on the mapping of strategic people and according to their fields of work and place of residence, with a special focus on women and young people. It is expected that a minimum of 20 people will be employed full-time by the project, 10 women.

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

It is ensured that all employees and service providers are legally contracted in accordance with Brazilian labor legislation. In addition, international agreements ratified by Brazil and issues related to worker's welfare are respected.

Every year, an audit verifies compliance with the labor norms and laws applied by Biofílica; this is due to the fact that it is a limited liability company. Its financial statements are published on the JusBrasil website, the largest open and legal community in Latin America.

After the hiring and before the beginning of the worker's activities, there is training and qualification on the technical procedures and the promotion of empowerment as to their rights and applicable laws. In addition, employees are oriented to join the institutions responsible for their rights, the respective labor unions.

The pertinent laws and regulations that protect workers' rights in Brazil, as well as theinternational agreements ratified by Brazil on labor issues are listed below:

Federal Legislation and Regulations:

- Decree-Law No. 5,452, May 1, 1943: Approves the Consolidation of Labor Laws.

- Law No. 6.514 of December 22, 1977: Amendments to Chapter V of Title II of the Consolidation of Labor Laws, on safety and medicine at work and other measures.

- Regulatory Norm n°. 31 of 03/03/2005: it disposes on safety and health in the work in the agriculture, livestock silviculture, forest exploration and aquiculture

International agreements ratified by Brazil:

- International Labor Organization Convention no. 29 of 1930, ratified by Brazil on April 25th, 1957: Provides for the abolition of forced labor.

- International Labor Organization Convention no. 87 of 1940: Provides for freedom of association.

- International Labor Organization Convention no. 97 of 1949, ratified by Brazil on June 18th, 1965: Provides for migrant workers.

- International Labor Organization Convention no. 98 of 1949, ratified by Brazil on November 18th, 1952: Provides for the right to organize unions and collective bargaining.

- International Labor Organization Convention no. 100 of 1951, ratified by Brazil on April 25th, 1957: provides for equal pay for men and women.

- International Labor Organization Convention no. 105, ratified by Brazil on June 18th, 1965: Provides for the abolition of forced labor.

- International Labor Organization Convention No. 111 of 1958, ratified by Brazil on March 1rst, 1965: Provides for discrimination with respect to employment and occupation.

- International Labor Organization Convention no. 131 of 1970, ratified by Brazil on May 4th, 1983: provides for the fixing of the minimum wage, especially in developing countries.

- International Labor Organization Convention no. 87 and 138 of 1973, ratified by Brazil on June 28th, 2001: provides for minimum age for admission.

- International Labor Organization Convention no. 142 of 1975, ratified by Brazil on November 24th, 1981: provides for the development of human resources.

- International Labor Organization Convention no. 143, 1975: Provides for the development of illegal human resources. immigration and the promotion of equal opportunities for migrant workers.

- International Labor Organization Convention no. 155 of 1981, ratified by Brazil on May 18th, 1992: Provides for the safety and health of workers.

- International Labor Organization Convention no. 169 of 1989, ratified by Brazil on July 25th, 2002: Provides for indigenous and tribal rights.

- International Labor Organization Convention no. 182, ratified by Brazil on February 2nd, 2000: Prohibits the worst forms of child labor and takes immediate action to eliminate them.

2.3.17 Occupational Safety Assessment (G3.12)

The guarantee of safe and healthy work within the scope of the Corridors for Life ARR Grouped Project through the service providers of IPÊ, responsible for technical and operational initiatives in the field (e.g., implementation and maintenance of reforestations) is signed between IPÊ and its service providers by means of a legal contract, reinforcing the importance of mutual commitment to the fulfillment of labor requirements of health and safety.

All service providers that carry out reforestation activities in the field are subject to the following procedures associated with occupational safety and medicine:

- NR 07 (P.C.M.S.O - Occupational Health Medical Control Program);

- Ordinance SEPRT 8,873 of 07/23/2021 (provides for Occupational Risk Management and Occupational Risk Management);

- Decree n° 3048 - INSS (L.T.C.A.T - Technical Report of Environmental Conditions of Work);

- Decree No. 3048 of May 6, 1999 (provides for the Social Security Regulations);

- NR 31 (P.G.R.T.R - Rural Work Risk Management Program);

- SEPRT Ordinance No. 22,677 of October 22, 2020 (provides for Safety and Health at Work in Agriculture, Livestock, Forestry, Forestry, and Aquaculture);

- NR 01 (OS - Work Order).

- In addition to developing and frequently updating procedures, programs, and internal manuals on Preliminary Risk Analysis (APR), Safe Work Procedure, and PPE Matrix.

In addition to the above, the Corridors for Life ARR Grouped Project intends through its service providers that already comply with the internal procedures, programs and manuals on health and safety, to offer and carry out training in accordance with the regulatory standards to internal workers and service providers, highlighting

- Safety Integration (NR 01);

- Use, Care and Conservation of PPE (NR 06);

- First Aid (NR 07);

- Operation of Machines and Equipment (NR 12);

- Lifting and Manual Weight Transport (NR 17);

- Safety in Chainsaw and Brushcutter Operation (NR 31); Safety in Agricultural Machinery Operation - Tractor (NR 31);

- Prevention of Accidents with Agrochemicals (NR 31);

- Accident Prevention (NR 09)

There will also be periodic visits to the service providers in the reforestation activities in the field by the Safety at Work Technician together with the project proponents with the preparation of a photographic record report, issuing technical opinions on the environmental working conditions and providing technical guidance to workers and service providers on Occupational Safety Health (S.S.T). Additionally, he will also perform the Daily Safety Dialogue (D.D.S) and other competent activities of the competence of the professional Labor Safety Technician.

2.4 Management Capacity

2.4.1 Project Governance Structures (G4.1)

The project management will be the responsibility of Biofílica and the IPÊ. In this sense, the obligations and commitments of the parties are described below:

Biofílica's responsibilities: responsible for the relationship and management of the project's investors (clients) and for carrying out all operations associated with carbon management and certification (construction of the Project Design Description, conduct of validation/verification audits and registration and management of RVEs generated by the project).

IPÊ's responsibilities: responsible for field activities, resource management, hiring companies and teams for seedling production and planting, social and environmental monitoring, relationship with owners of the restored areas, production of activity reports and infrastructure and logistics support to Biofílica and other professionals involved in the project. In addition, it should provide all the necessary support for the auditing processes, construction of promotional materials, and other business processes.

It is worth mentioning that the governance of the project will ensure the involvement of participating farmers, who will sign agreements that include all terms of responsibility, rights, and informed consent.

During the conception and development of the project, other organizations (mentioned in item 2.1.4) were involved to carry out certain studies and diagnoses. As such, their responsibilities are described below:

Therefore, as shown in this section, the Corridors for Life ARR Grouped Project Project is backed by a solid and structured governance that allows the proper implementation of the project.

2.4.2 Required Technical Skills (G4.2)

In general, the main technical skills needed to make the Corridors for Life ARR Grouped Project effective are knowledge about the methodologies, management and development of forest restoration projects in the Atlantic Forest biome, experience in initiatives of articulation and engagement of landowners and nurserymen through technical assistance and environmental education, and notion about forest monitoring.

All the proponents involved in the project have the necessary technical skills for the successful development of the Corridors for Life ARR Grouped Project.

Biofílica Ambipar Environmental Investments is a Brazilian company that promotes initiatives for the preservation, management and rehabilitation of forest areas in the most diverse biomes in Brazil, especially the Amazon and the Atlantic Forest. The company is a reference in the conception, implementation and management of REDD+ projects in the Amazon. And is currently including Afforestation/Reforestation projects in its portfolio. It has a specialized team for the development of forest restoration and conservation projects, ensuring the quality and effectiveness of the developed ARR activities. The company aims to promote large-scale ecological restoration, mitigate carbon emissions in the atmosphere, conserve biodiversity and water resources, and promote social inclusion and development of local communities in the Atlantic Forest through the sale of credits for environmental services, development and financing of scientific research activities, and the development of sustainable business chains. Biofílica aims to make environmental recovery an economically interesting activity for landowners, communities and investors.

IPÊ is a Non-Governmental Organization that has been working in the Pontal do Paranapanema region since 1989 with fauna conservation and forest restoration. Throughout this period, it has involved about 400 families of rural settlers in training, environmental education, agroforestry, and restoration. Working closely with local rural settlers, the NGO has contributed to the establishment of six community nurseries and three forest restoration ventures among rural settlers, which are now financially independent. The organization also partners with private farmers and state agencies, achieving to date the restoration of more than 2,000 hectares of rainforest and 60 hectares of agroforestry systems. The team includes members from local communities. IPÊ has recently received the Whitley Gold Award (2020), Society for Restoration Ecology (2019), National Geographic Society Award for Leadership in Conservation (2019), UBS Global Visionaris (2019), The Margot Marsh Award for Excellence in Primate Conservation (2016), Wildlife Conservation (Cincinnati Zoo & Botanical Garden) (2016) among dozens of other local and international awards throughout its history.

The landscape of the Pontal do Paranapanema region is marked by the presence of rural properties, pasture and sugar cane areas, and the vegetation cover is basically composed of forest remnants on the properties and remnants present in conservation units, including the Ecological Station (ESEC) Mico-Leão-Preto, the Private Reserve of Natural Heritage (RPPN) Mosquito, the Rio Peixe State Park (PE), the Environmental Protection Area (APA) of the Paraná River Islands and Floodplains and, mainly, the Morro do Diabo PE, which has 36. 000 hectares of Atlantic Forest. In this context of recovering and connecting the vegetation of Pontal, and at the same time strengthening the objectives of socioeconomic development and improvement of living conditions, developed by IPÊ in the region, the Corridors for Life ARR Grouped Project aims to implement recovery actions in degraded areas, in accordance with the recent policies of environmental regularization (New Brazilian Forest Code), foster social benefits and ensure the generation of carbon credits by the Biofílica Ambipar Environmental Investments.

2.4.3 Management Team Experience (G4.2)

Biofílica Ambipar Environmental Investments

Plínio Ribeiro - Executive Director

Plinio Ribeiro has a degree in Business Administration from Instituto de Ensino e Pesquisa - INSPER and a Master in Public Administration and Environment from Columbia University and the Earth Institute (USA).

He has participated in several conservation projects in the lower Negro River, through the Institute for Ecological Research - IPÊ since 2005 and was one of the producers of the documentary "Return to the Amazon", by Jean Michel Cousteau. He works at Biofílica since 2008, where he has led Projects, Operations and Business Management. Currently, he is Executive Director and shareholder of the company.

Cláudio Padua - Scientific Director

Cláudio Padua is graduated in Business Administration and Biology, Master in Latin American Studies and PhD in Ecology from the University of Florida in Gainsville (USA). A retired professor from the University of Brasilia, Pádua is currently dean of the School of Conservation and Sustainability and vice-president of the Ecological Research Institute (IPÊ). He is also a Senior Research Associate at the Center for Environment and Conservation Studies at Columbia University (USA) and Director of International Conservation at the Wildlife Trust Alliance, and a consultant for the Brazilian Biodiversity Fund (FUNBIO) and WWF Brazil. Pádua represents Brazil on the International Advisory Group (IAG) of the G7 Pilot Program. In 2003, together with his wife, Suzana Pádua, he was named "Hero of the Planet" by Time magazine for his activities in favor of biodiversity conservation. Between 1997 and 2007, he won six conservation awards, three national and three internationals. Pádua has published two books and more than 30 articles in national and international scientific journals. Since 2008 he directs the scientific involvement and production of Biofílica as Scientific Director and advisor.

Paula Conde - Financial and Administrative Analyst

Paula Conde is graduated in Business Administration from PUC in São Luís and post graduated in Accounting and Financial Administration from FAAP. She has large experience, most of it in one of the biggest media and education groups in Latin America - Editora Abril, where she worked with Financial Control and Reports, Treasury, Accounting and Financial Conciliation, Accounts Payable and Receivable and Royalties. At Biofílica, he is responsible for administrative and financial activities, logistic support to the team and projects.

Caio Gallego - Chief Operations Officer

Caio Gallego is a Forest Engineer graduated from the University of São Paulo (USP/ESALQ). He is a specialist in geoprocessing and remote sensing for environmental conservation, mapping, and land use change analysis. He has knowledge focused on Sustainable Forest Management, environmental modeling and use of alternative GIS for forestry and agribusiness. He has advanced knowledge in the use of GIS software and analysis of changes in land use and land cover, such as ArcGIS, QuantumGIS and DynamicsEGO.

Laion Pazian - Commercial Manager

Laion Pazian has a degree in Economics from the University of São Paulo (USP/ESALQ) and an MBA in Commercial Management from Fundação Getúlio Vargas. He manages the commercial team of carbon credits, key-accounts, policy and business strategy of Biofílica. In addition, monitors and directs the analysis of carbon markets intelligence, being responsible for pricing policy and planning of the area.

Leonardo Almeida - Project Coordinator

Leonardo Almeida is a Forest Engineer, graduated from the Universidade Estadual Paulista (Botucatu Campus) with extension at Hochschule Weihenstephan-Triesdorf in Germany. Certified in Green Belt, he has experience with project management and process improvement in the forest production chain. He has also worked with sustainable forest management, wood panel production and environmental licensing.

Luana Geraldini - Project Coordinator

Luana Geraldini is a Forest Engineer, graduated from the Universidade Estadual Paulista (Botucatu Campus) and has a post-graduate degree in Project Management from USP/ESALQ. During her undergraduate studies she worked with environmental education projects and research on forest restoration. She has extensive experience in the environmental area as an environmental analyst in environmental licensing and geoprocessing projects.

Ricardo Cordeiro - Communication Coordinator

Ricardo Cordeiro is a publicist, On and Off-line art director with over 10 years of experience, he has worked in digital agencies, trade and live marketing. Experience in UX, planning and digital strategies. Specialization in Digital Marketing and Web Project Management. At Biofílica acts as communication coordinator, responsible for the actions of digital marketing, branding and institutional communication.

Ieda Januário - Legal Support

Ieda Januário is a lawyer, member of the firm Guedes Nunes Oliveira e Roquim. Graduated from Universidade Presbiteriana Mackenzie, she is a specialist in Real Estate Law from Fundação Getúlio Vargas (FGV-SP) and a monthly columnist for Globo Rural magazine. She is widely active in advisory and litigation cases involving real estate and agrarian law, land tenure regularization and land disputes, real estate development and subdivision regularization.

Susane Rasera - ARR Specialist

Susane Rasera is a Forest Engineer with a Masters in Forest Resources, both from the University of São Paulo (USP/ESALQ). She has experience in Forest Ecosystem Conservation, mainly in Forest Restoration and forest biomass and carbon allocation.

Amanda Fiallos - Project Analyst

Amanda Fiallos is a Forest Engineer, graduated at the University of São Paulo (USP/ESALQ). She has experience in forest restoration and conservation projects, environmental education, geoprocessing and remote sensing applied to the planning of planted forests.

Samara Silva - Project Analyst

Samara Martins Silva is an Environmental Manager graduated from the University of Brasilia (UnB) and Master in Forest Resources from the University of Sao Paulo (USP/ESALQ). Currently she is a student in the Professional Master in Economic Management of the Environment (UnB) and PhD in Forest Resources from USP (ESALQ campus). She has experience in general climatology and global climate change, Brazilian forest policy and legislation, conservation of forest ecosystems, and management of tropical native forests with a focus on the Cerrado and Amazon. She works specifically with environmental quantification and economic valuation of its services aiming at the use of related economic instruments in the public and private sectors.

Taísi Sorrini - Project Analyst

Taísi Sorrini is an Agricultural Engineer, graduated from the University of São Paulo (ESALQ campus) and Master of Science from the same institution. She has experience in conservation and restoration of forest ecosystems, with a focus on ecological restoration project management, and corporate consulting in sustainability and environmental management.

Marco Antonio Martins - Geoprocessing Analyst

Marco Antonio Martins is a Geographer, graduated from the University of São Paulo (FFLCH-USP). During his undergraduate studies he worked with geoprocessing and remote sensing projects applied to forest monitoring, land planning, mapping of coastal habitats and restored areas in conservation units.

Institute for Ecological Research (IPÊ)

Eduardo Ditt - Executive Director

Eduardo Ditt is the executive director of IPÊ - Institute for Ecological Research. His activities in this organization started in 1992, year of its foundation. Initially, he was coordinator of research and conservation projects on themes related to forest fragmentation and ecosystem services. These themes were the object of his master's research at Procam/USP, completed in 1999 and doctoral research at Imperial College London, completed in 2008. Since then he has dedicated himself to issues of institutional development, management and governance of the organization, and supervision of socio-environmental projects. During his 30 years at IPÊ, Eduardo has also collaborated as coordinator of courses and professor at the same institute, through ESCAS - School of Environmental Conservation and Sustainability.

Laury Cullen - Operational Coordinator

Laury Cullen Junior is a Forest Engineer and scientific researcher at IPÊ - Institute for Ecological Research. He received his Master's degree in Conservation Biology from the University of Florida, his Ph.D. from the University of Kent, England, and post-doctorate from Columbia University, USA. He is a researcher and associate professor at ESCAS-IPÊ (School of Conservation and Sustainability) and a Fellow of the ASHOKA Foundation. He has focused his research on large mammal ecology and applied conservation biology concepts to the restoration of fragmented landscapes and community engagement. More recently he has been coordinating projects in Climate, Community and Biodiversity. He has published more than 60 articles in national and international journals. Among the awards he has received are the Rolex Awards for Interprize, the Whitley Gold Award 2002 received at the hands of Princess Anne of England and considered in Europe as the Oscar of conservation.

Alexandre Uezu - GIS Expert

Alexandre Uezu is a Biologist graduated from the Institute of Biosciences/USP, with a Masters and PhD in Ecology from the same university. His research focuses on Landscape Ecology, biodiversity conservation and ecosystem services, and the prioritization of areas for conservation and restoration. He has published more than 30 articles in national and international publications. He is a professor and permanent researcher at ESCAS and has taught dozens of courses on Geographic Information Systems, Spatial Analysis and Landscape Ecology, for more than 1000 students, professionals in Conservation Biology. He has participated in the training of more than 30 master's and doctoral students as advisor or co-advisor.

Ricardo Cesar - Restoration Specialist

Ricardo Gomes César has a Bachelor's degree in Forest Engineering from ESALQ-USP, PhD in Ecosystem Conservation and specialist in Restoration Ecology from ESALQ/USP. He works with the topics of Ecological Restoration, Landscape Ecology, Scientific Communication, Model Selection, Forest Succession and Forest Landscape Restoration. He has experience in teaching subjects in higher education and has co-authored scientific articles published in Nature and Science Advances, among other international journals. He has worked as a collaborator for the national institutions SOS Mata Atlântica and IPÊ; and for international institutions The Nature Conservancy (TNC), WeForest and ReforestAction. He is currently a post-doctoral student at the Laboratory of Silviculture and Forest Restoration (LASTROP) at ESALQ/USP and consultant in the area of Forest Landscape Restoration. He is fluent in English, Spanish and Portuguese and has translated articles and books into English.

Haroldo Gomes - Field Coordinator

Haroldo Borges Gomes is an agricultural technician, graduated in Biological Sciences. Master in Agronomy from the Universidade Estadual Paulista "Júlio de Mesquita Filho" Campus of Ilha Solteira, specializing in production systems, and is pursuing his PhD in Environment and Regional Development at the Universidade do Oeste Paulista (UNOESTE). He has been working at IPÊ - Institute for Ecological

Research for almost 21 years. His attributions are related to the development of Rural Extension activities, acting mainly on the following themes: family agriculture, agroforestry and agroecological systems, ecological restoration, forest seedling production, interconnected projects of biodiversity conservation, rural development and community involvement.

Amanda Ceballos - Field Coordinator

Amanda Garbim Ceballos is an agricultural technician from ETEC Professora Carmelina Barbosa - Dracena/SP; and a Forest Engineer from Faculdade de Ensino Superior e Formação Integral de Garça - FAEF. She is part of the Forest Restoration team at IPÊ since December 2021, institution where she was an intern in 2015 and 2016, during her graduation. Worked as an Environmental Consultant at ATR Agroambiental, in Dracena/SP.

Aline Souza - Field Technician

Aline dos Santos Souza is a biologist graduated from Unoeste - Universidade do Oeste Paulista. Master's student in Biodiversity Conservation at ESCAS - School of Environmental Conservation and Sustainability. She has worked as an educator in the public, state and private education networks with education for rural youth and adults. Works at IPÊ - Institute for Ecological Research, since 2015, in the area of landscape restoration with a focus on agroforestry systems, ecological corridors and community involvement.

Nivaldo Campos - Field and Community Nursery Technician

Nivaldo Ribeiro Campos is an Environmental Technician, graduated in agronomy, responsible for nurseries for forest seedling production, also works as an extensionist in projects of agroforestry systems and ecological restoration developed by IPÊ - Institute for Ecological Research with family farmers in rural settlements in the region of Pontal do Paranapanema - SP.

Marcela Paolino - Administrative and Financial

Marcela Paolino has a Bachelor's degree in Business Administration from EASP-FGV, with specialization in Finance from the same institution, and an MBA in Management of Third Sector Organizations from CEATS_FIA. He developed his career in the financial area in multinational companies such as Pirelli, Johnson & Johnson and Dupont. In 2006 he made his career transition to work in the Third Sector. He currently works as Controller at IPÊ - Institute for Ecological Research. She also dedicates herself to the study of themes related to the Culture of Peace and Non-Violence.

Wiliana Marin - Administrative and Financial

Williana Marin is graduated in Biology at UNOESTE, specialized in Project Management - PMI, Strategy and Economics Business Management, Executive Business Management, Business and Executive Coaching - by IBC. Works in projects at IPÊ site Pontal do Paranapanema since 2004, with over 14 years of experience as project manager.

Erika Bechara – Legal

Érika Bechara has a Bachelor's degree in Law, Master's and Doctorate in Environmental Law from the Pontifical Catholic University of São Paulo (PUC - SP). She is a partner at SBSA Advogados. She is a professor of Environmental Law and assistant coordinator of the Specialization course in Environmental Law and Strategic Sustainability Management, both at PUC - SP. Member of the boards of Master's, Doctorate and qualification examinations. She is a lecturer in events promoted by educational institutions, training and professional training entities. Legal and Administrative Coordinator of the Brazilian Association of Environmental Law Professors - APRODAB. Author of books and several articles on Environmental Law and Third Sector Law, published in specialized magazines, collective works and newspapers.

Rafael Lotfi – Legal

Rafael Mortari Lotfi graduated in Law at the Pontifical Catholic University of Campinas, specialized in Environmental Law and Management at PUC-SP and holds a master's degree in Environmental Conservation and Sustainability from ESCAS. He has more than 20 years of experience advising Projects and Companies in the Environmental Legal Area, especially focused on forest legislation and sustainability. He was a professor of Environmental Legislation at the Faculties of Environmental Engineering and Architecture of UNESP - Presidente Prudente between 2012 - 2016, collaborator of the Institute for Ecological Research - IPE and founding partner of the law firm Pacianotto, Chelli and Lotfi lawyers.

Paula Piccin - Communication Coordinator

Paula Piccin, is Communications Coordinator Journalist from the Methodist University of São Paulo, with specialization in Environment and Society by FESP/SP and MBA in Corporate Communications by Aberje/SP. She has experience in communication vehicles such as TV Cultura, Companhia de Notícias, Diário do Grande ABC and Notícias Populares newspapers, and in institutional communication for the Third Sector. She works at IPÊ since 2003 and in the coordination of the communication nucleus since 2011.

Cibele Quirino - Communication Analyst

Cibele Quirino is Institutional Communication Advisor, a journalist with more than 15 years of experience, specialized in Environment and Society by Fundação Escola de Sociologia e Política de São Paulo. She has more than five years dedicated to the Communication Coordination area, including two years in the Project Semeando Água, from IPÊ. She also signs the third edition of the magazine Boas Práticas na Gestão de Unidades de Conservação (Good Practices in Protected Areas Management), a publication of ICMBio - Chico Mendes Institute for Biodiversity Conservation. Currently, she is a member of IPÊ's Institutional Communication team.

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

The Corridors for Life ARR Grouped Project has all the necessary partnerships for the design and implementation of the restoration activities of the forest asset. Currently, the partner institutions, mentioned in sub-item 2.1.4, are responsible for the elaboration of the Socioeconomic and Environmental Diagnostics, Carbon Stock and Baseline, which compose the Project Design Document, through service supply contracts.

When other initiatives along the Project's development require new technical knowledge and partners, the Project proponents will articulate association with governmental, non-governmental and private sector organizations, in order to enable the generation of net positive impacts to climate, society and biodiversity.

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

Document proving the financial health of both institutions are classified as commercially sensitive information and will be shared with the audit team on a confidential basis.

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

Biofílica Ambipar Environmental Investments supports annual financial auditing processes ensuring that its resources are allocated responsibly and free of corruption. The company's financial statements and minutes of meetings are published on the JusBrasil website, the largest open legal community in Latin America. In association, the Ambipar Group, to which Biofílica belongs, has several policies, statutes and regulations related to governance and ethics to which its employees, suppliers and service providers are subject. The

company's Code of Conduct & Compliance is a public document that guides and values the good practices of conduct of employees and third parties, in adherence with the Brazilian legislation, indicating the minimum and non-negotiable standards of behavior and relationship. Within the various values and guidelines, it recommends: correct and transparent integration, integrity and honesty in the conduct of business, prohibition and combat of acts of corruption; and respect for people and their individual choices and identities, rejecting any type of discrimination.

With regard to the prohibition of corrupt practices and/or conducts that prioritize personal benefits, the Code of Conduct & Compliance ensures the fulfillment and observance of the Integrity Program and of the Anti-Money Laundering Anti-Corruption Policy, based on Brazil's Anti-Corruption Law. It also encourages anti-corruption training for employees and third parties in order to avoid bribery, embezzlement, and the granting of undue advantages, as well as the concealment of these acts and the hindering of investigation and inspection activities.

All the documents mentioned are managed by the Ambipar Group's Conduct Committee, which ensures their execution, proper operation and disclosure. This group of people also evaluates the occurrences and accusations of violations of the established principles that are reported via an electronic channel, in a confidential manner, determining appropriate corrective measures and actions regarding moral and ethical principles.

Like the Biofílica Ambipar Environmental Investments, the Institute of Ecological Research (IPÊ), by means of a Statute registered in a notary's office, publicly affirms its responsibility and respect for the principles of legality, impersonality and morality. The organization evidences in this document its commitment to repudiate any and all kinds of discrimination, to reject any and all kinds of privileges, and to reject any and all kinds of unethical behavior. To this end, it counts on the participation and collaboration of a Board of Directors, Board of Administration, Fiscal Council, Advisory Council, and General Assembly; in order to ensure the compliance and proper functioning of the Statute by the Institute's associates, directors, officers, collaborators, and donors.

2.4.7 Commercially Sensitive Information (*Rules* 3.5.13 – 3.5.14)

Some information required by the VCS and/or CCB standards is considered confidential or commercially sensitive and cannot be publicly disclosed by the Project proponents. This information will be fully provided to the audit team during the validation process attached to this document. Below is a list of information that will be made available:

- Land Documents and Legal Status;

- Financial Statements of Biofílica Ambipar Environmental Investments and IPÊ;

- Project Financial Performance Spreadsheet (budget) and other related documents;

- Agreements and contracts signed between the parties involved;

2.5 Legal Status and Property Rights

2.5.1 Statutory and Customary Property Rights (G5.1)

In the Corridors for Life ARR Grouped Project area there are private areas managed by rural landowners that were incorporated into the project through an agreement signed in a free, consented, prior and informed manner. The restoration and/or reforestation agreement freely signed between Biofílica and Instituto IPÊ, and between Instituto IPÊ and the owners of the rural properties located in the Corridors for Life ARR Grouped Project area is the result of workshops and agreement between both parties.

2.5.2 Recognition of Property Rights (G5.1)

The property rights for each property are recognized, respected, and regulated. All the landowners involved in the project have the property titles and registration of the rural properties that certify and ensure rights to the land.

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

This project is being carried out with the free, prior and informed consent of rural landowners as well as of IPÊ and Biofílica. The project will involve the region in which IPÊ has been developing actions related to nature conservation, environmental education and rural development for more than three decades.

Thus, upon manifestation of interest in establishing large-scale restoration in the Pontal do Paranapanema region by the IPÊ and in developing the Corridors for Life ARR Grouped Project with the commercialization of carbon credits by Biofílica, both organizers signed a contract/term of cooperation, consenting freely, previously and informedly to the development of the project's activities.

The project will involve private lands whose owners and representatives have been previously consulted and invited through mobilizing actions such as workshops. These workshops mobilized rural landowners and the people responsible for these proponents of the project (Biofílica and IPÊ), where they were informed about the importance of restoration and/or reforestation in areas of permanent preservation and legal reserves to comply with legal requirements, benefits of restoration and/or reforestation for the society and general explanations about the functioning of the project and reading of the contract* for the interested parties.

Afterwards, visits were made to each rural property for the signing of the contract between IPÊ and the proponent rural landowners. Since then, several actions such as planting seedlings and active restoration in certain properties have been carried out, initiating the project's activities.

2.5.4 Property Rights Protection (G5.3)

The project activities will not cause any kind of involuntary relocation or removal of property rights of the private lands located in the project area, as the owners have their respective rights over the property and there will be no sale or purchase transaction between them and the Corridors for Life ARR Grouped Project developers. This project also does not force property rights to relocate activities important to the local community's culture and livelihoods, and contracts are signed in advance, freely and informed after the socialization workshops have taken place. Communication is also maintained between the project developers and the landowners involved in restoration and/or reforestation in the project area.

2.5.5 Illegal Activity Identification (G5.4)

In the baseline scenario, the illegal deforestation practiced in the region in permanent preservation areas and legal reserves generated problems related to the scenario without the project. In this sense, the project has as one of its objectives to provide rural landowners with the restoration of the deforested area over time, creating the positive benefit of legal and environmental regularization for the holder of the area as well as restoring the supply of ecosystem services for the project region.

2.5.6 Ongoing Disputes (G5.5)

The area in which the Corridors for Life ARR Grouped Project is located has no conflicts or disputes currently occurring or having occurred in the last 10 years regarding land rights, territories, and natural resources.

The activities developed by the Corridors for Life ARR Grouped Project do not harm or put in dispute any rights to lands, territories, and natural resources. By signing the free, prior, and informed agreement all parties are aware of their responsibilities and rights under this project.

2.5.7 National and Local Laws (G5.6)

The importance of mitigation and adaptation actions to climate change and the conservation of biodiversity and its services is covered internationally in international conventions such as the Kyoto Protocol and the Paris Agreement, of which Brazil is a signatory. In the Brazilian legislation, whether at federal, state, or municipal level, there is provision for the use of command and control norms and economic instruments to help achieve the goals of the climate commitments that have been made.

Compliance with laws, statutes and other significant regulatory instances for the Corridors for Life ARR Grouped Project is related to the formation of ecological corridors and the generation of carbon credits, promoting environmental conservation and connectivity among the remaining forest fragments. The goal is to implement the environmental readjustment of properties with forest liabilities, according to the criteria established in the New Brazilian Forest Code (Law No. 12,651, May 25, 2012).

As for the carbon market, there is a Bill (PL No. 528 of 2021) in progress in the House of Representatives that aims to establish the Brazilian Emissions Reduction Market (MBRE) and regulate the purchase and sale of carbon credits in the country arising from activities of Reducing Emissions from Deforestation and Forest Degradation, for example. The promotion of this voluntary carbon market is foreseen in the Law that instituted the National Policy for Climate Change (Law no. 12.187, dated 12/29/2009).

After years of discussion and stagnation of the Bill No. 528 of 2021 in the National Congress, more recently, Decree No. 11,075 of May 19, 2022 was enacted, which addresses the implementation of a regulated carbon credit market in Brazil through the creation of the National System for Reducing Greenhouse Gas Emissions (SINARE) and establishes procedures for the preparation of Sectoral Plans for Climate Change Mitigation. Besides these measures, the document also brings new concepts related to methane credit, registration of the carbon footprint of processes and activities, carbon from native vegetation, soil carbon and blue carbon.

Below, the main relevant legislation and regulations at federal and state levels are listed and detailed. In addition, a brief analysis of the international climate agreements that have been driving the creation and development of ARR initiatives around the world is provided.

International Agreements

LAW N° 58.054 of 1966: promulgates the Convention for the protection of flora, fauna and scenic beauty of the American countries.

CITES de 03/03/1973: "Convention on International Trade in Endangered Species of Wild Fauna and Flora", signed in Washington D.C. march 3rd, 1973, altered in Bonn 22th June, 1979.

DECREE No. 99.280, June 6th, 1990: Enacts the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer.

Decree No. 2.519, March 16th, 1998: Promulgates the Convention on Biological Diversity signed in Rio de Janeiro, on June 5th, 1998.

FCCC/CP/2005/Misc.1: Reducing emissions from deforestationing developing countries: approaches to stimulate action. Submission from Parties.

DECREE No. 5.445, May 12th, 2005: Promulgates the Kyoto Protocol to the United Nations Framework Convention on Climate Change, opened for signatures in the city of Kyoto, Japan, on December 11th, 1997, on the occasion of the Third Conference of the Parties to the United Nations Framework Convention on Climate Change.

FCCC/CP/2007/6/add.1: Report of the Conference of the Parties on its thirteenth session, held in Bali from 3rd to 15th December 2007. Addendum. Part two: Action taken by the Conference of the Parties at its thirteenth session.

FCCC/CP/2009/Add.1: Report of the Conference of the Parties on its fifteenth session, held in Copenhagem from 7th to 19th December 2009. Addendum. Part Two: Action taken by the Conference of the Parties at its fifteenth session.

FCCC/CP/2010/7/Add.1: Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29th November to 10th December 2010. Addendum. Part Two: Action taken by the Conference of the Parties at its sixtenth session.

FCCC/CP/2011/9/Add. 1: Report of the Conference of the Parties on its seventeenth session, held in Durban from 28th November to 11th December 2011. Addendum. Part Two: Action taken by the Conference of the Parties at its seventeenth session.

FCCC/CP/2012/8/Add.1: Report of the Conference of the Parties on its eighteenth session, held in Doha from 26th November to 8th December 2012. Addendum. Part two: Action taken by the Conference of the Parties at its eighteenth session.

FCCC/CP/2013/Add.1: Warsaw Framework for REDD-plus, held in Warsaw, Poland, from 11th to 22th November 2013 with decisions:

DECISION 9/CP.19: Work program on results-based finance to progress the full implementation of the activities referred to in decision 1/CP. 16, paragraph 70.

DECISION 10/CP.19: Coordination of support for the implementation of activities in relation to mitigation actions in the forest sector by developing countries, including institutional arrangements.

DECISION 12/CP.19: The timing and the frequency of presentations of the summary of information on how all the safeguards referred to in decision1/CP.16, appendix I, are being addressed and respected.

DECISION 13/CP.19: Guidelines and procedures for the technical assessment of submissions from Parties on proposed forest reference emission levels and/or forest reference levels.

DECISION 14/CP.19: Modalities for measuring, reporting and verifying.

DECISION 15/CP.19: Addressing the drivers of deforestation and forest degradation.

FCCC/CP/2015/Add.1: Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13th December 2015. Addendum. Part two: Action taken by the Conference of the Parties at its twenty-first session.

Brazilian NATIONALLY DETERMINED CONTRIBUTION (NDC) forwarded in September 2015 to the United Nations Framework Convention on Climate Change for mitigation, adaptation and means of implementation, in a manner consistent with the purpose of contributions to achieve the ultimate objective of the Convention, pursuant to decision 1/CP.20, paragraph 9.

BRAZILIAN NATIONALLY DETERMINED CONTRIBUTION (NDC): First Brazilian NDC submitted in in September 2015 to the UN Framework Convention on Climate Change for mitigation, adaptation and means of implementation, in a manner consistent with the purpose of contributions to achieve the ultimate objective of the Convention, pursuant to Decision 1/CP.20, paragraph 9. The updated Brazilian NDC was presented at the COP26 on December 8th, 2022.

FCCC/CP/2015 PARIS AGREEMENT: Global, legally-binding agreement that sets out a global framework to avoid dangerous climate change by limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. Entry into force on 4 November 2016.

LAW No. 13,123 OF 2015: Regulates the Convention on Biological Diversity (CBD), provides for the access to genetic heritage, the protection and access to associated traditional knowledge, the sharing of benefits for the conservation and sustainable use of biodiversity, and other provisions.

DECREE No. 8,772 OF 2016: Regulates Law No. 13,123 of May 20th, 2015, which provides on access to genetic heritage, on the protection of and access to associated traditional knowledge, and on benefit sharing for the conservation and sustainable use of biodiversity.

FCCC/CP/2016 DECISIONS ADOPTED BY THE CONFERENCE OF THE PARTIES (COP): Especially decisions 1 (preparation into force of the Paris Agreement), 3 (Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts), 6 (National adaptation plans) and 7 (Long-term climate finance).

FCCC/CP/2017, FCCC/CP/2018, FCCC/CP/2019 DECISIONS ADOPTED BY THE COP: Especially decision 1 reporting on developments of the implementation of the Paris Agreement.

ARTICLE 6 OF THE PARIS AGREEMENT (2021): Decision 1/CP.21 mandated the SBSTA to operationalize the provisions of this Article through recommending a set of decisions to the COP serving as the meeting of the Parties to the Paris Agreement at its first session. At COP26, the Parties to the Paris Agreement at its third session (CMA 3) adopted three main decisions related to Article 6: decision 2 (on Article 6.2), decision 3 (on Article 6.4) and decision 4 (on Article 6.8).

GLASGOW LEADERS' DECLARATION ON FORESTS AND LAND USE (2021): Signatories (including Brazil) promise to reverse and end deforestation by 2030.

National Policies

LAW No. 6.938 OF 1981: Provides on the National Environmental Policy, its purposes and formulation and enforcement mechanisms, and makes other provisions.

Law No. 12,651 OF 2012: Provides on the protection of native vegetation; amends Laws Nos. 6,938 of August 31th, 1981, 9,393 of December 19th, 1996, and 11,428 of December 22th, 2006; revokes Laws Nos. 4,771 of September 15th, 1965, and 7,754 of April 14th, 1989, and Provisional Measure No. 2,166-67 of August 24th, 2001; and makes other provisions.

LAW No. 12.187 OF 2009: Creates the National Policy on Climate Change - PNMC and makes other provisions.

DECREE No. 9,578 OF 2018: consolidates normative acts edited by the federal Executive Branch that provide for the National Fund on Climate Change, referred to in Law No. 12,114 of 2009, and the National Policy on Climate Change, referred to in Law No. 12,187 of 2009.

Decree No. 4.339, OF AUGUST 22th, 2002: Creates principles and guidelines for the implementation of the National Biodiversity Policy.

Law No. 9.795/1999: Provides on environmental education, establishes the National Policy for Environmental Education, and makes other provisions.

DECREE N° 4.281 DE 2002: Regulates Law N° 9.795, of April 27th, 1999, which establishes the National Environmental Education Policy, and makes other provisions.

LAW No. 14.119 OF 2021: Establishes the National Policy of Payment for Environmental Services; and amends Laws No. 8.212, of July 24th, 1991, No. 8.629, of February 25th, 1993, and No. 6.015, of December 31th, 1973, to adapt them to the new policy.

DECREE No. 10.828 OF 2021: Regulates the issuance of Rural Product Certificates, related to the activities of conservation and recuperation of native forests and their biomes, dealt with in item II of Paragraph 2 of Article 1 of Law No. 8.929, of August 22th, 1994.

Other Relevant Federal Legislation

LAW No. 9.393 OF 1996: Tax on Rural Land Property (ITR)

LAW No. 12,727 OF 2012: APP and RL protection and management of these areas - Amends Law No. 12,651 of May 25th, 2012, which provides for the protection of native vegetation; amends Laws Nos. 6,938 of August 31th, 1981, 9,393 of December 19th, 1996, and 11,428 of December 22th, 2006; and revokes Laws Nos. 4. 771, of September 15th, 1965, and 7.754, of April 14th, 1989, Provisional Measure No. 2.166-67, of August 24th, 2001, item 22 of item II of article 167 of Law No. 6.015, of December 31th, 1973, and paragraph 2 of article 4 of Law No. 12.651, of May 25th, 2012.

DECREE No. 2.661 OF 1998: regulates article 27 of Law 4.771/1965 by establishing standards for activities involving fire in agrosilvopastoral systems and forestry practices among other measures.

DECREE No. 5.975 OF 2006: Regulates art. 12, final part and, 15, 16, 19, 20 and 21 of Law 4.771/1965, art. 4, item III, of Law 6.938/1981, art. 2 of law No. 10.650/2003 and Decree 6.514/08 and 3420/00.

DECREE No. 11.100 OF 2022: determines the suspension of permission to use fire in the national territory for a period of one hundred and twenty days and changes Decree No. 2.662, of July 8th, 1998.

CONAMA RESOLUTION No. 378 OF 2006: It defines undertakings potentially responsible for national or regional environmental impact for purposes of item III, paragraph 1, art. 19 of Law 4771 of September 15th, 1965, and other measures.

IBAMA NORMATIVE INSTRUCTION No. 3 OF 1992: It recognizes the Brazilian List of Flora Species Threatened with Extinction.

MINISTRY OF ENVIRONMENT NORMATIVE INSTRUCTION No. 103 OF 2006: among other subjects defines the implementation of the Forest Origin Document (DOF).

IBAMA NORMATIVE INSTRUCTION No. 253 OF 2006: establishes the substitution of the Transport Authorization Document (ATPFs) for the Forest Origin Document (DOF) as of September 1th, 2006.

MINISTRY OF ENVIRONMENT NORMATIVE INSTRUCTION N° 1,896 OF 2013: establishes MMA rule 31 rule 1/1996: provides for Mandatory Restoration and Integrated Forest Plan.

NORMATIVE INSTRUCTION IBAMA N° 112 OF 2006: It regulates the Document of Forest Origin - DOF, established by Ordinance Ministry of Environment Administrative Rule 253 of August 18th, 2006. (Amended by IBAMA Normative Instruction No. 134 of November 22, 2006).

ADMINISTRATIVE RULE MINISTRY OF ENVIRONMENT N° 06 OF 2006: It provides for the reforestation and consumption of forest raw materials, and other measures.

NORMATIVE INSTRUCTION IBAMA N° 178 OF 2008: It defines guidelines and procedures, provided by IBAMA, for consideration and approval on the issue of forest suppression authorizations and other forms of native vegetation in an area greater than two thousand hectares in rural properties located in the Legal Amazon, and a thousand hectares in rural properties located in the remaining regions of the country.

REGULATORY NORM N°. 31 OF 03/03/2005: APPROVES the Regulatory Norm for Safety and Health at Work in Agriculture, Cattle Raising, Forestry, Forest Exploration, and Acquafarming.

DECREE No. 7,830 OF 2012: Provides for the Rural Environmental Registration System, the Rural Environmental Registry, establishes rules of general character to the Environmental Regularization Programs, dealt with in Law No. 12,651, of May 25th, 2012, and makes other provisions.

DECREE No. 8,235 OF 2014: Establishes general complementary rules to the Environmental Regularization Programs of the States and the Federal District, dealt with by Decree No. 7,830, of October 17th, 2012, institutes the Mais Ambiente Brasil Program, and makes other provisions.

IBAMA NORMATIVE INSTRUCTION No. 4 OF 2011: to establish procedures for the preparation of a Degraded Area Recovery Project - PRAD or Altered Area, for the purposes of compliance with

environmental legislation, as well as the Terms of Reference contained in Annexes I and II of this Normative Instruction

IBAMA NORMATIVE INSTRUCTION No. 17 OF 2011: Regulates the administrative process for the calculation, determination and constitution of tax credits arising from the TCFA within IBAMA, the notice of violation arising from the failure to comply with the accessory obligations arising therefrom relating to the Federal Technical Registry-CTF and the installment payment of these amounts when not yet recorded in the active debt and other provisions.

LAW No. 9.605 OF 1998: Provides on the penal and administrative sanctions derived from conducts and activities that are harmful to the environment and makes other provisions.

Decree No. 6514 of 2008: Provides on administrative offenses and penalties to the environment, establishes the federal administrative procedure for investigation of such offenses, and makes other provisions.

Law No. 5.197 OF 1967: Provides on the protection of fauna and makes other provisions.

CONAMA RESOLUTION No. 379 OF 2006: Creates and regulates the data and information system on forest management within the National Environmental System - SISNAMA.

CONSTITUTION OF THE FEDERATIVE REPUBLIC OF BRAZIL OF 1988: Article 225

LAW No. 12.188 OF 2010: Establishes the National Policy for Technical Assistance and Rural Extension for Family Agriculture and Agrarian Reform - PNATER and the National Program for Technical Assistance and Rural Extension in Family Agriculture and Agrarian Reform - PRONATER, amends Law No. 8.666, of June 21th, 1993, and makes other provisions.

DECREE No. 7.215 OF 2010: Regulates Law No. 12.188, of January 11th, 2010, to provide for the National Program of Technical Assistance and Rural Extension in Family Agriculture and Agrarian Reform - PRONATER.

Special Legislation Of The Atlantic Forest

Law No. 11.428, 2006: Provides on the use and protection of the native vegetation of the Atlantic Forest Biome, and makes other provisions.

CONAMA RESOLUTION No. 218 OF 1989: Provides for exploration in native forests and successor forest formations in the Atlantic Forest, and other measures.

CONAMA RESOLUTION No. 388 OF 2007: Published in the DOU No. 38, of February 26th, 2007, Section 1, page 63 Correlations: - Convalidates CONAMA Resolutions nos. 10/93, 1, 2, 4, 5, 6, 25, 26, 28, 29, 30, 31, 32, 33 and 34/94, 7/96 and 261/99 Provides on the convalidation of the resolutions that define primary and secondary vegetation in the initial, medium and advanced stages of regeneration of the Atlantic Forest for the purposes of the provisions of art. 4o § 1o of Law no. 11.428, of December 22th, 2006.

CONAMA RESOLUTION No. 317 OF 2002: Published in the DOU no 245, of December 19th, 2002, Section 1, page 224 Correlations: - Regulates art 1 of CONAMA Resolution no 278/01 Regulates Resolution no

278, of May 24th, 2001, which provides on the cutting and exploitation of endangered species of flora of the Atlantic Forest.

CONAMA RESOLUTION no. 278 OF 2001: Published in the DOU no. 138-E, of July 18th, 2001, Section 1, pages 51-52 Correlations: - Complemented and amended by CONAMA Resolution No. 300/02 (amended the caput and § 2 of art. 2) - Regulated by CONAMA Resolution No. 317/02 Provides on the cutting and exploitation of endangered species of flora of the Atlantic Forest.

CONAMA RESOLUTION No. 249 OF 1999: Published in the DOU no 21, on February 1rst, 1999, Section 1, page 60 Guidelines for the Policy of Conservation and Sustainable Development of the Atlantic Forest.

CONAMA RESOLUTION No. 003 OF 1996: The NATIONAL COUNCIL OF THE ENVIRONMENT - CONAMA, in the use of the attributions conferred upon it by item I, of Article 4, of Law No. 6.938, of August 31th, 1981, items II and X, of Article 7, of Decree No. 99.274, of June 6th, 1990, with a view to clarifying the application of Decree No. 750/93, resolves Art. 1 It is understood that: Remnant vegetation of Atlantic Forest, expressed in the sole paragraph of Article 4, of Decree No. 750, of February 10th, 1993, covers the totality of primary and secondary vegetation in initial, medium and advanced stages of regeneration.

CONAMA RESOLUTION No. 012 OF 1995: THE NATIONAL ENVIRONMENT COUNCIL - CONAMA, in the use of the attributions conferred upon it by Law No. 6.938, of August 31th, 1981, as amended by Law No. 8.028, of April 12th, 1990, regulated by Decree No. 99.274, of June 6th, 1990, and in view of the provisions of its Internal Regulations, and Whereas the need to streamline the implementation of the National Environmental Policy; Whereas the provisions of § 4 of Art. 225 of the Federal Constitution; Considering the patent intention of the Federal Executive Power, represented by the Ministry of Environment, of Water Resources and the Legal Amazon, as well as by the Brazilian Institute of Environment and Renewable Natural Resources, to forward a Draft Bill to the National Congress on the subject, resolves Art. 1 Create the Temporary Technical Chamber for Atlantic Forest Issues.

CONAMA RESOLUTION Nº 001 OF 1994: The PRESIDENT OF THE NATIONAL COUNCIL OF THE ENVIRONMENT - CONAMA, AD REFERENDUM of the Plenary, in the use of his attributions and in view of the provisions of art. 9, of Decree nº 99.274, of June 6th, 1990; Whereas joint action between the Secretary of the Environment of the State of São Paulo, in the use of the attributions conferred upon him by article 94 of State Decree nº 30.555, of October 3rd, 1989, and the Superintendent of the Brazilian Institute of the Environment and Renewable Natural Resources - IBAMA in São Paulo, in the use of the attributions granted to him by article 68 of the Internal Regulations approved by Ministerial Ordinance 445, of August 16th, 1989;

CONAMA RESOLUTION No. 011 OF 1993: The PRESIDENT OF THE NATIONAL COUNCIL OF THE ENVIRONMENT - CONAMA, AD REFERENDUM of the Plenary, in the use of the attributions conferred on him by Law No. 6.938, of August 31th, 1981, as amended by Law No. 8.028, of April 12th, 1990, regulated by Decree No. 99.274, of June 6th, 1990, and Law No. 8.746, of December 9th, 1993, considering the provisions of Law No. 8.490, of November 19th, 1992, and in view of the provisions of its Internal Regulations, resolves Art. 1 Extend the term object of § 1, of art. 1, of CONAMA Resolution No. 10, of October 1rst, 1993, for 30 (thirty) days. Art. 2 This Resolution takes effect on the date of its publication

State Law

Law 13.798, of 11/09/2009: Creates the State Policy for Climate Change - PEMC.

Law 12,927, of 04/23/2008: Provides on the recomposition of legal reserves in the State of São Paulo.

Decree No. 66.550, of 03/07/2022: Reorganizes the "Forest Remnants Program", referred to in article 23 of Law No. 13.798, of November 9th, 2009, and in articles 51 to 67 of Decree No. 55. 947, of June 24th, 2010, to be renamed "REFLORESTA-SP Program", and reorganizes the "Program of Incentives to the Recovery of Riparian Forests and to the Recomposition of Vegetation in the Basins Forming Water Springs - Springs", dealt with by Decree No. 62,914, of November 8th, 2017, to be renamed "Springs Program", and makes related provisions

Decree No. 66.549, of 03/07/2022: Disciplines the application, within the scope of the State of São Paulo, of Federal Law No. 14.119, of January 13th, 2021, creates the State Policy for Payment for Environmental Services - PEPSA, the State Program of Payment for Environmental Services - PPSA and the State Register of Projects of Payment for Environmental Services, and makes related provisions

Decree No. 58.107, of 06/05/2012: Creates the Strategy for the Sustainable Development of the State of São Paulo 2020, and makes related provisions

Decree No. 55,947 of June 24, 2010: Regulates Law No. 13,798 of November 9th, 2009, which provides for the State Policy on Climate Change

Decree No. 60,521, of 06/05/2014: Creates the Program of Incentives to the Recovery of Riparian Forests and Vegetation Recomposition in the Basins Forming Water Sources, establishes the standard unit Tree-Equivalent and related provisions.

Decree No. 49,723, of 06/24/2005: Establishes the Recovery Program for Riparian Areas in the State of São Paulo.

Decree nº 49.369, of 02/11/2005: Establishes the São Paulo Forum on Global Climate Change and Biodiversity.

Decree nº 53.939, of 06/01/2009: Provides on the maintenance, recomposition, conduction of natural regeneration, compensation and composition of the Legal Reserve area of rural properties in the State of São Paulo.

Decree No. 59.261, of 06/05/2013: Establishes the Rural Environmental Registration System of the State of São Paulo SICAR-SP and makes related provisions.

Decree No. 62,914, of 08/11/2017: Reorganizes the Program of Incentives to the Recovery of Riparian Forests and Vegetation Recomposition in the Basins Forming Water Sources - Springs Program and related provisions.

Decree nº 65,182, of 09/16/2020: Creates the Agro Legal Program, regulates articles 27 and 32 of Law nº 15,684, of January 14th, 2015, which provides for the environmental regularization of rural properties in the State of São Paulo, and amends Decree nº 64,842, of March 5th, 2020, which regulates Law nº 15,684, of January 14th, 2015.

Resolution Secretary of Agriculture and Supply of the State of São Paulo (SAA) n° 55, of 18/09/2020: Provides on guidelines, criteria and procedures for, within the scope of the Agro Legal Program, regularizing

the Legal Reserve of rural properties in the State of São Paulo, not located in Conservation Units of public domain and in territories of indigenous peoples and traditional communities, according to the provisions of articles 67 and 68 of federal Law 12. 651/12 and 27 and 32 of State Law 15.684/15 and in Decrees 65.182/2020 of 16-09-2020 and 64.131, of 11-03-2020.

Law 15.684, of 14/01/2015: Provides on a specific and supplementary basis, under the terms of articles 23, III, VI and VII and 24, VI and paragraphs of the Federal Constitution and under the terms of articles 191, 193, XVI, 194, sole paragraph, 197, 205, III, 209, 213, of the Constitution of the State of São Paulo, about the Environmental Regularization Program - PRA of rural properties and real estate, created by Federal Law no. 12. 651, of May 25th, 2012, and on the application of Federal Complementary Law No. 140, of December 8th, 2011, within the scope of the State of São Paulo

Joint Resolution Secretary of Agriculture and Supplying and Secretary of Infrastructure and Environment (SAA/SIMA) No. 3, of 9/16/2020: Provides for the measures of regeneration, recomposition and monitoring of native vegetation, as well as those of compensation of the Legal Reserve, in the Projects of Recomposition of Degraded and Altered Areas - PRADAs, in the scope of the Program of Environmental Regularization of rural properties in the State of São Paulo - PRA, disciplined by State Law 15. 684, of 14-01-2015, and by State Decree 64.842, of 05-03-2020.

2.5.8 Approvals (G5.7)

The long-term presence of Ipê in the region of Pontal do Paranapanema combined with good communication provided the development of relationships of trust with the stakeholders. This fact resulted in the provision of opportunities for improvement for all stakeholders and greater clarity of the institutional mission of Ipê providing credibility with stakeholders to listen, opine, suggest and exchange ideas, participatory and networking actions that conserve nature and develop communities around the restoration of ecosystems.

The proponents of the Corridors for Life ARR Grouped Project have gained trust for the development of their actions and activities over time with the community and stakeholders in the region, as described above. More specifically, meetings were held for recognition and approval regarding the implementation of the Corridors for Life ARR Grouped Project Project and counted with the participation of the proponents, stakeholders, and community validation of the project as described in Section 2.3.

There were four face-to-face meetings, two of them at the proponents' work HUB in Piracicaba - SP (July 26th and August 2nd, 2022) for in-depth discussion about the stakeholders' profile and their adhesion to the project. The third meeting, held at the IPÊ HUB in Teodoro Sampaio - SP, included the validation of stakeholders and communities by the IPÊ field team, focusing mainly on the characteristics and relationships of communities and stakeholders with the project.

The fourth meeting included the public consultation (ECOnsulta) with stakeholders and communities with the presentation of the project by the Corridors for Life ARR Grouped Project team in Teodoro Sampaio, São Paulo State, where they were consulted based on the presentation of the project by Corridors for Life ARR Grouped Project team in Teodoro Sampaio - SP and the workshop with SWOT analysis in order to hear potentials and challenges of the project by the stakeholders and communities.

The invitations to stakeholders and communities for the fourth meeting were delivered in person and by mail, online, through e-mails, Message App, and also by phone calls. These forms strengthened the bond

of proximity between the community, stakeholders, and project proponents in order to further engage them in the public consultation process and its respective feedback and validation activities.

2.5.9 Project Ownership (G5.8)

In the Corridors for Life ARR Grouped Project all instances are located on private farms that the owners have the legal right to own and operate the land. For the operation of the reforestation activities and cession of the right to credits to the proponents, a contract with transference of rights was signed between the legitimate owner of the property and the Ecological Research Institute. In parallel, a contract between IPÊ and Biofílica shares these rights.

2.5.10 Management of Double Counting Risk (G5.9)

The Corridors for Life ARR Grouped Project generates benefits to climate, communities, and biodiversity, but only net greenhouse gas removals will be traded after being properly registered on a market platform.

2.5.11 Emissions Trading Programs and Other Binding Limits

Not applicable.

2.5.12 Other Forms of Environmental Credit

The Corridors for Life ARR Grouped Project does not intend to generate any other form of environmental credits related to GHG emissions removals claimed under the Verified Carbon Standard (VCS) program.

2.5.13 Participation under Other GHG Programs

The Corridors for Life ARR Grouped Project has not received or sought to be registered under any other GHG program, other than submitting the Project to validation and verification under the VCS (Verified Carbon Standard) and CCBS (Climate, Community and Biodiversity Standard).

2.5.14 Projects Rejected by Other GHG Programs

The Corridors for Life ARR Grouped Project has not undergone validation/verification by any other GHG program and is therefore not rejected by any GHG program.

2.5.15 Double Counting (G5.9)

The project proponents will use the Verra registration platform to register, issue, and sell the credits/VCUs. In addition, they will guarantee through contracts with buyers that any and all credits traded will go through the registration and issuance process and will be immediately counted, and once the sale is completed with the buyers, the credits will be retired or transferred to the buyer's account and thus double counting will be avoided.

3 CLIMATE

3.1 Application of Methodology

3.1.1 Title and Reference of Methodology

The approved and consolidated methodology for large-scale reforestation projects "Afforestation and reforestation of lands except wetlands (AR-ACM0003, version 2.0)" and the approved tools related to this methodology were applied to the project:

- "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM *Project activities (AR-TOOL02, version 1.0)";*

- *"Calculation of the number of sample plots for measurements within A/R CDM project activities (AR-TOOL03, version 2.1);*

- "Estimation of *carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities (AR-TOOL12, version 3.1)";*

- "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities (A*R-TOOL14, version 4.2)";*

- "Estimation of the increase in GHG emissions attributable to *displacement of pre-project agricultural activities in A/R CDM project activity (AR-TOOL15, version 2.0)";*

- "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities (AR-TOOL16, version 1.1)";

- *"Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities (AR-TOOL17, version 1.0)"*

- *"Demonstration of eligibility of lands for A/R CDM project activities (AR-TOOL19, version 2.0)"*

3.1.2 Applicability of Methodology

The methodology AR-ACM0003 is applicable to the project under the following conditions:

Table 11 - Conditions for application of the methodology AR-ACM0003, version 2.0.

Applicability condition	Compliance
(a) The land subject to the project activity is not categorized as a 'wetland'	The areas subject to the Grouped project activities are Legal Reserve and Permanent Preservation Areas, which historically have been unduly occupied with agricultural activities, particularly extensive pasture and sugarcane plantations. During the eligibility analyses and the mapping of areas for reforestation, sites that presented characteristics of wetlands, as well as periodic flooding and anaerobic conditions, were promptly excluded from the project area boundary.
(b) Soil disturbance attributable to the project activity covers no more than 10 percent of the area on each of the following land types, when those lands are included within the project boundary: (i) Soils containing organic soils; (ii) Land that, at baseline, is subject to land use and management practices and receives inputs listed in Appendices 2 and 3 of methodology AR-ACM0003.	The areas to be reforested in this Grouped Project do not include land with organic soil. Furthermore, they are areas characterized mainly by degraded and/or abandoned (unmanaged) pasture with a low percentage of organic matter. In the absence of the project activity, it is expected that the areas, composed in the baseline scenario mostly of unmanaged and degraded pasture, will remain without management and/or improvement initiatives (and, in this sense, without use and management practices and receipt of inputs listed in Appendices 2 and 3 of methodology AR-ACM0003). As for project activities, the most common practice of soil preparation and disturbance for implementation of project activities involves striping, furrowing or subsoiling in the planting row or, often, just opening the planting pits. However, it is important to point out that depending on the state of soil degradation or the amount of grass biomass in the area, due to the absence of management practices in the baseline scenario, harrowing activities are carried out during soil preparation. It is also important to emphasize that these soil disturbing activities only occur during soil preparation for planting and are not repeated throughout the project.

Applicability conditions of the Tools

Table 12 - Applicability conditions of the tools applied to the Project

Tool	Applicability condition	Compliance
AR-TOOL02, version 1.0: "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM Project activities"	*(a) Forestation of the land within the proposed project boundary performed with or without being registered as the A/R CDM project activity shall not lead to violation of any applicable law even if the law is not enforced.* *(b) This tool is not applicable to small-scale A/R project activities.*	(a) Project forestation activity will not lead to violation of any applicable law, as established in Section 2.5.7 (National and Local Laws) The project's forest restoration activity will not lead to the violation of any applicable law, (Section 2.5.7- National and Local Laws and Section 3.1.5 - Additionality). (b) The Corridors for Life ARR Grouped Projects a Large Scale project, as set forth in Section 2.12.
AR-TOOL8, version 4.0: "Estimation of non-CO2 GHG emissions resulting from burning of biomass"	*- The tool is applicable to all occurrence of fire within the project boundary* *- Non-CO2 GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area greater than the minimum threshold area reported by the host Party for the purpose of defining forest, provided that the accumulated area affected by such fires in a given year is ≥5% of the project area.* Additionally, this tool applies the following assumptions: (a) *Aboveground biomass of living trees shall be considered not to result in significant non-CO_2 GHG emission in case of fire, when* i) *A forest fire burns through the understory but does not climb into the tree canopy; or* ii) *A forest fire singes trees but does not cause mortality such that leaf regeneration can be observed within six months (this may be demonstrated in remote sensing imagery);*	The use of fire is not part of the activities of the Corridors for Life ARR Grouped Project. However, if fire incidence occurs within the Project area boundaries during the Project lifetime, this tool will be applied. Specifically, this tool will be applied to calculate the estimated non-CO_2 GHG emissions resulting from the burning of above ground woody biomass if during the life of the Bundled Project fire occurs over an area greater than 1ha (the minimum threshold area for defining forest according to Brazil's Designated National Authorities (DNA)), provided that the total accumulated area is equal to or greater than 5% of the project area. In addition, for the applicability of the tool and calculation of the

	(b) *60% of the dead organic matter is entirely burnt in all fires.*	associated emissions, the assumptions established in the tool itself will also be considered: (a) Non-CO_2 GHG emissions from wildfires will not be considered significant for above ground biomass of living trees when: (i) the forest fire reaches the understory, but not the canopy; ii) the wildfire reaches the trees, but does not cause mortality, so that leaf regeneration can be observed within six months (remote sensing images can be used to demonstrate this regeneration). (b) 60% of the dead organic matter is entirely burnt in the fires.
AR-TOOL12, version 3.1: "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"	*This tool has no internal applicability conditions*	Not applicable, once "this tool has no internal applicability conditions"
AR-TOOL14, version 4.2: "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"	*This tool has no internal applicability conditions*	Not applicable, once "this tool has no internal applicability conditions"
AR-TOOL15, version 2.0: "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity"	*This tool is not applicable if the displacement of agricultural activities is expected to cause, directly or indirectly, any drainage of wetlands or peat lands*	The project activities will be implemented mostly in areas of abandoned pasture, besides a few areas of agricultural crops, mainly sugar cane. In situations where the pasture was managed or where there was agricultural production, the production will be interrupted or relocated to another area of the property. Thus, the displacement of pre-project activities is not foreseen in the Grouped Project. Additionally, in this sense, there will be no leakage from agricultural activities that can cause, directly or indirectly, the

		drainage of wetlands or peatlands.
AR-TOOL16, version 1.1: Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities	*This tool is applicable when the areas of land, the baseline scenario, and the project activity meet the following conditions:* *(a) The areas of land to which this tool is applied:* *i) Do not fall into wetland category; or* *ii) Do not contain organic soils as defined in Annex A: glossary of the IPCC GPG LULUCF 2003;* *iii) Are not subject to any of the land management practices and application of inputs as listed in the Tables 1 and 2 of the tool.* *(b) The A/R CDM project activity meets the following conditions:* *i) Litter remains on site and is not removed in the A/R CDM project activity; and* *ii) Soil disturbance attributable to the A/R CDM project activity, if any, is:* *• In accordance with appropriate soil conservation practices, e.g. follows the land contours;* *• Limited to soil disturbance for site preparation before planting and such disturbance is not repeated in less than twenty years*	With respect to condition (a), the areas within the project boundary do not fall into the category of wetlands or organic soils (as shown in Table 11 of the applicability of the AR-ACM0003 methodology). Furthermore, the tool will not be applied to areas that are subject to the management practices and inputs listed in Tables 1 and 2 of the tool. Regarding condition (b), the Corridors for Life ARR Grouped Project will maintain litter on the ground, follow contour lines for soil preparation and planting, soil disturbance will be limited to the pre-planting soil preparation stage (soil will be mostly striped or furrowed, as pointed out in Table 11), and will not occur again in the area.
AR-TOOL17, version 1.0: Demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/R CDM project activities"	*This tool has no internal applicability conditions*	Not applicable, once "this tool has no internal applicability conditions"
AR-TOOL19, version 2.0: "Demonstration of eligibility of lands for A/R CDM project activities"	*This tool has no internal applicability conditions*	Not applicable, once "this tool has no internal applicability conditions"

3.1.3 Project Boundary

The relevant carbon pools and GHG sources applicable to the Corridors for Life ARR Grouped Project boundary are presented in the tables below.

Carbon Pool	Included/ Excluded	Justification/Explanation
Aboveground Biomass	Included	Major carbon pool subjected to project activity
Belowground Biomass	Included	Carbon stock in this pool is expected to increase due to the implementation of the project activity
Deadwood	Included	Carbon stock in this pool may increase due to implementation of the project activity
Litter	Included	Carbon stock in this pool may increase due to implementation of the project activity
Soil Organic Carbon	Included	Carbon stock in this pool may increase due to implementation of the project activity

Source		Gas	Included?	Justification/Explanation
Baseline	Burning of wood biomass	CO_2	No	CO_2 emissions due to burning of biomass are accounted as a change in carbon stock
		CH_4	No	Burning of wood biomass for site preparation will not occur in this Grouped Project.
		N_2O	No	Burning of wood biomass for site preparation will not occur in this Grouped Project.
Project	Burning of wood biomass	CO_2	No	CO_2 emissions due to burning of biomass are accounted as a change in carbon stock
		CH_4	No	The use of fire is not part of the activities of the Corridors for Life ARR Grouped Project. However, if fire incidence occurs within the project area boundaries during the project lifetime, the AR-AMTOOL08 tool will be applied and non-CO_2 gases resulting from burning will be accounted for and reported, considering the significance of these emissions.
		N_2O	No	

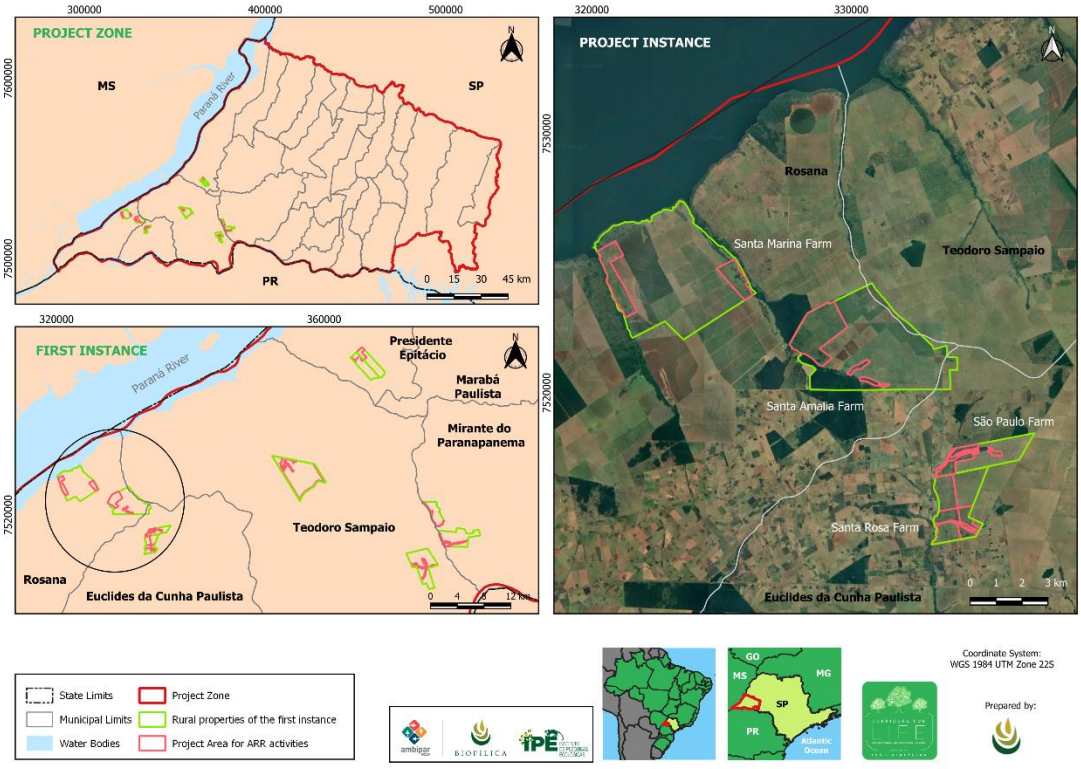

Figure 26 - Location of Santa Marina, Santa Amalia, São Paulo and Santa Rosa instances

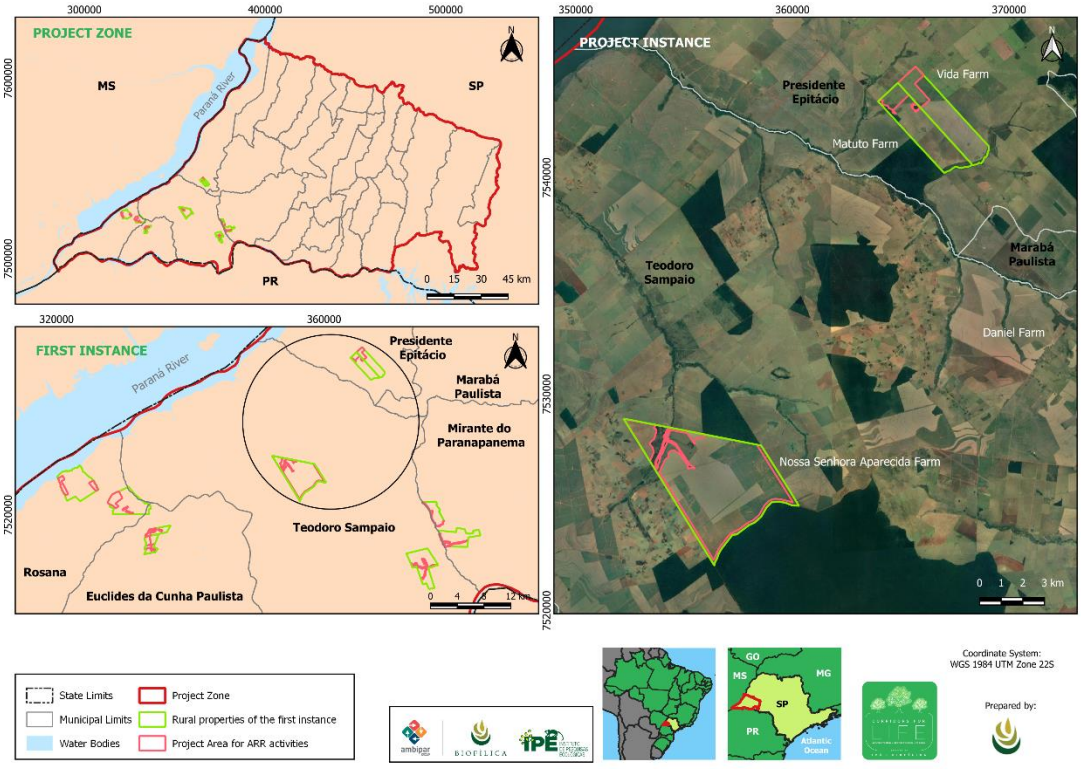

Figure 27 - Location of Nossa Senhora Aparecida, Matuto and Vida instances

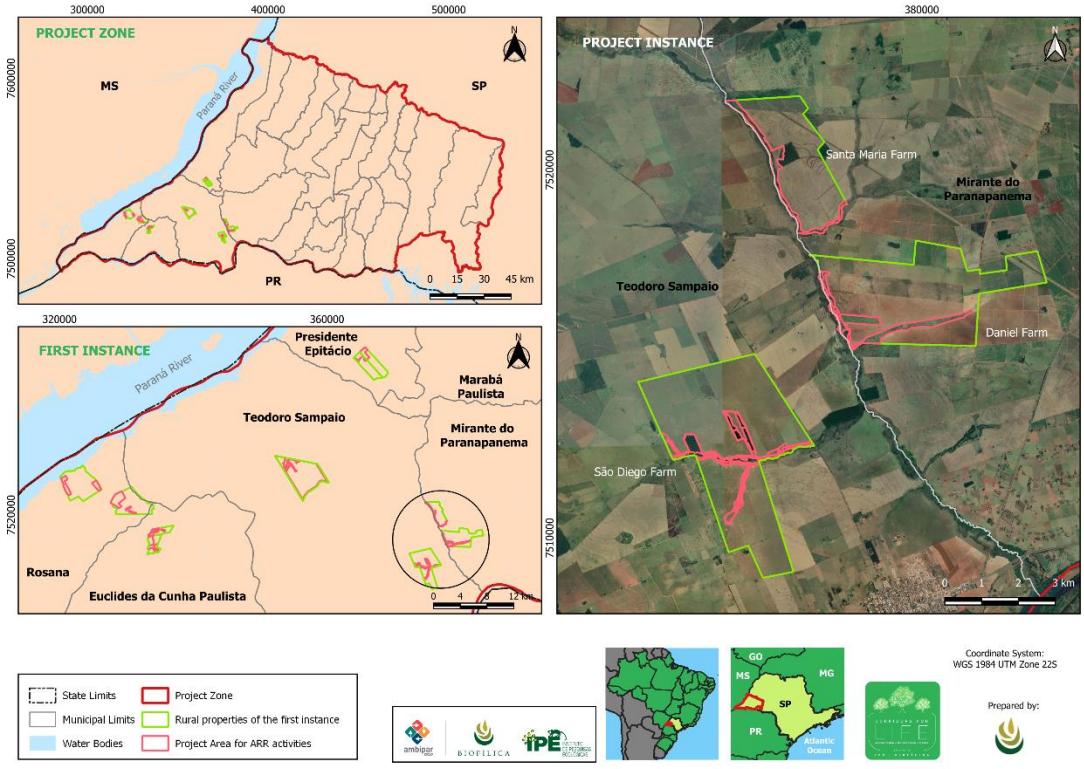

Figure 28 - Location of San Diego, Santa Maria and Daniel instances

3.1.4 Baseline Scenario

The definition of the baseline scenario, followed by the determination of additionality, is given by the tool "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (AR-TOOL02, version 1.0)". The steps of the tool are presented in the following additionality section (Section 3.1.5).

As pointed out throughout the document, the baseline scenario at the project boundary is characterized by pre-project land use mostly composed of unmanaged and degraded pasture, and some areas with annual crops, mainly sugarcane. Further details on land use and land cover are presented in Section 2.1.6.

Baseline Stratification

The AR-ACM0003 methodology states that if the distribution of biomass in the project area is not homogeneous, stratification should be performed to increase the precision of the ex-ante estimates of the baseline and ex-post estimates of project removals.

The baseline stratification was performed on the project areas (areas eligible for planting on the initial properties), which were classified into 3 strata, according to the existing vegetation cover and the greater or lesser presence of herbaceous vegetation:

- Stratum 1: "Herbaceous" (Herbaceous vegetation only)

- Stratum 2: "Irregular-herbaceous" (Predominance of herbaceous vegetation, but with the presence of some shrub and/or tree individuals)

- Stratum 3: "Irregular-herbaceous" (Predominance of tree and/or shrub vegetation, with clearings and presence of herbaceous vegetation)

The stratification was carried out with the support of satellite images, calculation of vegetation indices on these images, visual identification and classification of the strata in part of the polygons, and supervised classification on satellite images with Software R and the "Random Forest" classification method. Details of this methodology were shared with VVB.

With the classification of the strata in the polygons, sample plots were randomly drawn in each identified stratum to carry out an initial inventory, in order to obtain an approximate value for the variance of carbon stock in each stratum, necessary to perform the sample sufficiency calculation, as determined by the AR-TOOL03 tool (version 2.1): "Calculation of the number of sample plots measurements within A/R CDM project activities".

Note that with these steps, the assumptions established in this tool were met, which are:

(a) Approximate value of the area of each stratum within the project boundary is known;

(b) Approximate value of the variance of biomass stocks in each stratum is known from a preliminary sample, existing data related to the project area, or existing data related to a similar area;

(c) The project area is stratified into one or more strata.

A second baseline inventory was conducted after the sample sufficiency calculation, with sample plots randomly distributed in the first instances of the project.

With the field result it was possible to determine the average initial stock in each stratum and consider them in the ex-ante GHG removal estimates of the Grouped Project.

3.1.5 Additionality

To demonstrate the additionality of the project we followed the guidelines and the "step by step" approach established in the specific tool referenced in the AR-ACM0003 methodology (version 2.0) to identify the baseline and demonstrate additionality in A/R CDM Project activities (AR-TOOL02, version 1.0).

As already pointed out in Section 3.1.2, the project is in compliance with the two criteria for applicability of this tool, since the project's forest restoration activities will not lead to violation of any laws and the Corridors for Life ARR Grouped Project is not a Small-Scale project.

The tool establishes five steps for demonstrating additionality:

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

STEP 0: Preliminary screening based on the starting date of the A/R project activity

The reforestation project activity has a starting date of 06 December 2021, which means that it has a starting date after 31 December 1999, but before the date of its registration. In this regard, the following requirements and justifications are presented:

- Provide evidence that the starting date of the A/R CDM project activity was after 31 December 1999

- Provide evidence that the incentive from the planned sale of CERs was seriously considered in the decision to proceed with the project activity. This evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available to third parties at, or prior to, the start of the project activity

The project start date is December 6, 2021, when the planting of the Project's forest restoration work at Fazenda Santa Rosa and Fazenda Vida began.

The Memorandum of Understanding, signed on September 24, 2020, and the partnership agreement between the Project proponents, signed on May 27, 2021, evidence that the sale of the RVEs was seriously considered in the decision to develop the Project and the ARR activities. The memorandum of understanding and contract between the parties have been made available to the VVB.

STEP 1: Identification of alternative Scenarios

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

Scenario 1: Continuation of the pre-project land use

As pointed out in Section 2.1.6, 84.1% of the entire Project Zone is characterized as an agricultural area, with 45.7% of pasture and 21.8% of agriculture and 16.6% of mosaic of agricultural uses. It is also pointed out that pasture areas are being gradually replaced by agriculture, mainly annual crops such as sugarcane and soybeans, but that the forest vegetation cover remains around 8.4% for at least 35 years (Figure 06).

In the properties of the initial instance, agricultural use represents 95.2% of the area (44.7% with pastures, 35.0% with agriculture and 15.6% with mosaic of agricultural uses). More specifically, in the project area, 66.0% refer to pasture areas, 14.3% to agriculture, and 14.2% to a mosaic of agricultural uses.

As evidenced by the land use history presented, it is understood that areas that currently have unmanaged pasture and annual crops will continue to have these same land uses in a scenario without a project, even though they may change from agricultural to pasture or vice versa.

Scenario 2: Forestation of the land within the project boundary performed without being registered as an ARR VCS project activity

The Instituto de Pesquisas Ecológicas (IPÊ), as mentioned earlier in this document, has been operating in the region for 35 years and in the last 18 years has restored approximately 2,000 hectares of APP and Legal Reserves for medium and large landowners and 60 hectares of agroforestry systems, implemented in Legal Reserve areas of small landowners and rural settlers. The costs linked to restoration, mainly through the planting of seedlings, are important barriers to restoration and, associated with the opportunity cost of land, it is the greatest obstacle to the recovery of areas of APP and RL environmental liabilities.

The Instituto de Pesquisas Ecológicas (IPÊ), as mentioned earlier in this document, has been operating in the region for 35 years and in the last 18 years has restored approximately 2,000 hectares of APP and Legal Reserve for medium and large landowners and 60 hectares of agroforestry systems implemented in Legal Reserve areas for small landowners and rural settlers. These actions were only possible due to the intense fundraising and participation in public notices.

Other non-governmental organizations in the region are also known to work with fundraising and partnership with landowners to enable the restoration of environmental liabilities.

However, as much as these efforts have been employed, they are not very representative when we look at all the existing environmental liabilities in the Project Zone (54,457ha of APP and 172,674ha of Legal Reserve) and the non-increase in forest areas in the last 35 years. in the area (Figure 6).

Thus, given the existing forest liabilities in the Project Zone (54,457ha of APP and 172,674ha of Legal Reserve), the history of land use and occupation in the region and the cost associated with forest restoration in these passive areas, it is little It is likely that this scenario, although plausible, will occur in large proportions.

Outcome of sub-step 1a:
List of credible alternative land use scenarios that would have occurred on the ground within the boundaries of the ARR VCS project activity:
- Scenario 1: Continuation of pre-project land use: mostly unmanaged grassland and some annual cropland.
- Scenario 2: Project activity on the ground within the project boundary conducted without being recorded as an ARR VCS project activity: small-scale forest restoration and agroforestry

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

Both Scenario 1 and Scenario 2 do not comply with the Native Vegetation Protection Law-LPVN (Federal Law No. 12,651 of May 25, 2012), popularly known in Brazil as the “Forest Code”.

In summary, the law specifies mainly two types of areas that must be restored:

1. Permanent Protection Areas (PPA): areas that must be restored in critical environmental areas to safeguard natural resources, such as buffering water bodies, springs and in steep slopes to prevent erosion. Production activities are limited and only allowed under certain conditions. The area of restoration and the production activities allowed in PPAs depend mainly on the size and nature of the resources protected (e.g. water bodies, spring), the farm size and other factors.

2. Legal Reserves (LR): minimum forest cover that a farm must have, with the main purpose of safeguarding biodiversity in the landscape. Production in these areas is allowed, even using non-native species, as long as the area is not deforested. The restoration requirements for Legal Reserves vary mainly due to the ecological domain where the farm is located and farm size. According to the LPVN the Legal Reserve should be, for each rural property, in the proportion of 80% for Amazon Biome, 35% for Cerrado Biome (the Brazilian Savanna) in the Legal Amazon region, and 20% for other Biomes as Atlantic Forest.

Even though the LPVN has existed in different forms since 1934, enforcement of the law is poor in Brazil. Currently, there is a deficit of 21 million hectares that need to be restored under the requirements of this law (Soares-Filho et al. 2014). Especificamente na Zona do Projeto, existe um déficit de 227.131ha que precisam ser restaurados.

Due to weak law enforcement, several past changes in the law that reduced restoration demands in 2012 (Brancalion et al. 2016), and a current government that openly dismantles public environmental agencies (Abessa et al. 2019), some farmers are not motivated to carry out restoration in Brazil.

Portanto, aponta-se que por mais que exista legislação para conservação e readequação ambiental das propriedades, ela não é aplicada.

Outcome of sub-step 1b:

List of plausible alternative land use scenarios to the ARR VCS project activity that comply with mandatory legislation and regulations taking into account their application in the region or country and EB decisions on national and/or sectoral policies and regulations:

As these two land use scenarios (scenario 1 and scenario 2) result from the systematic lack of enforcement of applicable laws and regulations, both scenarios are results of sub-stage 2a, which are.

- Continuation of pre-project land use: mostly unmanaged pasture and some annual cropland.

- Project activity on the ground within the project boundaries carried out without being recorded as ARR VCS project activity: small-scale forest restoration and agroforestry.

STEP 2: Barrier analysis

This step serves to identify barriers and to assess which of the land use scenarios identified in the sub-step 1b are not prevented by these barriers.

Sub-step 2a. Identification of barriers that would prevent the implementation of at least one alternative land use scenarios

Investment barrier

As pointed out in the description of scenario 2, the Instituto de Pesquisas Ecológicas (IPÊ) has restored in recent years approximately 2,000 hectares of APP and Legal Reserve of medium and large landowners and 60 hectares of agroforestry systems implemented in Legal Reserve areas of small landowners and rural settlers. These forest restoration activities and the implementation of agroforestry systems were only possible due to the great effort exerted by IPÊ in raising funds from various sources, such as through donations, environmental compensation via a state program, public notices and socio-environmental actions by financiers (payment by planted seedling, mainly).

In addition to IPÊ, it is known that other non-governmental organizations have also been working with fundraising and partnership with landowners to enable the restoration of environmental liabilities in the region.

The investment barrier is the main obstacle to the environmental regularization of rural properties. The average cost of forest restoration in the region is currently between R$30,000 and R$40,000 per hectare (at an exchange rate close to R$5.10 per dollar, this represents between US$5,800 and US$7,800 per hectare). This is expensive for most farmers, even for the large landowners. Comparatively, the minimum wage is around R$1,212/month (or US$240/month) and approximately almost one third of Brazilian population lives with less than the minimum monthy wage (Neri, 2022) (approximately R$840 or US$165, considering the Parity Purchasing Power of $5.50/day) or even less. Considering only the state of São Paulo, 17.85% of the population lives on this income.

Lines of credit and financing

The Safra Plan is the main instrument for directing public policies aimed at the agricultural sector, especially those related to financing and costing credit lines. The main way for rural producers to access credit lines for financing with banks is through the Programs and, particularly for the development of activities for the recovery of environmental liabilities in the state of São Paulo, there are the following Programs that can be obtained by owners and rural producers: PRONAF (National Program for the Strengthening of Family Agriculture), specifically PRONAF Eco (with a limit of 165 thousand reais per agricultural year), PRONAMP (National Program to Support Medium Rural Producers) (with a limit of 430 thousand reais per agricultural year) and the ABC Program, specifically via the Environmental ABC Program (with a limit of 2.2 million reais per agricultural year).

However, even though these lines of credit exist to finance the activities of environmental regularization of properties, the demand for these lines has been low (Costa, 2016; Moreira, Neto and Kimura, 2016). According to a study carried out by Moreira, Neto and Kimura (2016), the existing reasons for the low demand for these lines of credit derive mainly from “uncertainties about the complete regulation of the new forest law, the economic situation in Brazil and the high level of indebtedness”. of the rural producer, allied

to the perception, on the part of the rural owner and also of the financial agents, that the credit for this type of activity of recovery of environmental liabilities is a burden to the producer". In addition to these reasons, the high cost of monitoring - linked to the difficulty in monitoring the progress of forest restoration and its maintenance during the period of validity of the credit agreement - and the need for collateral as complicating factors in obtaining credit for restoration activities and environmental suitability of the property (FEBRABAN and GVces, 2017). Furthermore, the requirements required for the producer to obtain credit, the interest rate and the amount made available per agricultural year (sometimes less than necessary) are mentioned.

Specifically for the 2017/2018 and 2018/2019 harvests (which were the last harvests in which the Program information was made available by the ABC Observatory), the amount contracted for the ABC Ambiental subprogram was around 1% of the total contracted for the ABC Program (OBSERVATÓRIO ABC, 2019), which represents both the low demand for financing environmental adequacy activities and the availability of resources for this modality.

Having exposed that the restoration of APP and RL areas has occurred mainly through donations and other fundraising, that the cost of restoration is one of the biggest obstacles and that credit lines have not been applied to carry out regularization activities environment, it is concluded that the expected situation in the territory is that the areas of environmental liability remain without being restored if there is no help or cost coverage, as done by IPÊ and some other NGOs.

Barriers due to social conditions: Lack of skilled and/or properly trained labor force

It is common in the region that -due to the high cost associated with the forest restoration activity- many landowners try to restore their areas of environmental liability on their own, with the farm's own employees and without specific knowledge or with untrained teams. In this way, many plantations end up not being established, due to the lack of maintenance and technical experience of the team.

These failures are known precisely because IPÊ itself ended up having to intercede again in many APP and RL areas whose restoration activities did not perform when they were carried out by an unqualified team.

The forest restoration activity involves several steps and specific knowledge so that there is success in the establishment of the forest. Among others, we can mention the need for: correct soil preparation and control of weed competition and leaf-cutting ants (pre and post planting); good seedling quality; irrigation in dry times and replanting in cases of high mortality; monitoring and maintenance of plantations; implementation of a schedule that is consistent with all stages and the time of year that each stage will be carried out.

It is not by chance that one of the project's activities is the training of service providers in forest restoration activities, as the technique in operations is essential for the establishment and development of plantations and consequent landscape connectivity.

Another point of considerable attention is the quality of forest restoration when carried out without the support of a specialized team that has knowledge of species and landscape ecology, especially with regard to biodiversity and connectivity. As an example, we cite the Project's practice of trying to allocate RL areas in places with better landscape connectivity, as well as implementing a minimum of 100 native species in each area (in addition to following the guidelines established in the SMA No. 2014 on choice and proportionality of species and ecological groups).

In other words, plantations carried out without technical knowledge - in addition to the risk that they may not work - may be poorly biodiverse plantations and that will not necessarily fulfill their ecological functions provided for and established in the Forest Code itself and in the aforementioned SMA 32/2014.

Barriers due to ecological conditions

Associated with the investment barrier and the barrier of knowledge and technical experience in carrying out forest restoration activities, there is a barrier due to ecological conditions, related to the existence of invasive exotic grasses (mainly Panicum maximum, Urochloa decumbens and Melinis minutiflora). As pointed out in more detail in Section 5.2.9, invasive exotic grasses are considered one of the biggest filters for the establishment and development of reforestation in tropical regions, as they compete for resources (inputs, luminosity and space) with the implanted seedlings and with the regenerating ones. natural resources, besides favoring the occurrence of fires.

Thus, preventive and periodic control of these grasses is essential in forest restoration areas, especially in the first years after planting or until the canopy is closed.

Outcome of Step 2a:

List of barriers that may prevent one or more land use scenarios identified in Step 1b:
- Investment barrier
- Barrier due to social conditions
- Barrier due to ecological conditions

Sub-step 2b. Elimination of land use scenarios that are prevented by the identified barriers

The scenario 2 "Forestation of the land within the project boundary performed without being registered as an ARR VCS project activity" is prevented by the three barriers identified, while the scenario 1 "Continuation of the pre-project land use: mostly unmanaged grasslands and some annual croplands" does not face any of the identified barriers.

Table 13 - Impeding barriers to the identified scenarios

Scenario	Prevented Barrier
Scenario 1: Continuation of the pre-project land use: mostly unmanaged grasslands and some annual croplands	- No barrier impediment
Scenario 2: Forestation of the land within the project boundary performed without being registered as a ARR VCS project activity	- Investment barrier - Barrier due to social conditions - Barrier due to ecological conditions

Outcome of Sub-step 2b:
List of land use scenarios that are not prevented by any barrier:
- Scenario 1: Continuation of the pre-project land use: mostly unmanaged grasslands and some annual croplands

Sub-step 2c. Determination of baseline scenario (if allowed by the barrier analysis)
As forestation without being registered as an ARR VCS project activity is not included in the list of land use scenarios that are not prevented by any barrier and it is the only land use scenario in outcome of sub-step 2b, this remaining land use is the baseline scenario.

STEP 3. investment analysis

Not applicable, once it is not mandatory

STEP 4. Common practice analysis

The Project Zone, as pointed out in detail in Section 2.1.6, began its process of landscape transformation and consequent deforestation and loss of biodiversity at the end of the 19th century, with the opening of pastures for cattle raising and, later, for coffee cultivation. Deforestation has intensified over the years with changes in economic cycles and development policies instituted, which has always led to the conversion of forest areas into pasture areas, cotton cultivation and, between the 1970s and 1980s, , in sugarcane areas, in addition to the loss of forests with the installation of 4 hydroelectric plants.

As mentioned earlier, IPÊ has been operating in the region for 35 years and, with the aim of converting deforested areas with environmental liabilities into forest areas and connecting the fragments, it started its first restoration plantation in 2004 on a private property located close to Morro do Diabo State Park (the largest remnant of Seasonal Semideciduous Forest in the State of São Paulo). Since then, in 18 years, it has managed to restore approximately 2,000 hectares and implement 60 hectares of agroforestry systems.

In order to guide where efforts in the implementation of forest restoration plantations are more prioritized for landscape connectivity, a Dream Map was developed for the Project Zone, which incorporates information on the proximity of riparian forests (APPs) and Legal Reserves (RLs), property boundaries, species ecology and existing forest remnants.

It is a fact that reforestation projects aimed at preservation, in a way, represent a guarantee that the entire standing forest will be untouched. Based on the polluter-pays principle, there is direct compensation for the burden of recomposing the area, which results in a reduction in deforestation and the addition of native forest, with the consequent improvement in the environment.

Dib et al. (2020) generated different scenarios for one deforested watershed in Brazil and observed that helping farmers to comply with the restoration requirements of Brazilian legislation would increase forest cover by 18-48% in the watershed and increase mean species abundance by approximately one third when compared to the business-as-usual land management. Therefore, working closely with farmers to carry out the legal requirements of Brazilian legislation can generate additionality for restoration and carbon in Brazil.

Regardless of law enforcement and political instabilities, we carry out individual agreements with each landowner, committing then to protect the forests under restoration. Clearly, farmers and public agencies alone do not have the technical and financial resources to restore the millions of hectares required by Brazilian legislation, and the support of external institutions is crucial to change this scenario.

Areas of legal reserve and permanent preservation are areas that have mandatory preservation established by law. However, according to the context presented above (and Sub-step 1.b), without the intervention of a certified project, the restoration of degraded areas could take years, or even not be implemented by the landowner.

Furthermore, considering that:

i) there is an urgent need to conserve forest remnants and restore areas of environmental liabilities of properties for the maintenance of species of fauna and flora

ii) the success of the plantations and the quality of the restoration depend on knowledge and qualified labor

iii) the restoration approach must consider the entire territory, including not only aspects of biodiversity (such as the ecology of populations of fauna and flora), but also those of the community (identifying who the key actors occupying the territory are and how they can make them partners in the implementation of the project); and, mainly, that

iv) the cost of implementing and maintaining ecological restoration areas is one of the biggest challenges and obstacles to the environmental adequacy of rural properties

It is understood that the development and implementation of a certified ARR carbon project is a way of leveraging, enabling and accelerating the forest restoration process in the territory (already initiated by IPÊ).

Outcome: as similar activities can be observed and essential distinctions between the proposed CDM project activity and similar activities can be made, the proposed ARR VCS project activity is not the baseline scenario and, hence, it is additional.

3.1.6 Methodology Deviations

There was no deviation from methodology in the construction of this project.

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

The "A/R Large-Scale Consolidated Methodology – Afforestation and reforestation of lands except wetlands (version 2.0)" establishes that the baseline net GHG removals by sinks shall be calculated as follows:

$$\Delta C_{BSL,t} = \Delta C_{TREE\_BSL,t} + \Delta C_{SHRUB\_BSL,t} + \Delta C_{DW\_BSL,t} + \Delta C_{LI\_BSL,t} \quad \text{Equation 1}$$

Where:

$\Delta C_{BSL,t}$: Baseline net GHG removals by sinks in year *t*; t CO_2-e

$\Delta C_{TREE\_BSL,t}$: Change in carbon stock in baseline tree biomass within the project boundary in year *t*, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities*"; t CO_2-e

$\Delta C_{SHRUB\_BSL,t}$: Change in carbon stock in baseline shrub biomass within the project boundary, in year *t*, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities*"; t CO_2-e

$\Delta C_{DW\_BSL,t}$: Change in carbon stock in baseline dead wood biomass within the project boundary, in year *t*, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities*"; t CO_2-e

$\Delta C_{LI\_BSL,t}$: Change in carbon stock in baseline litter biomass within the project boundary, in year *t*, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities*"; t CO_2-e

3.2.1.1 Stratification

As pointed out in methodology AR-ACM0003, "if the distribution of biomass in the project area is not homogeneous, stratification should be performed to improve the accuracy of the biomass estimate".

It is also pointed out that "for net GHG removals by baseline carbon pools, it is generally sufficient to stratify the area according to the main vegetation types and their canopy cover and/or land use types".

In the case of the Corridors for Life ARR Grouped Project (as already pointed out in section 3.1.4 - Baseline Scenario), the project considered 3 different strata: i) "herbaceous (only herbaceous vegetation); ii) irregular-herbaceous (predominance of herbaceous vegetation, but with the presence of some shrub and/or

arboreal individuals); and iii) irregular-arboreal (predominance of arboreal and/or shrubby vegetation, with the presence of clearings and herbaceous vegetation).

In view of the baseline stratification, sample plots were installed to measure the existing biomass within these plots and consequent average estimate of the baseline biomass in each stratum.

The estimation of carbon stocks in trees and shrubs was given by the specific equations established in the AR-AMTOOL14 tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities (version 4.2), specifically in the sections 8 (Estimating carbon stock in trees at a point of time) and 11 (Estimating carbon stock in shrubs at a point of time).

3.2.1.1.1 Estimation of initial carbon stock in trees

The carbon stock in trees at a given time can be estimated using one of the following methods (or a combination of them):

(a) Estimation via measurement of sample plots;

(b) Estimation via modeling of tree growth and development of stands

(c) Estimate via relative canopy coverage

(d) Updating of previous stock via measurement independent of change

When the estimate is performed by methods (a), (b) or (d) above, the date of the last measurement of the sample plot, or canopy coverage estimate, is the one that will be used as the date of the carbon stock estimate, even if the entire measurement process extends over a period of time.

When the estimation of carbon stock in trees at a given time in year t is performed by applying different methods in different strata, the value of CTREE,i is given by the sum of the carbon stock in all strata in which the area of the project was divided

Estimation via measurement of sample plots

The estimate of the carbon stock in the Grouped Project's baseline was carried out via measurement in sample plots, but as pointed out above, 3 other methods can be used.

In this method, the tool establishes that the sample plots are installed in one or more strata (and, in the case of the ARR Grouped Project Corredores de Vida, as mentioned above and in Section 3.1.4., the sample plots were installed in the three strata determined) and two sample designs are possible: i) stratified random sampling; ii) double sampling.

The arrangement used by the Grouped Project was stratified random sampling. Under this method, sample plots are installed in different strata at random and then these plots are measured.

As pointed out in the tool, this method is more efficient when the sample plots are optimally allocated to the strata, considering the average biomass expected per hectare of the trees and their variability in the strata. The number of sample plots and their allocation to strata were estimated using the methodological tool AR-AMTOOL03 "Calculation of the number of sample plots for measurements within the A/R CDM project activities".

The average carbon stock in trees, given by the estimate of tree biomass in the strata, and the associated uncertainty are estimated as follows:

$$C_{TREE} = \frac{44}{12} \times CF_{TREE} \times B_{TREE}$$ Equation 2

$$B_{TREE} = A \times b_{TREE}$$ Equation 3

$$b_{TREE} = \sum_{i=1}^{M} w_i \times b_{TREE,i}$$ Equation 4

$$u_C = \frac{t_{VAL} \times \sqrt{\sum_{i=1}^{M} w_i^2 \times \frac{s_i^2}{n_i}}}{b_{TREE}}$$ Equation 5

Where:

C_{TREE}: Carbon stock in trees in the tree biomass estimation strata; t CO_2-e

CF_{TREE}: Carbon fraction of tree biomass; t C (t d.m.)$^{-1}$. A default value of 0.47 is used unless transparent and verifiable information can be provided to justify a different value.

B_{TREE}: Tree biomass in the tree biomass estimation strata; t d.m.

A: Sum of areas of the tree biomass estimation strata; ha

b_{TREE}: Mean tree biomass per hectare in the tree biomass estimation strata; t d.m. ha^{-1}

w_i: Ratio of the area of stratum i to the sum of areas of tree biomass estimation strata (i.e. $w_i = A_i / A$); dimensionless

$b_{TREE,i}$: Mean tree biomass per hectare in stratum i; t d.m. ha^{-1}

u_C: Uncertainty in C_{TREE}

t_{VAL}: Two-sided Student's t-value for a confidence level of 90 per cent and degrees of freedom equal to $n – M$, where n is total number of sample plots within the tree biomass estimation strata and M is the total number of tree biomass estimation strata

s_i^2: Variance of tree biomass per hectare across all sample plots in stratum i; (t d.m. ha^{-1})^2

n_i: Number of sample plots in stratum i.

Mean tree biomass per hectare in a stratum and the associated variance are estimated as follows:

$$b_{TREE,i} = \frac{\sum_{p=1}^{n_i} b_{TREE,p,i}}{n_i}$$ Equation 6

$$s_i = \frac{n_i \times \sum_{p=1}^{n_i} b_{TREE,p,i}^2 - \left(\sum_{p=1}^{n_i} b_{TREE,p,i}\right)^2}{n_i \times (n_i - 1)}$$ Equation 7

Where:

$b_{TREE,i}$: Mean tree biomass per hectare in stratum i; t d.m. ha^{-1}

$b_{TREEp,i}$:Tree biomass per hectare in plot p of stratum i; t d.m. ha^{-1}

s_i^2: Variance of mean tree biomass per hectare in stratum i; (t d.m. ha^{-1})^2

n_i: Number of sample plots in stratum i.

The tree biomass per hectare in a plot is estimated using one of the plot measurement methods provided in Appendix 1 of the tool (AR-AMTOOL14). Specifically, the "measurement of fixed area plots" method was used.

3.2.1.1.2 Estimation of carbon stock in shrubs

$$C_{SHRUB,t} = \frac{44}{12} \times CF_s \times (1 + R_s) \times \sum_i A_{SHRUB,i} \times b_{SHRUB,i} \quad \text{Equation 8}$$

$$b_{SHRUB,t} = BDR_{SF} \times b_{FOREST} \times CC_{SHRUB,t} \quad \text{Equation 9}$$

Where:

$C_{SHRUB,t}$: Carbon stock in shrubs within the project boundary at a given point of time in year *t*; t CO_2-e

CF_S: Carbon fraction of shrub biomass; t C (t.d.m.)$^{-1}$. A default value of 0.47 is used unless transparent and verifiable information can be provided to justify a different value.

R_S: Root-shoot ratio for shrubs; dimensionless. The default value of 0.40 is used unless transparent and verifiable information can be provided to justify a different value.

$A_{SHRUB,i}$: Area of shrub biomass estimation stratum *i*; ha

$b_{SHRUB,i}$: Shrub biomass per hectare in shrub biomass estimation stratum *i*; t d.m. ha^{-1}

BDR_{SF}: Ratio of shrub biomass per hectare in land having a shrub crown cover of 1.0 (i.e. 100 per cent) and the default above-ground biomass content per hectare in forest in the region/country where the A/R CDM project activity is located; dimensionless. A default value of 0.10 should be used unless transparent and verifiable information can be provided to justify a different value.

b_{FOREST}: Default above-ground biomass content in forest in the region/country where the A/R CDM project activity is located; t d.m. ha^{-1}. Values from Table 3A.1.4 of IPCC GPG-LULUCF 2003 are used unless transparent and verifiable information can be provided to justify different values.

$CC_{SHRUB,i}$: Crown cover of shrubs in shrub biomass estimation stratum *i* at the time of estimation, expressed as a fraction (e.g. 10 per cent crown cover implies $CC_{SHRUB,i}$ = 0.10); dimensionless.

3.2.2 Project Emissions

Actual net GHG removals by carbon pools

As established in methodology AR-ACM0003 (version 2.0), the actual net GHG removals by carbon pools must be calculated as follows:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t} \quad \text{Equation 10}$$

Where:

$\Delta C_{ACTUAL,t}$: Actual net GHG removals by sinks, in year t; t CO_2-e

$\Delta C_{P,t}$: Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO_2-e

$GHG_{E,t}$: Increase in non-CO2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t, as estimated in the tool "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity"; t CO_2-e

It is important to point out that no project emissions are foreseen, once:

• Use of fire is not part of the activities of the Corridors for Life ARR Grouped Project, as pointed out in sections 3.1.2 and 3.1.3.

• GHG emissions resulting from removal of herbaceous vegetation, combustion of fossil fuel, fertilizer application, use of wood, decomposition of litter and fine roots of N-fixing trees, construction of access roads within the project boundary, and transportation attributable to the project activity shall be considered insignificant and therefore accounted as zero, as established in AR-ACM0003 (version 2.0) methodology.

Change in the carbon stock in the project

In turn, the change in carbon stocks in the project, occurring in the selected carbon pools in year t, should be calculated as follows:

$$\Delta C_{P,t} = \Delta C_{TREE\_PROJ,t} + \Delta C_{SHRUB\_PROJ,t} + \Delta C_{DW\_PROJ,t} + \Delta C_{LI\_PROJ,t} + \Delta C_{SOC\_PROJ,t} \quad \text{Equation 11}$$

Where:

$\Delta C_{P,t}$: Change in the carbon stocks in project, occurring in the selected carbon pools, in year *t*; t CO_2-e

$\Delta C_{TREE\_PROJET,t}$: Change in carbon stock in tree biomass in project in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2-e

$\Delta C_{SHRUB\_PROJET,t}$: Change in carbon stock in shrub biomass in project in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_2-e

$\Delta C_{DW\_PROJET,t}$: Change in carbon stock in dead wood in project in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO_2-e

$\Delta C_{LI\_PROJET,t}$: Change in carbon stock in litter in project in year *t*, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO_2-e

$\Delta C_{SOC\_PROJET,t}$: Change in carbon stock in SOC in project, in year *t*, in areas of land meeting the applicability conditions of the tool "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities", as estimated in the same tool; t CO_2-e

3.2.2.1 Estratification

According to the methodology, "for actual net GHG removals by carbon pools, the stratification for *ex-ante* estimates is based on the project's planting/management plan and the stratification for *ex-post* estimates is based on the actual implementation of the planting plan/project management".

In addition, if natural or anthropogenic impacts (e.g., local fires) or other factors (e.g., soil type) significantly alter the pattern of biomass distribution in the project area, then the stratification for *ex-post* estimation should be readjusted.

As the objective of the Project is to carry out restoration plantations over 20 years, it is previously understood that the distribution of biomass in the project will vary according to the year of planting (Table xx). Stratification for *ex-post* estimation will take into account not only the execution of the planting plan,

but the development of plantations, using geoprocessing technologies and tools to support the determination of strata.

Just like what happened to determine baseline emissions in each stratum (Section 3.2.1.1), sample plots must be installed to measure the existing biomass within these plots and consequent average estimate of the biomass in each stratum.

The estimation of carbon stock in trees and shrubs will be given by the specific equations established in the AR-AMTOOL14 tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities (version 4.2)".

3.2.3 Leakage

Leakage emissions, as established in the AR-ACM0003 methodology (version 2.0), must be estimated as follows:

$$LK_t = LK_{AGRIC.t}$$ Equation 12

Where:

LK_t: GHG emissions due to leakage, in year t; t CO_2-e

$LK_{AGRIC,t}$: Leakage due to the displacement of agricultural activities in year t, as estimated in the tool "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity"; t CO_2-e

The project activities will be implemented mostly in areas of abandoned pasture, in addition to a few areas of agricultural culture, mainly sugarcane. In situations where the pasture was managed or there was agricultural production, production will be interrupted or relocated to another area of the property (in an agricultural or livestock area already consolidated). Thus, the displacement of pre-project activities -as well as emissions from leakage- is not foreseen in the Corridors for Life ARR Grouped Project. That is, the project leakage emissions are accounted for as zero.

3.2.4 Net GHG Emission Reductions and Removals

The net removals of anthropogenic GHGs by carbon pools, according to the AR-ACM0003 methodology (version 2.0), must be calculated as follows:

$$\Delta C_{AR-CDM,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_t$$ Equação 13

Where:

$\Delta C_{AR-CDM,t}$: Net anthropogenic GHG removals by sinks, in year t; t CO_2-e

$\Delta C_{ACTUAL,t}$: Actual net GHG removals by sinks, in year t; t CO_2-e

$\Delta C_{ACTUAL,t}$: Baseline net GHG removals by sinks, in year t; t CO_2-e

LK_t: GHG emissions due to leakage, in year t; t CO_2-e

3.2.4.1 Ex-ante estimated baseline removals

Baseline estimates followed the steps and calculations presented in Section 3.2.1. (Baseline Emissions).

The allometric model and the parameters used to estimate tree and shrub biomass, as well as to estimate the average carbon stock, ex-ante at baseline, are presented in the table below.

Parameter	Model or Value	Source
Estimate of aboveground tree biomass (kg)	$AGB_{est} = 0{,}0673 \times (\rho\ D^2\ H)^{0{,}976}$ ρ: basic wood density ($g.cm^{-3}$) D: diameter at breast height (cm) H: height (m)	(Chave *et al.*, 2014)
ρ: basic wood density ($g.cm^{-3}$)	Specific for each species or genus	(Zanne *et al.*, 2009)
R_T: Root-to-shoot radio for tree specie	$R = e^{(-1{,}085 + 0{,}9256 \times \ln(AGB))}/AGB$	AR-TOOL14, version 4.2: "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM activities*" (Appendix 1 – p.25)
Estimate of aboveground schrub biomass (kg)	$b_{SHRUB,t} = BDR_{SF} \times b_{FOREST} \times CC_{SHRUB,t}$ (details of the equation already explained in section 3.2.1.1.2 (Estimated carbon stock in shrubs)	AR-TOOL14, version 4.2: "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM activities*" (Section 11 – p.20)
R_S: Root-to-shoot in shrubs	0,40	AR-TOOL14, version 4.2: "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM activities*" (Section 11 – p.21)
R: Root-to-shoot radio (where AGB<125 $t.ha^{-1}$)	0,20	(IPCC, 2006)
R: Root-to-shoot radio (where AGB≤125 $t.ha^{-1}$)	0,2845	(IPCC, 2019)

CF: Carbon Fraction of dry matter	0,47	(IPCC, 2006) e AR-TOOL14, version 4.2: "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM activities*"

3.2.4.2. Ex ante estimated project removals

Trees and shrubs

Ex-ante estimates of project removal by trees and shrubs were performed through literature review and non-linear regression with the data found.

The process started with the selection and literature review of studies of biomass and/or carbon stock in restored areas carried out in Seasonal Semideciduous Forest (same forest typology as the Project).

14 studies were found in this literature review, 5 of which refer to studies in which the biomass estimate was performed directly, with generation of allometric equations.

The 15 studies resulted in 88 sampling points, which were used to generate a non-linear model for estimating carbon stocks, with R^2 of 0.61.

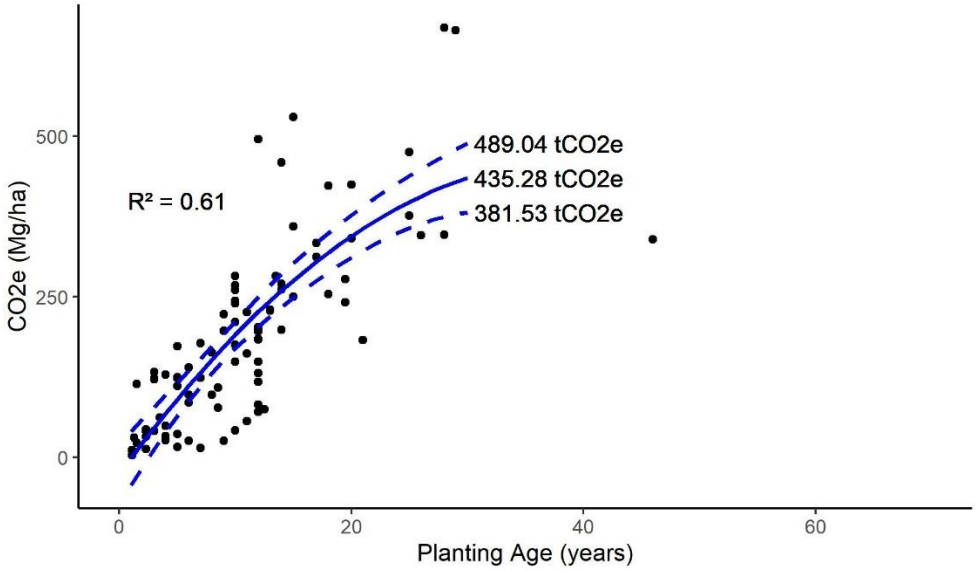

Figure 7 - Nonlinear regression derived from 88 sample points of restoration plantations from 1 to 46 years of age.

Conservatively, the smallest 95% confidence interval of the model was selected to determine the ex-ante estimate of tree and shrub carbon removals (above and below ground) of the Corridors for Life ARR Grouped Project. In other words, the ex-ante value used for the tree-shrub component was **381.53** tCO_2/ha.

All analysed studies, sampling points and statistical analysis were made available to the VVB.

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
Dez/2021-Dez/2022	832	6,212	0	5,380
Dez/2022-Dez/2023	2,080	47,137	0	45,057
Dez/2023-Dez/2024	3,327	91,320	0	87,993
Dez/2024-Dez/2025	4,575	127,644	0	123,069
Dez/2025-Dez/2026	5,823	188,522	0	182,699
Dez/2026-Dez/2027	5,823	238,827	0	233,004
Dez/2027-Dez/2028	6,655	288,637	0	281,982
Dez/2028-Dez/2029	6,655	337,877	0	331,222
Dez/2029-Dez/2030	6,655	411,321	0	404,666
Dez/2030-Dez/2031	7,487	473,809	0	466,322
Dec/2031-Dec/2032	7,487	535,406	0	527,919
Dec/2032-Dec/2033	7,487	596,042	0	588,555
Dec/2033-Dec/2034	7,487	655,662	0	648,175
Dec/2034-Dec/2035	7,487	714,236	0	706,749
Dec/2035-Dec/2036	7,487	771,756	0	764,269
Dec/2036-Dec/2037	7,487	828,237	0	820,750
Dec/2037-Dec/2038	7,487	883,715	0	876,228
Dec/2038-Dec/2039	7,487	938,241	0	930,754
Dec/2039-Dec/2040	7,487	991,879	0	984,392
Dec/2040-Dec/2041	7,487	1,044,700	0	1,037,213
Dec/2041-Dec/2042	0	984,968	0	984,968
Dec/2042-Dec/2043	0	970,629	0	970,629
Dec/2043-Dec/2044	0	956,169	0	956,169
Dec/2044-Dec/2045	0	941,738	0	941,738
Dec/2045-Dec/2046	0	927,490	0	927,490
Dec/2046-Dec/2047	0	913,584	0	913,584

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
Dec/2047-Dec/2048	0	900,175	0	900,175
Dec/2048-Dec/2049	0	887,413	0	887,413
Dec/2049-Dec/2050	0	875,433	0	875,433
Dec/2050-Dec/2051	0	864,346	0	864,346
Dec/2051-Dec/2052	0	851,580	0	851,580
Dec/2052-Dec/2053	0	823,922	0	823,922
Dec/2053-Dec/2054	0	789,358	0	789,358
Dec/2054-Dec/2055	0	755,814	0	755,814
Dec/2055-Dec/2056	0	712,614	0	712,614
Dec/2056-Dec/2057	0	670,294	0	670,294
Dec/2057-Dec/2058	0	628,756	0	628,756
Dec/2058-Dec/2059	0	587,900	0	587,900
Dec/2059-Dec/2060	0	537,029	0	537,029
Dec/2060-Dec/2061	0	486,684	0	486,684
Dec/2061-Dec/2062	0	436,792	0	436,792
Dec/2062-Dec/2063	0	387,286	0	387,286
Dec/2063-Dec/2064	0	338,112	0	338,112
Dec/2064-Dec/2065	0	289,221	0	289,221
Dec/2065-Dec/2066	0	240,574	0	240,574
Dec/2066-Dec/2067	0	192,138	0	192,138
Dec/2067-Dec/2068	0	143,885	0	143,885
Dec/2068-Dec/2069	0	95,790	0	95,790
Dec/2069-Dec/2070	0	47,834	0	47,834
Dec/2070-Dec/2071	0	0	0	0
Total	**124,780**	**28,408,708**	**0**	**28,283,928**

3.3 Monitoring

3.3.1 Data and Parameters Available at Validation

Data / Parameter	$CF_{TREE;SHRUB}$
Data unit	t C $(t.d.m.)^{-1}$
Description	Carbon Fraction of dry matter in trees and shrubs. Carbon fraction is the amount of carbon in biomass components
Source of data	AR-TOOL14, version 4.2: "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM activities*"
Value applied	0.47
Justification of choice of data or description of measurement methods and procedures applied	As indicated in AR-TOOL14, "a default value of 0.47 is used unless transparent and verifiable information can be provided to justify a different value". This value is also found in IPCC (2006), in Table 4.3.
Purpose of data	*Calculation of baseline emissions* *Calculation of project emissions*
Comments	-

Data / Parameter	Basic Wood Density
Data unit	$g.cm^3$
Description	Basic wood density of tree and shrub specie
Source of data	Global wood density (ZANNE et al, 2009)
Value applied	Diversos: densidade específica para cada espécie e/ou gênero
Justification of choice of data or description of measurement methods and procedures applied	This database was chosen for being the largest available wood density database.
Purpose of data	*Calculation of baseline emissions* *Calculation of project emissions*
Comments	Zanne, A. E., Lopez-Gonzalez, G., Coomes, D.A., Ilic, J., Jansen, S., Lewis, S.L., Miller, R.B., Swenson, N.G., Wiemann, M.C., and Chave, J. 2009. Global wood density database. Dryad. Identifier: http://hdl.handle.net/10255/dryad.235.

Data / Parameter	R_S
Data unit	Dimensionless
Description	Root-shoot ratio for shrubs

Source of data	AR-TOOL14, version 4.2: "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM activities*"
Value applied	0.40
Justification of choice of data or description of measurement methods and procedures applied	As indicated in AR-TOOL14, "the default value of 0.40 is used unless transparent and verifiable information can be provided to justify a different value".
Purpose of data	*Calculation of baseline emissions* *Calculation of project emissions*
Comments	-

Data / Parameter	BDR_{SF}
Data unit	dimensionless
Description	Ratio of shrub biomass per hectare in land having a shrub crown cover of 1.0 (i.e. 100 per cent)
Source of data	AR-TOOL14, version 4.2: "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM activities*"
Value applied	0.10
Justification of choice of data or description of measurement methods and procedures applied	As indicated in AR-TOOL14, "a default value of 0.10 should be used unless transparent and verifiable information can be provided to justify a different value".

Data / Parameter	R_T
Data unit	dimensionless
Description	Root-shoot ratio for trees
Source of data	(IPCC, 2019)
Value applied	0,2845
Justification of choice of data or description of measurement methods and procedures applied	Valor estabelecido pelo IPCC
Purpose of data	Calculation of baseline emissions Calculation of project emissions
Comments	-

Data / Parameter	R_S
Data unit	Dimensionless
Description	Root-shoot ratio for shrubs
Source of data	AR-TOOL14, version 4.2: "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM activities*"
Value applied	0.40
Justification of choice of data or description of measurement methods and procedures applied	As indicated in AR-TOOL14 (p.20), "the default value of 0.40 is used unless transparent and verifiable information can be provided to justify a different value".
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	CC_{SHRUB}
Data unit	Dimensionless
Description	Crown cover of shrubs
Source of data	Field measurements
Value applied	See spreadsheet with field data
Justification of choice of data or description of measurement methods and procedures applied	The canopy length of the shrub species was given by surveying the soil cover of these species, established in Ordinance CBRN 01/2015, where the shrub cover is given by the sum of the measures of the sections of the central sampling line covered by shrub vegetation, in meters, in relation to the length of the line (30m).
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	Details of the field methodology are contained in the baseline inventory field report, named "relatorio-metodologico-biofilica-linha-de-base-2022.pdf", made available to the VVB. SAO PAULO. CBRN Ordinance No. 01/2015, of January 17, 2015. Establishes the Monitoring Protocol for Ecological Restoration Projects. Official Gazette of the State of São Paulo. São Paulo – SP, 123 (11), Section I, p.45-46.

Data / Parameter	BDR_{SF}
Data unit	dimensionless
Description	Ratio of shrub biomass per hectare in land having a shrub crown cover of 1.0 (i.e. 100 per cent)
Source of data	AR-TOOL14, version 4.2: "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM activities*"
Value applied	0.10
Justification of choice of data or description of measurement methods and procedures applied	As indicated in AR-TOOL14, "a default value of 0.10 should be used unless transparent and verifiable information can be provided to justify a different value".
Purpose of data	• Calculation of baseline emissions • Calculation of project emissions
Comments	-

Data / Parameter	Tree biomass equation for baseline estimates (B_{TREE_BSL})
Data unit	kg
Description	Equação alométrica para estimativa de biomassa arbórea acima do solo na linha de base (kg)
Source of data	(Chave et al., 2014)
Value applied	AGBest = 0,0673 x (ρ D2 H)0,976
Justification of choice of data or description of measurement methods and procedures applied	The trees inserted within the sample plot will have their diameters and heights measured in the field. The basic density will be the one contained in the database by Zanne et al, 2009. These parameters will be inserted into the equation by Chave et al (2014), mentioned above, which is an equation
Purpose of data	• Calculation of baseline emissions
Comments	

3.3.2 Data and Parameters Monitored

Data / Parameter	**A**
Data unit	ha
Description	Project Area (planted area)
Source of data	Survey databases of each polygon that is part of the Project.

Description of measurement methods and procedures to be applied	Field measurement: the area shall be delineated either on the ground, using GPS or from geo-referenced remote sensing data.
Frequency of monitoring/recording	At the beginning of site preparation, in final establishment of the Project and each time a verification is conducted.
Value applied	Ex-post.
Monitoring equipment	GPS equipment (precision 1- 5 m) and Remote Sensing data.
QA/QC procedures to be applied	To be developed
Purpose of data	• Calculation of Project emissions
Calculation method	Measurement.

Data / Parameter	n_i
Data unit	Dimensionless
Description	Number of plots to be established in the Project Area in each stratum i
Source of data	AR-TOOL03 (version 2.1): "Calculation of the number of sample plots for measurements"
Description of measurement methods and procedures to be applied	The calculations will be performed following the determined by the tool AR-TOOL03
Frequency of monitoring/recording	Each time a verification is conducted.
Value applied	To be determined
QA/QC procedures to be applied	All procedures established in the AR-TOOL03 will be followed
Purpose of data	• Calculation of Baseline emissions • Calculation of Project emissions

Data / Parameter	**DBH**
Data unit	cm
Description	Diameter at breast height (130 cm)
Source of data	Field measurements in sample plots.
Description of measurement methods and procedures to be applied	All the trees with DBH≥5cm are measured in the sample plots.

Frequency of monitoring/recording	Each time a verification is conducted.
Value applied	Specific for each measured tree
QA/QC procedures to be applied	Persons involving in the field measurement work should be fully trained in field data collection. Field measurements shall be checked by a qualified person to correct any errors in techniques.
Purpose of data	• Calculation of Baseline emissions • Calculation of Project emissions

Data / Parameter	H
Data unit	m
Description	Total height of trees.
Source of data	Field measurements in sample plots.
Description of measurement methods and procedures to be applied	All the height trees are measured in the sample plots
Frequency of monitoring/recording	Each time a verification is conducted.
Value applied	Specific for each measured tree
QA/QC procedures to be applied	Persons involved in the field measurement work should be fully trained in field data collection. Field measurements shall be checked by a qualified person to correct any errors in techniques.
Purpose of data	• Calculation of Baseline emissions • Calculation of Project emissions

3.3.3 Monitoring Plan

The monitoring plan establishes procedures for monitoring and verifying the implementation of project activities, GHG removal associated with the implementation and development of areas under forest restoration process and the consequent change in carbon stock in the different carbon reservoirs over the period from the project.

In this sense, the monitoring plan addresses two main parts:

i) Monitoring of key procedures for the inclusion of new planting areas

ii) Monitoring changes in the project's carbon stocks, emissions and GHG removals

3.3.3.1 Monitoring of key procedures for the inclusion of new planting areas

There are two main steps to include a new area in the Grouped Project:

Step 1: Legal-land analysis and contract signing

Step 2: Eligibility Analysis

3.3.3.1.1 Legal and land tenure analysis and contract signing

As described in section 2.5 Legal Status and Property Rights, the Corridors for Life ARR Grouped Project operates only in private rural properties and uses legal contracts to formalize partnerships with their respective owners, which advocate free consent between the parties. In order for a property to be able to participate in the project and, with that, transfer the right of operation and properties of the carbon credits to the project proponents, which is the main objective of the contractual formalization, the property must undergo a legal and land due diligence process. This process is very important for, in addition to attesting the rights of the carbon project, to anticipate and mitigate risks that could arise from the investment made by the project through ARR activities on the property under analysis. The legal-property due diligence analyses an extensive list of documents and real estate, socio-environmental and judicial proceedings. Thus, only after verifying the real estate regularity and the absence of legal risks that the project proponents formalize a contract and start the project operation in the area to be reforested in the property.

3.3.3.1.2 Eligibility Analysis

<u>i) Exclusion of deforested or degraded areas for at least 10 years from the start date of the project</u>

The assessment is carried out in the restoration areas (environmental liabilities) sent along with the property boundary, in KMZ or shapefile format. These areas are stored in the project's area bank, which contains farms that are currently being planted or are under negotiation.

The analysis is done with 4 scenes of Landsat 5 satellite images that completely cover the project region (30 municipalities in Pontal do Paranapanema). The images are analyzed with the composition of the R,G,B bands (red, green and blue) and the spatial resolution is 30 meters. The geospatial files directory of the project contains the individual scenes (along with the metadata) and a single file with the mosaic of the scenes.

The analysis is done by comparing images from 2021 with images from at least 10 years earlier. The analysis of the year 2021 is made with 6 scenes of Sentinel-2 images with composition of R,G,B bands (red, green and blue) and the spatial resolution of 10 meters. In the project's geospatial files directory, there are the individual scenes (along with the metadata) and a single file with the mosaic of the scenes.

At first, the year 2006 was chosen as the standard year of comparison, as it covers a period greater than 10 years from the start date of the project, ensuring security in the analyses. In the event that the analysis indicates that an area is not eligible, a consultation with images from 2012 must be carried out. If deforestation occurs between 2006 and 2012, the area remains eligible.

<u>ii) Exclusion of wetlands areas</u>

During the analysis of eligibility and elaboration of the maps of areas for the implantation of the reforestations, places that presented characteristics of humid areas, as well as periodic floods and anaerobic conditions, are promptly excluded from the boundary of the project area.

From the initial delimitation of the restoration polygons, the analysis of overlap with wetlands areas must be carried out, considering both areas close to rivers that are permanently flooded and areas periodically flooded during the rainy season in the region of the Project Zone, in a way to ensure that the seasonal dynamics of bodies and watercourses do not affect the planting area.

The procedure for delimiting these areas involves an initial stage of evaluation through Geoprocessing software, carried out by the Biofílica Ambipar team, and a stage of complementation and validation of the information obtained by the geoprocessing analysis, carried out in the field by the IPÊ team, if they understand that some area was not correctly identified by the software.

The geoprocessing analysis will be carried out from the superposition of the shapefiles of the farms and restoration areas with the Mapbiomas wetlands and with the shapefile of the IBGE hydrography, to identify the rivers close to the restoration areas. The maps showing the eligibility of the areas will be saved in the Biofílica restoration area bank. In the event of technical overlapping doubts, Biofílica will consult IPÊ, sending the farm map and the shapefile of the wetlands, together with the geographic coordinates, so that IPE's team can provide more information about the area. Conferences of the areas detected by the geoprocessing analysis will also be carried out by the IPÊ team during the stages of preparation of the area and planting activities (since they naturally do not carry out planting in wetland areas).

Then, the polygons of the wetlands will be corrected and crossed with the restoration areas, providing the eligible restoration area (ha) of the property.

Measurement of tree and shrub species

All trees and shrubs inserted within the sample plots will be measured. As there was a baseline inventory, also via sample plots, all individuals, even those that were in the area before the implementation of the ARR activities, can be measured and considered in the calculations for estimating biomass and carbon stock.

The sample plots will be randomly distributed in the different strata existing in the verification period and the sampling intensity will be given by the specific sample sufficiency calculation contained in the tool "Calculation of the number of sample plots for measurement (AR-TOOL03, version 2.1)".

Measurement of litter, dead wood and soil carbon

As pointed out in Section 3.2.4.2., the determination of carbon stocks in litter and dead wood will be given by the default value established in the AR-TOOL12 tool, version 3.1: "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities".

Similarly, the soil carbon stock will be determined by applying the calculations contained in the AR-TOOL16 tool, version 1.1: "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities".

Thus, as the values will be obtained directly from the application of specific tools, there will be no data collection activities and/or field samples to determine the change in carbon stock in these reservoirs.

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

The Climate Monitoring Plan and all its results will be publicly disclosed on the official website of the Biofilica Ambipar Environmental Investments, in the tab specially dedicated to the Corridors for Life ARR Grouped Project. All relevant information, the summary of the monitoring plan and its conclusions, will be made available to the community, proponents, partners and other interested parties through meetings and lectures, with emphasis on the monthly meeting "Friday with Science", idealized by IPÊ, historically implemented by the organization and aimed at the communities and other stakeholders in the Project Zone. In addition, in a physical way, at the office premises of the Ecological Research Institute, in Teodoro Sampaio (SP).

3.4 Optional Criterion: Climate Change Adaptation Benefits

3.4.1 Regional Climate Change Scenarios (GL1.1)

Not applicable

3.4.2 Climate Change Impacts (GL1.2)

Not applicable

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

Not applicable

4 COMMUNITY

4.1 Without-Project Community Scenario

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

As presented in the previous chapters, until the beginning of the 20th century the far west of the state of São Paulo was covered by extensive areas of forest. These areas were gradually substituted by pastures and agricultural crops. As highlighted by ITESP (2001), the fragility of the soils and the absence of conservationist measures quickly exhausted the productive potential of the land in this region, where today beef cattle raising predominates. This author also points out that the characteristic of the soil, the concentration of rainfall in a short period of the year and the exposure of hillsides without forest cover, led the region to be configured as one of the most degraded in the State of São Paulo.

In this context, ITESP seeks to integrate environmental actions in rural settlements through the Pontal Verde program (ITESP, 2001). According to the guidelines of this program, environmental education actions are foreseen, as well as the implementation of soil conservation systems, liming, construction of fences and firebreaks in the legal reserve and permanent protection areas. It is also planned to supply seedlings of native and exotic forest species to supply the demand for wood and reduce the pressure on the native forest remnants (ITESP, 2001). According to ITESP (2001), these actions are intended to make the socio-economic development of the settled families compatible with the recovery, conservation and environmental preservation of the legal reserve and permanent preservation areas. Furthermore, agroforestry systems such as agroforestry and silvopastoral systems were also encouraged.

To enable the restoration of the permanent preservation areas and the legal reserve, the Pontal Verde program sought the involvement of the settled community in a participative way. This involvement occurred through the formation of Environmental Agents trained to reproduce concepts about the importance and

role of forests, biodiversity in sustainable agriculture, preservation of natural resources and environmental legislation (ITESP, 2001). This program has also encouraged the establishment of community forest nurseries, making a new source of income possible for the community involved.

Along with this effort by the state government, universities and civil society organizations have also contributed to the socio-environmental development of the Pontal do Paranapanema region. It is worth mentioning the performance of the Institute for Ecological Research-IPÊ, which operates in the region since 1998 also with the training of environmental agents, encouraging the implementation of agroforestry and silvopastoral systems, creation of forest nurseries and training of workers to implement forest restoration systems (Chazdon et al., 2020).

The incentive to create forest nurseries by NGO IPÊ started in 2000 in the Ribeirão Bonito and Tucano settlements, teaching how to identify and demarcate seed-producing trees, as well as how to collect viable seeds. In 2004 there were 14 community nurseries, involving 102 families, and with a production capacity of 157,000 seedlings. These nurseries helped start agroforestry productions in the region, stimulating the participation of other settlements (Cullen Jr et al, 2005; Rodrigues et al, 2004).

Production agreements with the associations and families involved in the nursery operations have generated approximately USD 367,000.00 in local income between 2016 and 2019. In this process 115 people and 23 families are involved, from the collection of the seed to the production of the seedlings. Thus, this production provided a monthly income of USD 450.00 per family, which corresponded to 2 minimum wages in 2016 (Chazdon et al., 2020).

Originally, farm workers in the region were not familiar with the economic use of forests, and the use of agricultural practices that protect the soil. However, due to the efforts of government and civil society actions, there are now small businesses of workers with experience in implementing agroforestry systems, forest restoration, and native forest nurseries.

Currently there is an economic chain of forest restoration in the region, where small companies operate from seedling production to soil preparation and planting execution. Both rural settlements and private farms are potential consumers of these services, as they need to comply with the criteria for the protection of native forest in the Federal Law 16.651/1227. According to this law, the forests around rivers and springs must be preserved, in addition to a proportion of 20% of the rural property.

When analyzing these criteria, Soares-Filho et al. (2014) points out a great demand for rural properties to comply with the legislation, which can be met generating economic, environmental and social benefits for all those involved in this chain of forest restoration.

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

Not applicable

4.1.3 High Conservation Values (CM1.2)

The concept of High Conservation Values (HCV) was developed by the Forest Stewardship Council (FSC, 1996) for the certification of timber products from responsible forest management, according to standardized Principles and Criteria that reconcile environmental and ecological safeguards with social benefits and economic viability (FSC, 2014).

High Conservation Value Areas (HCVA) are areas that are of extreme or critical importance due to some characteristic, such as significant concentration of biodiversity, seasonal concentration of species, threatened and rare ecosystems, presence of endangered species, provision of essential ecosystem services, social, historical and cultural values, among others. Within this context, as defined by the HCV Resource Network, there may be six types of high conservation values.

Within the socio-economic contextualization of the Corridors for Life ARR Grouped Project, some ecological and economic aspects that have relevance for the surrounding communities are discussed, and may characterize High Conservation Value Areas, which should be identified and managed in order to ensure their maintenance and improvement (BROWN et al., 2013). Of the six criteria listed by FSC, one of them is directly related to the communities involved:

HCV 6: Areas of special cultural, archaeological or historical significance, nationally and globally, and/or of cultural, ecological, economic or religious/sacred importance to local communities.

In the project's area of coverage, seed collection areas were identified in several forest fragments, which are fundamental for the continuity and economic development of the forest nurseries in the region. Germplasm bank areas were also identified, which are fundamental for the conservation of biodiversity (HCV 6).

The non-preservation of forest resources can culminate in the degradation of fragments and sites of seed collection, also culminating in risk to germplasm banks, by depleting these natural resources. These sites are extremely important for the extraction of forest products for the income of the communities and especially for the conservation of local biodiversity. Thus, the HCV identified in the Project area will be continuously monitored.

High Conservation Value	Areas in the Project Zone are critical to the surrounding communities (AAVC 6)
Qualifying Attribute	Areas used by community groups for seed extraction, in addition to germplasm bank areas, fundamental for biodiversity conservation.
Focal Area	Areas within the project that are used by the communities need to be monitored and actions directed so that sustainable management of the resources is carried out, in order not to deplete them. Environmental education together with the monitoring of these areas help in the development of connectivity as a result of forest restoration. The ARR Project aims to enhance these activities to ensure the continuity of the HCV.

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

Describe the expected changes in the well-being conditions and other characteristics of communities and community groups under the without-project land use scenario.

Or non-occurrence of the Corridors for Life ARR Grouped Project would result in the continuation and/or worsening of the problems found in the communities, such as

- Communities with low-income levels, little productive diversity, coupled with low productivity and economic activities.

- Low acquisition of native forest seedlings and hiring of forest restoration and maintenance services from local communities. Without the project there would not be the need to acquire a progressive number of

seedlings, inputs and labor for the development of the initiatives of implementation and maintenance of forest restorations. With this, the project would not foster the expansion of community nurseries, the emergence of technical assistance and rural extension organizations and the origination of companies specialized in forest restoration that make viable the existence of jobs in the region.

- Lack of training of communities in the reforestation chain and environmental awareness, causing damage to the conservation of standing forest, damaging the strengthening of the local economy, job generation and improvement of the quality of life of the populations.

- Absence of works, studies and scientific research focused on the proposed strategies for climate, community and biodiversity; reducing the improvement of techniques for seedling production and reforestation in order to ensure continued well-being for the community

- Low hiring of forest restoration and maintenance services from local communities.

- Communities with little access to public policies and public services.

- Development of low-tech, profitable, productive, and unsustainable shifting agriculture.

Such condition presented in this scenario could have consequently the rural exodus, that is, the going of the residents to the cities, where there is the possibility of marginalization, due to the low conditions of absorption of labor in the region.

In the scenario with the presence of the Corridors for Life ARR Grouped Project, the communities are envisioned with increased levels of socio-economic conditions, reaching levels of development from their production to the access to public policies that guarantee the continuity of families in the communities, avoiding rural exodus.

Furthermore, with the Project and from the promotion of the proposed activities, an innovation process is created towards the development of a strategy of a social impact business structure, generating a favorable business environment that is economically, environmentally, and socially sustainable.

4.2 Net Positive Community Impacts

4.2.1 Expected Community Impacts (CM2.1)

Community Groups	Service providers
Impact(s)	- Access to training and technical capacity building about sustainable practices in the use of natural resources; - Valorization and awareness of forest resources; - Permanence of families on their land; - Integration with new markets; - Income generation and diversification; - Community engagement; - Promotion of gender equity and opportunities for young people.

Type of Benefits/Costs/Risk	- Direct impact under the community; - Cost related to courses and training; - Net positive benefits
Changes in Well-Being	- Territorial Belonging; - Qualification to access professional opportunities; - Improvement in economic practices.

Community Groups	Forest Nurseries
Impact(s)	- Access to training and technical capacity building for seedling production; - Development of seed collection techniques; - Environmental awareness and permanence of families on their land; - Integration with new markets - Income generation and diversification; - Promotion of gender equity and opportunities for young people.
Type of Benefits/Costs/Risk	Expected Benefits: - Direct impact under the community; - Cost related to courses and training; - Net positive benefits.
Changes in Well-Being	- Improved income; - Qualification to access professional opportunities; - Improved economic practices.

Community Groups	Assistance and Rural Extension team
Impact(s)	- Access to training and technical capacity building; - Development of skills in activities in the forest production and maintenance chain; - Integration with new markets; - Employment generation and income diversification; - Promotion of gender equity and opportunities for young people.
Type of Benefits/Costs/Risk	Expected Benefits: - Direct impact on the community; - Cost related to courses and training; - Net positive benefits.
Changes in Well-Being	- Improved income; - Qualification to access professional opportunities;

	- Improved economic practices.

4.2.2 Negative Community Impact Mitigation (CM2.2)

As mentioned in the section above (Section 4.2.1) the Corridors for Life ARR Grouped Project does not provide negative impacts for the well-being of local communities. Some potential risks are pointed out such as lack of interest from other stakeholders, decrease in population numbers by rural exodus and lack of engagement of communities.

In order to mitigate these risks, some measures can be taken, such as the consolidation of the involvement of all the parties involved in the decision-making processes of the Project activities, mainly in meetings, besides the improvement of the already existing communication tools. In order to mitigate the rural exodus, a mitigation measure is to involve the community in the decision-making process regarding the Project's activities, in addition to their involvement in the proposed training and capacity building, thus improving the well-being of the population.

For the maintenance and improvement of the Area of High Conservation Value (AAVC), activities related to the protection of forest fragments and their seed extraction sites and germplasm bank have been proposed. These activities are focused on improving the surveillance of property, remote monitoring and encouraging sustainable practices, helping to maintain forest cover and protect biodiversity.

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

The Corridors for Life ARR Grouped Project proposes activities aimed at the socioeconomic and sustainable development of communities, improving their well-being and quality of life, through training and improvement of techniques aimed at the forest restoration chain.

In the scenario without the Project, as described in Section 4.1.4, the context of low income, lack of access to public policies and other public services, makes the families belonging to the communities seek alternatives to increase their income, from economic and subsistence activities practiced in an unsustainable and unplanned way.

The Project expects to create opportunities for the communities causing the following net positive impacts

- Promote the empowerment of local communities through the expansion of existing community nurseries, technical assistance companies, rural extension, forest planting and maintenance companies.

- Increase the engagement of communities through their participation in the Project's activities, as well as the strengthening of skills, knowledge and human capacities related to economic activities;

- Promote efficient communication, aimed at strengthening partnerships and integration with markets.

- Increase the levels of knowledge about sustainable practices, improving the population's perception of the importance of forests and the opportunities generated by reforestation activities;

- Improve the productive systems, related to all the lines mapped by the project, making them sustainable, implementing partnerships, increasing family income

- Improve employment and income opportunities for local communities through involvement in reforestation activities;

- Promote the emergence of new enterprises aimed at meeting the Project's needs, such as nurseries and forest restoration companies.

The main problems that will be faced in this context are:

- Low access to public policies, related to goods and services;

- Unsustainable economic activities, with low diversification and productivity;

- Difficulty of mobility and access;

As a project, we intend to influence the social issues and the living conditions of the communities surrounding the Project area, in order to reduce social vulnerability and rural exodus, providing families with an improvement in their quality of life and stability in income that allows families to obtain conditions to obtain goods and services that promote economic and social well-being.

4.2.4 High Conservation Values Protected (CM2.4)

To date, during the preliminary assessment conducted, no negative impacts on high conservation value attributes related to social issues have been identified (HCVA 6 - Section 4.1.3). However, should these be identified at some point in the future, measures should be taken to ensure that there are no net negative impacts on the attributes.

To ensure that no HCVAs related to community well-being are negatively affected, the proposed activities of the Corridors for Life ARR Grouped Project incorporate measures to protect and conserve forest areas used by communities.

The activities developed by the project throughout its duration will allow the generation of positive impacts on areas of high conservation value, because they include measures to maintain the attributes related to the community, such as the promotion of sustainable practices, environmental education related to seed collection activities and the importance of germplasm banks.

4.3 Other Stakeholder Impacts

4.3.1 Impacts on Other Stakeholders (CM3.1)

For the Corridors for Life ARR Grouped Project, negative impacts on other stakeholders are not anticipated or are unlikely. It is possible to observe positive impacts of the project, which may bring well-being to other stakeholders, such as:

Institutions of Technical Assistance and Rural Extension and Land and Environmental Regularization:

- Promote improvement in meeting the objectives of environmental agendas and commitments, strengthening legal security of production chains.

Private Sector:

- Promote the environmental and productive adequacy of rural properties and promote the maintenance of natural resources, such as water resources and soil protection.

NGOs and Other Social Movements:

- Promote improvement in meeting the objectives of environmental agendas and commitments, encourage the development of public policies, expand the performance and improvement of local governance, and encourage the production and dissemination of knowledge;

- Encourage participation, representativeness, active voice and political articulation for the valorisation of rural settlements and family agriculture as a whole.

Other Public Institutions:

- Contribute to meeting the objectives of environmental agendas, promote increased job creation, expand the performance and improvement of local governance, disseminate environmental knowledge aimed at mitigating environmental risks.

Research and Extension Institutions:

- Promote the development of research to contribute to professional training, advancement of science, biodiversity conservation and socioeconomic development.

We can emphasize that all local communities, as well as other stakeholders living in the project region, participating or not in the project activities, will benefit from all the positive impacts related to the restoration of forest cover and protection of biodiversity. All communities and other stakeholders will benefit from the sustainable development and opportunities generated by the Project activities, improving their quality of life and well-being.

As indicated above, negative impacts of these activities are unlikely and may be:

- Lack of engagement of communities and other stakeholders in Project activities and other articulations;

- Failure to communicate the Project's actions and to establish possible conflicts arising from the implementation and conduction of the activities.

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

As mentioned above, negative impacts on other stakeholders are not expected in this project. Mitigating measures include the implementation of participatory strategies in the design of the activity and in decision-making regarding the most appropriate moment and structure for interaction between them.

4.3.3 Net Impacts on Other Stakeholders (CM3.3)

As described and detailed in Section 4.3.1, other negative impacts on the well-being of other local stakeholder groups are not anticipated, as the Project does not limit access to natural resources for any actor originally dependent on these resources. The Project objectives only seek impacts that promote inclusion and well-being for communities and other stakeholders.

4.4 Community Impact Monitoring

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

The social, economic, and institutional parameters of the reforestations implemented by the activities proposed by the Corridors for Life ARR Grouped Project are fundamental to ascertain their effectiveness. Generally, indicators associated with human welfare, social harmony, economic development, and governance help elucidate the progress of a carbon project (LE et al., 2012). The social function is composed of indicators related to the perception of the local community and socioeconomic development, such as technical training and income generation (RIGUEIRA et al., 2013). Therefore, the choice of social indicators that cause the success of restored forests composes a solid foundation for the development of successful long-term reforestation projects that are beneficial to man and the planet (CHAZDON et al, 2013).

Technical description of monitoring tasks

Monitoring the benefits to communities aims to access the effectiveness of the focused interventions: Capacity building of local communities in the reforestation chain and Environmental awareness, Research, development and innovation of project activities and Purchase of native forest seedlings and contracting of forest restoration and maintenance services from local communities.

a) Data to be collected

Topic	Activity (Theory of Change)	Indicator	Unit	Frequency	Method Description
Community	Capacity building of local communities in the reforestation chain and environmental awareness / Research, development and innovation of project activities	Number of events held	Number of events	1 year	Registration of the number of courses, events, workshops, and seminars with the Community
Community	Capacity building of local communities in the reforestation chain and environmental awareness / Research, development and innovation of project activities	Number of people participating	Number of people	1 year	Recording the number of people from the Community who participated in the courses, events, workshops, and seminars through attendance lists and other records

Community	Capacity building of local communities in the reforestation chain and environmental awareness / Research, development and innovation of project activities	Number of women and youth participants	Number of people	1 year	Recording the number of women and young people from the community who participated in the courses, events, workshops, through attendance lists and other records
Community	Capacity building of local communities in the reforestation chain and environmental awareness / Research, development and innovation of project activities	Number of people employed in rural assistance and extension	Number of people	2 years	Counting the number of people working with rural assistance and extension in the project. This information will be taken from reports.
Community	Acquisition of native forest seedlings and contracting forest restoration and maintenance services from local communities	Number of people employed in the reforestation service companies	Number of people	1 year	Counting the number of people working in the reforestation service companies that worked on the project.
Community	Acquisition of native forest seedlings and contracting forest restoration and maintenance services from local communities	Number of women and young people employed in the reforestation service companies	Number of people	1 year	Counting the number of women and young people working in the reforestation service companies that were involved in the project.
Community	Acquisition of native forest seedlings and contracting forest restoration and maintenance services from local communities	Number of people employed in the forest nurseries	Number of people	1 year	Counting the number of people working in the forest nurseries that supply seedlings to the project.
Community	Acquisition of native forest seedlings and contracting forest restoration and maintenance services from local communities	Number of women and young people employed in the forest nurseries	Number of people	1 year	Counting the number of women and young people working in the forest nurseries that supply seedlings to the project.

4.4.2 Monitoring Plan Dissemination (CM4.3)

The Community Monitoring Plan and all its results will be publicly disclosed on the official website of the Biofilica Ambipar Environmental Investments, in the tab specially dedicated to the Corridors for Life ARR

Grouped Project. All relevant information, the summary of the monitoring plan and its conclusions, will be made available to the community, proponents, partners and other interested parties through meetings and lectures, with emphasis on the monthly meeting "Friday with Science", idealized by IPÊ, historically implemented by the organization and aimed at the communities and other stakeholders in the Project Zone. In addition, in a physical way, at the office premises of the Ecological Research Institute, in Teodoro Sampaio (SP).

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (B1.1)

In Brazil, the Atlantic Forest biome occurs along the Atlantic Ocean coast from the northeastern region in the state of Rio Grande do Norte to the southern region in the state of Rio Grande do Sul, including most of the state of São Paulo. This biome presents a unique diversity of forest types, and two main ecoregions, one that occurs in a band of 50 to 100 km along the Atlantic coast, and another that extends inland from the continent and includes areas in Brazil, Paraguay and Argentina. As shown in Figure 29, the project area is inserted in the Atlantic Forest biome and also presents a transition area with the Savanna biome.

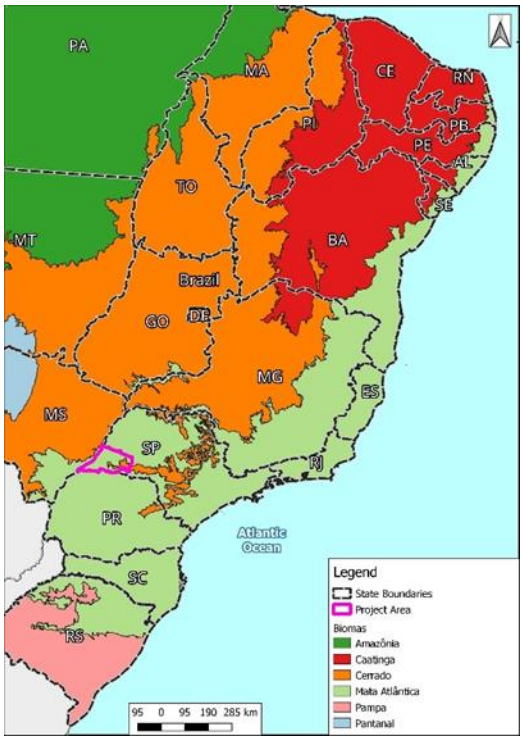

Figure 29 - Location of the project area in the Atlantic Forest biome

The Atlantic Forest biome is considered one of the most threatened biodiversity hotspots as highlighted by Laurence (2009). The term biodiversity hotspot was defined by Myers et al. (2000) to designate places

where at least 1,500 endemic vascular plant species occur and which have already lost at least 70% of their original area. In the State of São Paulo, the Forestry Institute (IF) prepares the State Forest Inventory following the methodology defined by the Brazilian Institute of Geography and Statistics (IBGE) (IBGE, 2012). According to the data presented in the 2020 inventory (IF, 2020), the largest forest fragments in the state are concentrated on the coast, while in the project area, the fragment protected by the Morro do Diabo State Park stands out as one of the largest in the region, isolated in the west of the state and distant from the large fragments mapped on the coast of São Paulo State.

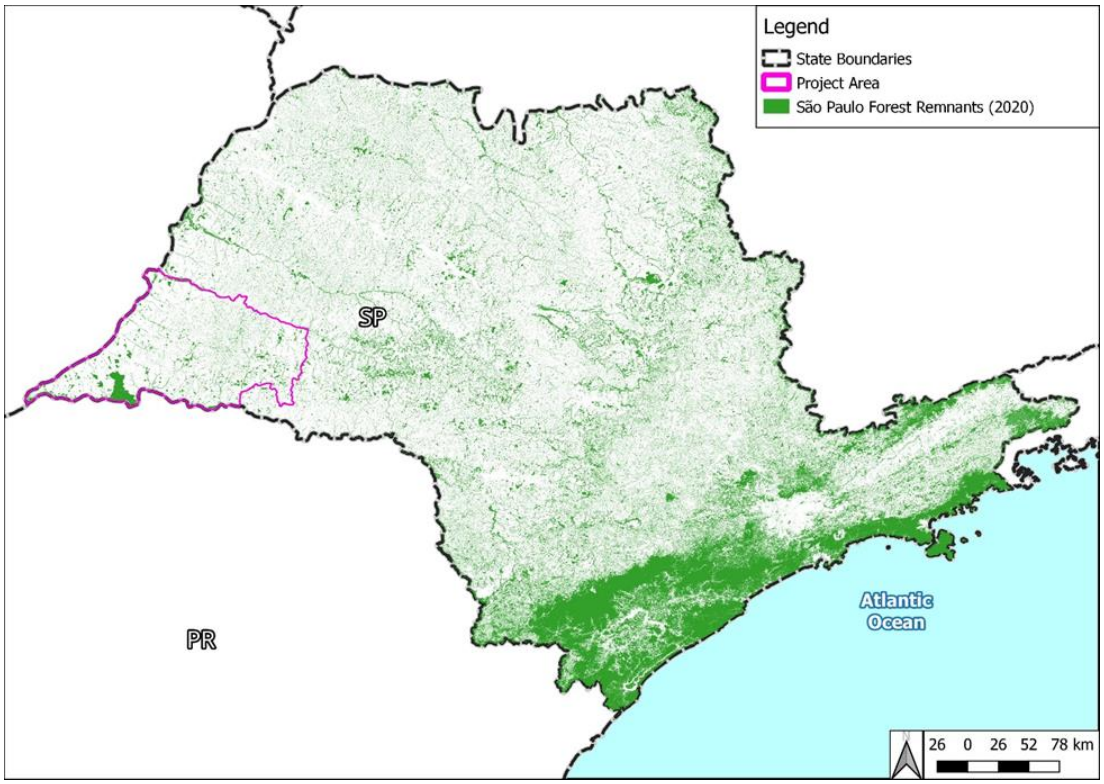

Figure 30 - Forest fragments of the 2020 inventory.

The predominant forest formation in the region is the Seasonal Semideciduous Forest, interspersed with some patches of savanna (IF, 2020). In general, this forest formation reaches 20 meters in height, is poor in epiphytes when compared to the Dense Ombrophylous Forest and has a thin understory. The predominant tree species belong to the families Leguminosae, Meliaceae, Euphorbiaceae, Myriaceae, Lauraceae, Apocynaceae, and Rubiaceae with several species of economic value such as the peroba (*Aspidosperma* spp.), jatobá (*Hymenea courbaril*), jequitibás (Cariniana spp.), aroeira (*Astronium urundeuva*), angicos (*Piptadenia* spp.), ipês (*Tabebuia* spp.), and pau d'alho (*Gallesia integnfolia*). Currently, only 1.8% of the original cover of the Semideciduous Seasonal Forest remains.

In addition to the Seasonal Semidecidual Forest, the following physiognomies also occur in smaller proportions in the project area Pioneer Formation with River Influence, Wooded Savanna and Forested Savanna. These physiognomies mapped by the Forestry Institute (IF, 2020) are spatialized in **Erro! Fonte de referência não encontrada.** In the project area, only 8% of the original forest cover remains, a value

well below the 30% needed to maintain specialist forest species as pointed out by Banks-Leite and collaborators (2014).

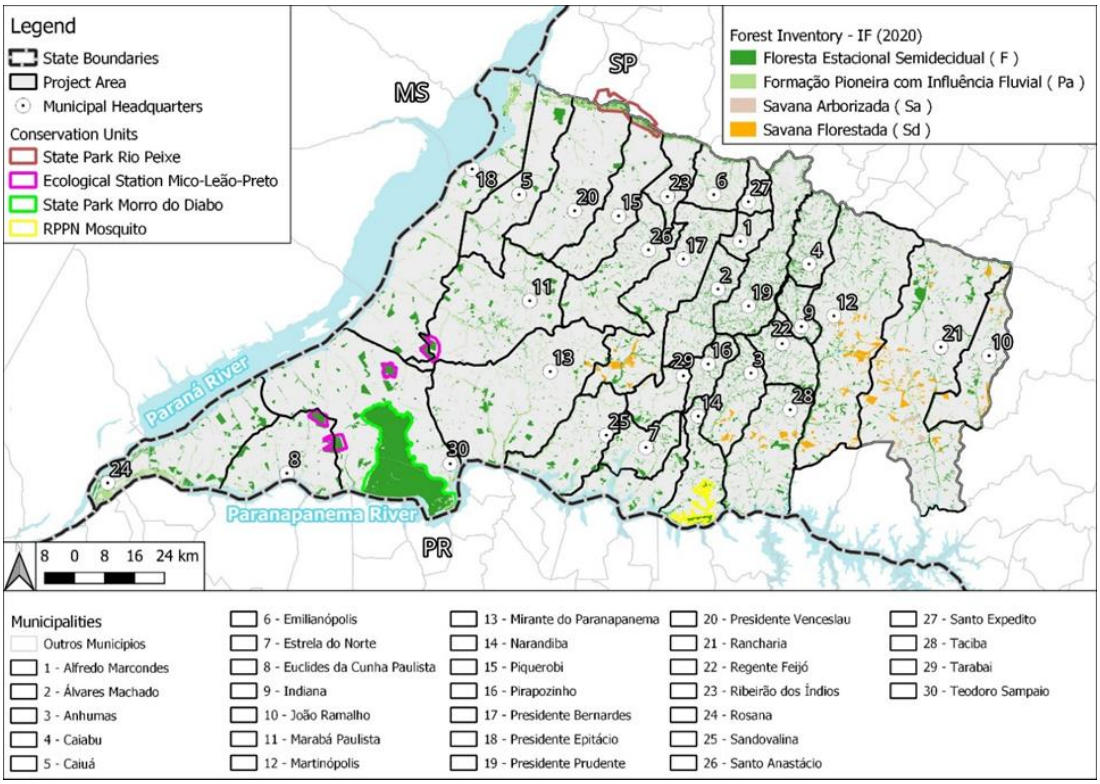

Figure 31 - Phytophysiognomies mapped by the 2020 Forest Inventory | Source: IF, 2020

The Morro do Diabo State Park, with an area of approximately 34 thousand hectares, maintains a representative sample of the original vegetation of the region and is the second largest forest remnant of the Atlantic Forest Phytophysiognomy Semidecidual Seasonal Forest (UEZU et al., 2008). Small forest fragments also stand out in the Mico-Leão-Preto Ecological Station. Finally, a significant stretch of forest on the banks of the Rio do Peixe is protected by the Rio do Peixe State Park, which, although it has a low diversity of tree species, is important because of its association with aquatic and transitional environments. These are the largest fragments in the region and are isolated and pressured by agriculture and cattle ranching areas in the landscape, due to the dynamics of current occupation.

Analyzing the phytophysiognomy of two forest fragments near Morro do Diabo State Park, named Estrela fragment and Água Sumida fragment, Durigan and collaborators (2002) found mean diversity values equivalent to other semidecidual forest areas in the state, and slightly lower than in Morro do Diabo State Park (DURIGAN et al., 2002). The most abundant species in the two fragments studied by Durigan and collaborators (2002) was *Plinia rivularis*, while Ditt (2000) identified *Eugenia repanda* as the most abundant in twelve fragments in western São Paulo. In general, the tree flora of the Estrela and Água Sumida fragments is very similar to that of the Morro do Diabo State Park forest (DURIGAN et al., 2002). Table 14, based on data collected by Durigan and collaborators (2002), shows the species identified in each fragment in descending order of Importance Value Index (IVI).

Table 14 - Species by decreasing order of IVI.

Fragment Água Sumida	**Fragment Estrela**
Plinia rivularis (Cambess.) Rotman	*Plinia rivularis* (Cambess.) Rotman
Chrysophyllum gonocarpum (Mart. & Eichler ex Miq.) Engl.	*Croton floribundus* Spreng.
Croton floribundus Spreng.	*Ficus insipida* Willd.
Garcinia gardneriana (Planch. & Triana) Zappi	*Duguetia lanceolata* A.St.-Hil.
Astronium graveolens Jacq.	*Astronium graveolens* Jacq.
Ficus guaranitica Chodat	*Helietta apiculata* Benth.
Aspidosperma polyneuron Müll.Arg.	*Eugenia psidiiflora* O.Berg
Duguetia lanceolata A.St.-Hil.	*Cecropia pachystachya* Trécul
Acacia polyphylla DC.	*Ocotea indecora* (Schott) Mez
Peltophorum dubium (Spreng.) Taub.	*Nectandra cuspidata* Nees

In the conclusion of the study, Durigan and collaborators (2002) highlight species that are heavily exploited by selective logging, for example, *Maclura tinctoria*, *Colubrina glandulosa*, *Cedrela fissilis*, *Sweetia fruticosa*, and *Hymenaea courbaril*. No adult individuals of cabreuva (*Myroxylon peruiferum* L.) were sampled, although it is common in the region. For these species, there is great compromise in maintaining the structure and genetic diversity in the forest fragments of the project region.

According to the list of endangered species of the International Union for Conservation of Nature (IUCN), in the project region there are four threatened tree species, two classified as Endangered (Peroba rosa and Pau marfim) and two classified as Vulnerable (Jequitibá rosa and Cedro rosa). The forest fragments of the Pontal do Paranapanema are the last natural refuges of these species, which suffer intense exploitation for their high value wood both for furniture construction and for finishing in civil construction, and also for building fences and tool handles (São Paulo, 2006).

In the work by Jenkins and collaborators (2015) it is estimated that more than 100 species of mammals, 439 species of birds, and 30 species of amphibians occur in the project region. Some of these are on the International Union for Conservation of Nature (IUCN) list of threatened species. This list includes species that are likely to become extinct according to existing information about their population trends.

Table 15 - Some species that occur in the project area, as well as their classification according to the IUCN Threatened Species List.

Kingdom	**Class**	**Common Name**	**Scientific Name**	**Classification (IUCN)**
Animalia	Mammal	Mico-Leão-Preto	*Leontopithecus chrysopygus*	Endangered (EN)
Animalia	Mammal	Onça Pintada	*Panthera onca*	Near Threatened (NT)
Animalia	Mammal	Tamanduá Bandeira	*Myrmecophaga tridactyla*	Vulnerable (VU)
Animalia	Mammal	Anta	*Tapirus terrestris*	Vulnerable (VU)
Animalia	Mammal	Queixada	*Tayassu pecari*	Vulnerable (VU)
Animalia	Bird	Macuco	*Tinamus solitarius*	Near Treatened (NT)
Animalia	Bird	Jó do sul	*Crypturellus noctivagus*	Near Treatened (NT)
Animalia	Bird	Gavião pombo grande	*Pseudastur polionotus*	Near Treatened (NT)
Animalia	Bird	Gavião pato	*Spizastur melanoleucus*	Least Concern (LC)
Animalia	Bird	Papagaio-de-peito-roxo	*Amazona vinacea*	Endangered (EN)
Plant	Tree	Peroba-rosa	*Aspidosperma polyneuron*	Endangered (EN)
Plant	Tree	Jequitibá-rosa	*Cariniana legalis*	Vulnerable (VU)
Plant	Tree	Cedro-rosa	*Cedrela fissilis*	Vulnerable (VU)

Plant	Tree	Pau marfim ou Guatambu	*Balfourodendron riedelianum*	Endangered (EN)

Of the species described above, the presence of the Jaguar deserves to be highlighted because it is the largest feline in the Americas and because its occurrence in the Atlantic Forest biome is in steady decline (GALETTI et al., 2013). The work of Beisiegel and collaborators (2012) draws attention to the estimate of less than 250 mature specimens alive in this biome, distributed in eight isolated populations, one of which occurs in the region of Pontal do Paranapanema. According to these authors, the most serious threats are the loss, fragmentation and degradation of its natural habitat, the reduction of the population of its prey, and hunting (BEISIEGEL et al., 2012). In the project region, the authors estimate that these threats have led to a reduction of at least 50% of the population over the past 15 years, with currently 52 adult individuals remaining. The steady trend of decline of this population could lead this species to extinction in the Atlantic forest in 88 years (BEISIEGEL et al., 2012). These large predators control the populations of herbivores and small predators, and their extinction would bring great harm to the ecosystem.

Among the potential jaguar prey that occur in the project region, the tapir stands out for being a large mammal, which occurs in low density populations and has low reproduction rate (MEDICE and DESBIEZ, 2012). In addition, it is very susceptible to human pressures that can cause from population decline to local extinction. When studying this species in the project region, Medice and Desbiez (2012) reported the occurrence of approximately 126 individuals of this species inside Morro do Diabo State Park, and in 7 forest fragments in its surroundings. The authors also report that road kill is the main threat to this group in this region, and point to the creation of forest corridors connecting the fragments as essential for the permanence of this population in the project region (MEDICE and DESBIEZ, 2012).

Another extremely endangered species that occurs in the region is the black lion tamarin, one of the rarest primates of the New World. This primate is endemic to the state of São Paulo, and was considered extinct until it was rediscovered in Morro do Diabo State Park by Coimbra-Filho (1970), a population of 821 individuals was estimated in the Morro do Diabo State Park fragment, and 42 individuals in other fragments of the region. The survival of this species in the natural environment depends on the migration of individuals between these populations. In this context, the connection between forest fragments is the main goal that should be sought to achieve this objective (VALLADARES-PADUA and CULLEN JR., 1994).

5.1.2 High Conservation Values (B1.2)

Landscape Ecology is an area of Ecology that studies the structure, dynamics and functions of ecosystems in natural or human-altered environments. According to the concepts of this area, the matrix is the element of a landscape that occupies the largest area, has the most extensive connectivity or exerts the greatest influence on the patches, which are the elements inserted into the landscape matrix (KUPFER et al. 2006). The project region represents a fragmented natural landscape, because the native vegetation patches are separated by a heterogeneous and anthropized matrix. This matrix influences the connectivity of the landscape, hindering or even preventing the movement of organisms between forest patches (UEZU et. al., 2008).

In this context, to identify the most important forest fragments for landscape connectivity in the project region, the Conefor Software was used. Conefor is a software that allows quantifying the importance of forest fragments for the maintenance or improvement of landscape connectivity (SAURA and TORNÉ, 2009). To model this scenario, Conefor works with graph structures, where the fragments classified by area (ha) are understood as graphs and the possible distances between these fragments are represented by

vectors of lines - simulating the possible flow of flora and fauna species between fragments (SAURA and TORNÉ, 2009). The graph structure enables the identification of patches that are very important for habitat connectivity and, consequently, for the long-term persistence of the population in the landscape (MINOR and URBAN, 2007).

For the project region, two criteria were used to estimate the importance for connectivity of forest patches, the area of the patches and the distances between them. To represent the importance of these fragments we used the Integral Connectivity Index (ICC), whose value ranges from 0 to 1, with 0 being of little relevance for connectivity and 1 of extreme relevance (PASCUAL-HORTAL and SAURA, 2006). In a scenario where a forest fragment has a small area (ha) and is geographically isolated, the ICC value tends to 0. In a scenario, in which a fragment presents a large area (ha) and is close to other fragments, the ICC value tends to 1.

Figure 32 shows the ICC value calculated for each forest patch using the Conefor software.

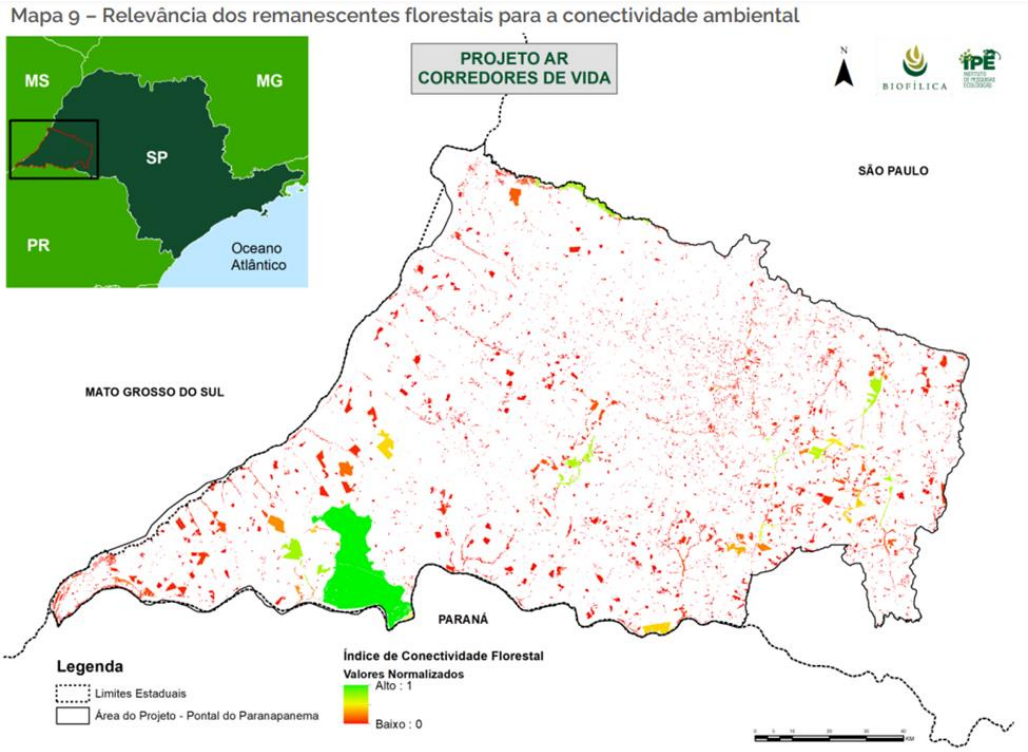

Figure 32 - Valor de ICC calculado para cada fragmento florestal

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

Considering the historical changes and trends in land use and occupation in the project region presented in Section 2.1.6, intensive sugarcane and soybean cultivation should expand over the current pasture areas used for beef cattle ranching. Intensive monocultures require the use of agrochemicals, whose long-term impact on fauna and flora is still unknown. In some cases sugarcane management with fire is still practiced, affecting the surroundings and the interior of the forest fragments.

Cattle raising should continue only on small properties and in places where the soil is poor in nutrients and highly susceptible to erosion. The traditional way of raising cattle, practiced in the region, generates compaction, erosion, contamination and loss of biological activity in the soil, resulting in highly degraded pastures. Furthermore, without proper fencing, the cattle access the interior of the existing small forest fragments, altering their structure and composition, and compacting the soil around rivers and springs. Over time, this process reduces the water balance, increases organic and chemical pollution, and eutrophication of the water.

In rural settlements, the practice of extracting wood from nearby forest fragments for fences and small constructions still occurs. In addition, crops and pastures are managed with fire, increasing the risk of forest fires.

In the project region, the predominant land use matrix is the monoculture of agricultural production, which isolates both the large fragment of the Morro do Diabo State Park and the other smaller fragments. This matrix is not very permeable to the endemic flora and fauna of the region, increasing its isolation and putting at risk the long-term maintenance of key species such as the black lion tamarin, jaguar and tapir.

In this context, agroforestry systems act as springboards for the transition and favor a greater richness of generalist species, being more interesting for conservation than monoculture systems (UEZU et al., 2008). Despite the actions of NGOs and the State in forest restoration and encouragement of agroforestry and silvopastoral crops, these actions are concentrated in the surroundings of Morro do Diabo State Park. Without the expansion and incentive for the entire project area, rural properties will remain illegal from the point of view of the Environmental Law.

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (B2.1)

The changes for biodiversity resulting from the Project activities are based on the Theory of Change (Section 2.1.11). From the analysis of the Theory of Change, it was possible to glimpse the cause and effect relationship between the initiatives proposed by the Project, the actions involved, their expected results and impacts in the short, medium and long term.

Thus, all the activities for biodiversity were planned with a focus on promoting an increase in native vegetation cover through reforestation and conduction of natural regeneration in the Project Zone, providing changes in the region's future expectations. For biodiversity, the main changes compared to the without Project scenario are related to habitat generation and increased connectivity between forest fragments, providing conservation of fauna and flora species; especially those threatened with extinction, whose populations tend to decline if the current land use and occupation in the region is maintained without the intervention of a carbon project (ARROYO-RODRÍGUEZ et al., 2020).

In summary, the expected changes to biodiversity from the Project are:

- Increased native forest cover and habitat for fauna;
- Increased connectivity between forest remnants;
- In situ conservation of native tree species;

- Contribution to the conservation of endangered species;
- Long-term population viability of endangered species;
- Reduction of threat levels according to IUCN listing.

The following tables provide details of the predicted changes in biodiversity in the Project Zone during the Project lifetime.

Table 16 - Expected changes in biodiversity from the Corridors for Life ARR Grouped Project activities.

Biodiversity Element	Native forest cover
Estimated Change	Positive
Justification of Change	Reforestation and natural regeneration activities increase the native vegetation cover in areas with irregular land use and occupation under Brazilian environmental legislation. When properly implemented in the field, these activities help to increase native forest vegetation in areas previously occupied by other land uses. The established forest areas favor the recruitment and establishment of flora species of different successional groups, the in situ conservation of native tree species, the formation of habitat and transit sites for fauna, and the protection of soil and water resources. In addition, auxiliary management practices, such as removal of degradation filters (control of leaf-cutting ants, exotic lianas, and undergrowth competition) and selection of potential species, accelerate the structural reconstruction of reforestations (FEREZ et al., 2015). Finally, the encouragement of research, development, and innovation of activities within the theme of reforestation help to improve the initiatives spent in the field, in recommendations for adaptive management and in ensuring the achievement of the desired objectives; enabling a continuous improvement of actions and the promotion of public policies (BELLOTO et al., 2009).

Biodiversity Element	Landscape Connectivity
Estimated Change	Positive
Justification of Change	Reforestation activities contribute to the formation of ecological corridors between remaining forest fragments and areas in the process of recovery; helping to ensure that an extensive forest continuum promotes the dispersal of seeds and fauna, favoring gene flow and the maintenance of native species (MARTENSEN, 2008; ALZATE and ONSTEIN, 2021). In general, ecological corridors help reduce the negative effects of fragmentation of ecosystems, especially associated with the vulnerability and permissiveness of habitats that can lead to changes in population growth rate, decreased length and diversity of the trophic chain and modification of species interactions, thus promoting the displacement and exchange of fauna, seed dispersal and colonization and reducing the risk of species extinction (SEOANE et al., 2010). Forest restoration of APPs and RLs on private farms, when appropriate techniques are deployed in the field, more than doubles habitat

	connectivity in agricultural landscapes with low native vegetation cover (ROTHER et al., 2018). Given the small forest cover in the Project Zone and the low permeability of the main land uses (sugarcane and pasture), the project's reforestation activities help increase landscape connectivity and benefit biodiversity.

Biodiversity Element	Fauna and Flora
Estimated Change	Positive
Justification of Change	In association with the positive change in the increase of native forest cover and the increase of connectivity in the landscape, the reforestation activity through the planting of native tree species and the conduction of natural regeneration will also provide direct and indirect net gains for species of fauna and flora; especially those that are endemic, vulnerable, and threatened with extinction. In addition to structural gains, the forest continuum formed by reforestation areas and forest remnants allows for the in situ conservation of a large number of native flora species, the generation of a diverse seed bank of native species from different ecological groups, the favoring of gene flow, the maintenance of biological diversity, the formation of an extensive and safe habitat for fauna present in the Project Zone, and the conservation and improvement of populations of endangered species (UEZU et al, 2005; PIVELLO et al., 2006). Thus, ensuring ecological and functional gains to the biodiversity of the Project Zone. The planting of native tree species involves the introduction of dozens of species native to the region. The high species richness at the time of planting allows these forests to maintain high richness throughout their development (GARCIA et al., 2016; CÉSAR et al. 2018). Thus, this activity is a powerful tool for in situ conservation of native Atlantic Forest tree species, especially vulnerable species that are also produced in nursery, such as *Cedrela fissilis* and *Zeyheria tuberculosa*. At the same time, the importance of raising the population's awareness about the relevance of the standing forest and the direct and indirect resources also help to enhance the conservation of species of fauna and flora by encouraging a critical sense and sharing of knowledge. Finally, the encouragement of research related to monitoring the ecology and behavior of species assists in understanding the viability of their populations, helping in the formation of a robust database and comparable in the long term for decision making more robust and grounded in the conservation of endemic, vulnerable and threatened species, both for adaptive management of the project and for the promotion of public policies (BELLOTO et al., 2009). The monitoring and research of the performance of reforestation activities will also generate knowledge to increase the chances of successful restoration and survival of planted trees, increasing the benefits of reforestation for biodiversity. The project foresees the aforementioned actions, all as tools to enable environmental and biodiversity benefits; especially for fauna and flora species in a quality landscape.

Biodiversity Element	Facilitation of hunting
Estimated Change	Negative

Justification of Change	With the increase in native vegetation cover and the increase in connectivity and displacement of fauna through the ecological corridors between remaining, reforested and regenerated forests; it is expected that a large habitat will be created for certain species of fauna, promoting ample shelter and displacement corridors for these animals. Despite the aforementioned benefits to biodiversity in the project area, these corridors may attract poachers, especially of mammals of commercial interest. In this sense, the mitigation measures outlined to prevent this illegal action in the reforestations and other forest fragments within the Project Zone are exposed and explained in the following section (Section 5.2.2).

Biodiversity Element	Shelter and facilitation of potential exotic fauna species
Estimated Change	Negative
Justification of Change	With the increase in the native vegetation cover and the increased connectivity between remaining forests, it is expected that a large habitat will be created for certain species of fauna, promoting a wide corridor of shelter and movement for these animals. In addition to supporting native species, these forest corridors may also facilitate access, transit and action by exotic fauna species, such as the wild boar (*Sus scrofa*), damaging the dynamics of the local food chain and compromising biodiversity outside the project area, mainly through competition for resources with native animals. With this, the mitigation measures planned to curb the negative effects of the entry, displacement and performance of these exotic fauna animals in reforestation and other forest fragments within the Project Zone are presented and explained in the following section (Section 5.2.2).

5.2.2 Mitigation Measures (B2.3)

The Corridors for Life ARR Grouped Project provides for the implementation of reforestation activity through scientific methods accepted and disseminated for decades, using local native tree species (RODRIGUES et al., 2009). In this sense, the development of this project will not negatively impact the biodiversity of the Project Zone. On the contrary, the activities foreseen by the Project were specifically planned to reinforce the protection of biological diversity, as well as to promote the increase of native forest cover, landscape connectivity, favoring the gene flow between ecological corridors, serving as refuge and protection for threatened species and ecosystems.

In this sense, seeking to convert the soil in the Project Area to native forests, in accordance with current environmental legislation, as well as to conserve and sustain populations of endangered species in the long term, all Project activities contemplated in the Theory of Change (Section 2.1.11) - in particular "Reforestation through seedling planting and regeneration conduction" and "Research and management of endangered fauna species" - were designed and structured to act as mitigating measures against the main threats to biodiversity, in addition to mitigating against negative adverse factors in the conservation and maintenance of AAVCs.

With respect to the potential negative effects on biodiversity arising from the planned activities identified and described in the previous section (Section 5.2.1), especially related to "Hunting facilitation" and "Shelter

and facilitation of potential exotic fauna species", these are potential and unlikely to occur within the Project Zone. Nevertheless, in order to ensure proper project development and net benefits to local biodiversity, the Corridors for Life ARR Grouped Project proponents have outlined mitigating measures, which are presented and clarified in the following tables:

Table 17 - Mitigating measures envisaged by the Corridors for Life ARR Grouped Project for potential negative impacts to biodiversity arising from its activities.

Negative Impact	Facilitation of hunting
Mitigation Measure(s)	The mitigation measures outlined to prevent this illegal action in reforestation and other forest fragments within the Project Zone consist of: environmental education initiatives, monitoring and political articulation. In general, lectures, workshops and training will be offered to the communities, other stakeholders and interested parties on the importance of biodiversity conservation, especially of fauna species pressured by poaching, and the preservation of standing forest. In addition, continuous communication with regulatory agencies, such as the Environmental Police, will be encouraged so that complaints of poaching can be investigated and appropriate measures taken by the competent institutions. Also, in order to generate information for strategic decision-making, the project will conduct sampling campaigns to measure the number of animals under pressure from poaching, using traps cameras as a support tool; in partnership with research institutions.

Negative Impact	Shelter and facilitation of potential exotic fauna species
Mitigation Measure(s)	The mitigation measures planned to curb the negative effects of the entry, displacement and performance of these exotic fauna animals in reforestation and other forest fragments within the Project Zone are based on environmental education, monitoring and political articulation. In short, lectures, workshops and training will be offered to the communities, other stakeholders and interested parties on the recognition of these animals in the field and the potential damage caused by invasive exotic species on biodiversity conservation and its associated ecological and environmental aspects. It is intended that the understandings and experiences gained in the environmental education initiatives be shared among the population outside the project area, in order to promote and solidify a sustainable and conservationist consciousness (Section 2.1.11). At the same time, continuous communication will be encouraged with regulatory agencies, such as the Environmental Police, so that complaints and reports of sightings of individuals and/or groups of exotic species of fauna can be investigated and appropriate measures taken by the competent institutions. At the same time, in order to provide information for strategic decision-making by regulatory agencies, the project will also monitor the presence of these animals in forest areas; as well as conduct sampling campaigns to measure the number of individuals of these species, using camera traps as a support tool; in partnership with research institutions.

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

The reforestation of natural ecosystems by planting native tree species and facilitating natural regeneration is a crucial tool to mitigate the current biodiversity and climate crises (STRASSBURG et al., 2020). These actions generate greater benefits for biodiversity and connectivity in landscapes with low forest cover, such as the Project Zone (TAMBOSI et al., 2013). The project seeks to plant dozens of native tree species to establish habitat and improve landscape connectivity, benefiting threatened fauna species and exercising *in situ* conservation of dozens of fauna and flora species. On the other hand, in the without-project scenario, land use and occupation in the Project Area will remain as environmentally irregular areas of pasture and intensive sugarcane plantations with a deficit of native vegetation in areas of permanent protection and legal reserves under current legislation, compromising the region's biodiversity and maintaining isolated forest remnants.

In this sense, the main benefits provided to biodiversity by the project activities are associated with the gain of habitat and connectivity between forest remnants, favoring in situ conservation and gene flow of flora and fauna in the landscape, including endangered species. At the same time, social activities were also designed to enhance biodiversity benefits in the Project Zone. The environmental awareness of the communities and other stakeholders will contribute to an improved perception of the population in the Project Zone about the importance of forests and the opportunities generated by reforestation activities.

Quantification and qualification of the positive benefits to biodiversity in the Project Zone will be carried out periodically through a robust Monitoring Plan suitable for local conditions (Section 5.4.1). From these surveys, a robust database will allow comparison and control of biodiversity conditions at consecutive evaluation periods during implementation and maintenance of the outlined activities, relative to the without-project scenario. This Monitoring Plan, as well as its frequent evaluation, will encourage the project to have its effectiveness guaranteed, promoting the desired net positive benefits for biodiversity.
Finally, it is worth mentioning that the Project, through the Theory of Change has outlined the activity "Research, development and innovation of project activities", this activity will allow the Project to implement an interactive and continuous process for maintaining relationships with its stakeholders and biodiversity components, increasing the effectiveness of activities and mitigating any potential risks to biodiversity, maintaining the net positive impacts of the project over time.

5.2.4 High Conservation Values Protected (B2.4)

Project activities do not take place directly in HCVAs and, similarly, the project area does not overlap HCVAs. Thus, no negative effects related to biodiversity are expected to result from the project's proposed activities in HCVAs.

In contrast to, the activities developed by the project throughout its duration will allow the generation of positive impacts on the areas of high conservation value, since they include measures to maintain the attributes related to biodiversity, such as connectivity of the forest landscape and conservation of species of fauna and flora, including those threatened with extinction.

5.2.5 Species Used (B2.5)

The following table presents the native tree species that will potentially be used in the reforestation activity through the planting of seedlings in the project area, according to the functional classification and dispersal syndrome, as classified in the list developed by the Secretary of Infrastructure and Environment of the State of São Paulo (2017). It is worth noting that a minimum of 60 native species from those listed below will be

deployed in the field, in accordance with the guidelines, directives and criteria of the environmental legislation in force on ecological restoration in the State of São Paulo (SMA Resolution N°. 32, April 3, 2014). The determination of the native species to be allocated in the reforestation areas will depend, above all, on the availability of seedlings in the supplier nurseries, according to the production volume at a certain time of year.

Table 18 - Native tree species planned in the reforestation activity of the Corridors for Life ARR Grouped Project.

Family	Species	Functional group	Dispersion syndrome
Anacardiaceae	*Astronium graveolens* Jacq.	Diversity	Anemochoric
Anacardiaceae	*Lithraea molleoides* (Vell.) Engl.	Diversity	Zoochoric
Anacardiaceae	*Myracrodruon urundeuva* M. Allemão	Diversity	Autochoric
Anacardiaceae	*Schinus terebinthifolius* Raddi	Filling	Zoochoric
Anacardiaceae	*Tapirira guianensis* Aubl.	Diversity	Zoochoric
Annonaceae	*Annona cacans* Warm.	Diversity	Zoochoric
Annonaceae	*Annona sylvatica* A.St.-Hil.	Diversity	Zoochoric
Annonaceae	*Xylopia aromatica* (Lam.) Mart.	Diversity	Zoochoric
Apocynaceae	*Aspidosperma cylindrocarpon* Müll.Arg.	Diversity	Anemochoric
Apocynaceae	*Aspidosperma parvifolium* A.DC.	Diversity	Anemochoric
Apocynaceae	*Aspidosperma polyneuron* Müll.Arg.	Diversity	Anemochoric
Apocynaceae	*Tabernaemontana hystrix* Steud.	Diversity	Zoochoric
Arecaceae	*Acrocomia aculeata* (Jacq.) Lodd. ex Mart.	Diversity	Zoochoric
Arecaceae	*Syagrus romanzoffiana* (Cham.) Glassman	Diversity	Zoochoric
Asteraceae	*Gochnatia polymorpha* (Less.) Cabrera	Filling	Anemochoric
Asteraceae	*Moquiniastrum polymorphum* (Less.) G. Sancho	Filling	Anemochoric
Bignoniaceae	*Cybistax antisyphilitica* (Mart.) Mart.	Diversity	Anemochoric
Bignoniaceae	*Handroanthus chrysotrichus* (Mart. ex DC.) Mattos	Diversity	Anemochoric
Bignoniaceae	*Handroanthus heptaphyllus* (Vell.) Mattos	Diversity	Anemochoric
Bignoniaceae	*Handroanthus impetiginosus* (Mart. ex DC.) Mattos	Diversity	Anemochoric
Bignoniaceae	*Handroanthus umbellatus* (Sond.) Mattos	Diversity	Anemochoric
Bignoniaceae	*Handroanthus vellosoi* (Toledo) Mattos	Diversity	Anemochoric
Bignoniaceae	*Jacaranda cuspidifolia* Mart.	Diversity	Anemochoric
Bignoniaceae	*Sparattosperma leucanthum* (Vell.) K.Schum.	Diversity	Anemochoric
Bignoniaceae	*Tabebuia aurea* (Silva Manso) Benth. & Hook.f. ex S.Moore	Diversity	Anemochoric
Bignoniaceae	*Tabebuia insignis* (Miq.) Sandwith	Diversity	Anemochoric
Bignoniaceae	*Tabebuia roseoalba* (Ridl.) Sandwith	Diversity	Anemochoric
Bignoniaceae	*Zeyheria tuberculosa* (Vell.) Bureau ex Verl.	Diversity	Anemochoric
Boraginaceae	*Cordia americana* (L.) Gottschling & J.S.Mill.	Diversity	Anemochoric
Boraginaceae	*Cordia superba* Cham.	Filling	Zoochoric
Boraginaceae	*Cordia trichotoma* (Vell.) Arráb. ex Steud.	Diversity	Anemochoric
Cannabaceae	*Trema micrantha* (L.) Blume	Filling	Zoochoric
Caricaceae	*Jacaratia spinosa* (Aubl.) A.DC.	Diversity	Zoochoric
Combretaceae	*Buchenavia tetraphylla* (Aubl.) R.A.Howard	Diversity	Zoochoric
Combretaceae	*Terminalia argentea* Mart. & Zucc.	Diversity	Anemochoric
Combretaceae	*Terminalia brasiliensis* (Cambess.) Eichler	Diversity	Anemochoric
Euphorbiaceae	*Alchornea glandulosa* Poepp. & Endl.	Filling	Zoochoric
Euphorbiaceae	*Croton floribundus* Spreng.	Filling	Autochoric
Euphorbiaceae	*Croton urucurana* Baill.	Filling	Autochoric
Euphorbiaceae	*Mabea fistulifera* Mart.	Filling	Autochoric
Fabaceae	*Acacia polyphylla* DC.	Filling	Autochoric

Fabaceae	*Albizia niopoides* (Spruce ex Benth.) Burkart	Diversity	Autochoric
Fabaceae	*Anadenanthera colubrina* (Vell.) Brenan	Diversity	Autochoric
Fabaceae	*Anadenanthera falcata* (Benth.) Speg.	Diversity	Autochoric
Fabaceae	*Anadenanthera macrocarpa* (Benth.) Brenan	Filling	Autochoric
Fabaceae	*Apuleia leiocarpa* (Vogel) J.F.Macbr.	Diversity	Autochoric
Fabaceae	*Bauhinia forficata* Link	Filling	Autochoric
Fabaceae	*Copaifera langsdorffii* Desf.	Diversity	Zoochoric
Fabaceae	*Dahlstedtia muehlbergiana* (Hassl.) M.J.Silva & A.M.G.Azevedo	Diversity	Autochoric
Fabaceae	*Dalbergia miscolobium* Benth.	Diversity	Anemochoric
Fabaceae	*Enterolobium contortisiliquum* (Vell.) Morong	Filling	Autochoric
Fabaceae	*Enterolobium maximum* Ducke	Diversity	Zoochoric
Fabaceae	*Erythrina verna* Vell.	Diversity	Autochoric
Fabaceae	*Hymenaea courbaril* L.	Diversity	Zoochoric
Fabaceae	*Inga edulis* Mart.	Filling	Zoochoric
Fabaceae	*Inga laurina* (Sw.) Willd.	Filling	Zoochoric
Fabaceae	*Inga marginata* Willd.	Filling	Zoochoric
Fabaceae	*Inga striata* Benth.	Filling	Zoochoric
Fabaceae	*Inga uruguensis* Hook. & Arn.	Filling	Zoochoric
Fabaceae	*Inga vera* Willd.	Filling	Zoochoric
Fabaceae	*Lonchocarpus cultratus* (Vell.) A.M.G.Azevedo & H.C.Lima	Diversity	Anemochoric
Fabaceae	*Machaerium hirtum* (Vell.) Stellfeld	Diversity	Anemochoric
Fabaceae	*Machaerium nyctitans* (Vell.) Benth.	Diversity	Anemochoric
Fabaceae	*Machaerium stipitatum* Vogel	Diversity	Anemochoric
Fabaceae	*Mimosa bimucronata* (DC.) Kuntze	Filling	Autochoric
Fabaceae	*Myrocarpus frondosus* Allemão	Diversity	Anemochoric
Fabaceae	*Myroxylon peruiferum* L.f.	Diversity	Anemochoric
Fabaceae	*Parapiptadenia rigida* (Benth.) Brenan	Diversity	Autochoric
Fabaceae	*Peltophorum dubium* (Spreng.) Taub.	Diversity	Autochoric
Fabaceae	*Platypodium elegans* Vogel	Diversity	Anemochoric
Fabaceae	*Poecilanthe parviflora* Benth.	Diversity	Autochoric
Fabaceae	*Pterodon emarginatus* Vogel	Diversity	Autochoric
Fabaceae	*Pterogyne nitens* Tul.	Diversity	Anemochoric
Fabaceae	*Senegalia lowei* (L.Rico) Seigler & Ebinger	Diversity	Autochoric
Fabaceae	*Senna alata* (L.) Roxb.	Filling	Autochoric
Fabaceae	*Senna macranthera* (DC. ex Collad.) H.S.Irwin & Barneby	Filling	Autochoric
Fabaceae	*Senna multijuga* (Rich.) H.S.Irwin & Barneby	Filling	Zoochoric
Lameaceae	*Vitex polygama* Cham.	Diversity	Zoochoric
Lauraceae	*Nectandra megapotamica* (Spreng.) Mez	Diversity	Zoochoric
Lauraceae	*Ocotea odorifera* (Vell.) Rohwer	Diversity	Zoochoric
Lauraceae	*Ocotea puberula* (Rich.) Nees	Diversity	Zoochoric
Lecythidaceae	*Cariniana estrellensis* (Raddi) Kuntze	Diversity	Anemochoric
Lecythidaceae	*Cariniana legalis* (Mart.) Kuntze	Diversity	Anemochoric
Lythraceae	*Lafoensia glyptocarpa* Koehne	Diversity	Anemochoric
Lythraceae	*Lafoensia pacari* A.St.-Hil.	Diversity	Anemochoric
Malvaceae	*Apeiba tibourbou* Aubl.	Diversity	Zoochoric
Malvaceae	*Ceiba speciosa* (A.St.-Hil.) Ravenna	Filling	Anemochoric
Malvaceae	*Guazuma ulmifolia* Lam.	Filling	Zoochoric
Malvaceae	*Heliocarpus americanus* L.	Filling	Anemochoric
Malvaceae	*Heliocarpus popayanensis* Kunth	Filling	Anemochoric
Malvaceae	*Luehea candicans* Mart.	Filling	Anemochoric
Malvaceae	*Luehea divaricata* Mart.	Filling	Anemochoric

Malvaceae	*Luehea grandiflora* Mart.	Filling	Anemochoric
Meliaceae	*Cedrela fissilis* Vell.	Diversity	Anemochoric
Meliaceae	*Cedrela odorata* L.	Diversity	Anemochoric
Meliaceae	*Guarea guidonia* (L.) Sleumer	Diversity	Zoochoric
Meliaceae	*Guarea macrophylla* Vahl	Diversity	Zoochoric
Moraceae	*Ficus dendrocida* Kunth	Diversity	Zoochoric
Moraceae	*Ficus guaranitica* Chodat	Diversity	Zoochoric
Moraceae	*Ficus mexiae* Standl. LC	Diversity	Zoochoric
Moraceae	*Maclura tinctoria* (L.) D.Don ex Steud.	Diversity	Zoochoric
Myrtaceae	*Campomanesia pubescens* (Mart. ex DC.) O.Berg	Diversity	Zoochoric
Myrtaceae	*Campomanesia xanthocarpa* (Mart.) O.Berg	Diversity	Zoochoric
Myrtaceae	*Eugenia brasiliensis* Lam.	Diversity	Zoochoric
Myrtaceae	*Eugenia florida* DC.	Diversity	Zoochoric
Myrtaceae	*Eugenia pyriformis* Cambess.	Diversity	Zoochoric
Myrtaceae	*Eugenia sulcata* Spring ex Mart.	Diversity	Zoochoric
Myrtaceae	*Eugenia uniflora* L.	Diversity	Zoochoric
Myrtaceae	*Plinia peruviana* (Poir.) Govaerts	Diversity	Zoochoric
Myrtaceae	*Psidium cattleianum* Sabine	Diversity	Zoochoric
Myrtaceae	*Psidium guineense* Sw.	Diversity	Zoochoric
Myrtaceae	*Psidium longipetiolatum* D.Legrand	Diversity	Zoochoric
Myrtaceae	*Psidium myrtoides* O.Berg	Diversity	Zoochoric
Phytolaccaceae	*Gallesia integrifolia* (Spreng.) Harms	Diversity	Anemochoric
Phytolaccaceae	*Phytolacca dioica* L.	Filling	Autochoric
Polygonaceae	*Ruprechtia laxiflora* Meisn.	Diversity	Anemochoric
Polygonaceae	*Triplaris americana* L.	Diversity	Anemochoric
Primulaceae	*Myrsine coriacea* (Sw.) R.Br. ex Roem. & Schult.	Diversity	Zoochoric
Primulaceae	*Myrsine guianensis* (Aubl.) Kuntze	Filling	Zoochoric
Primulaceae	*Myrsine umbellata* Mart.	Diversity	Zoochoric
Rhamnaceae	*Colubrina glandulosa* Perkins	Filling	Zoochoric
Rhamnaceae	*Rhamnidium elaeocarpum* Reissek	Diversity	Zoochoric
Rosaceae	*Prunus brasiliensis* (Cham. & Schltdl.) D.Dietr.	Diversity	Zoochoric
Rosaceae	*Prunus myrtifolia* (L.) Urb.	Diversity	Zoochoric
Rubiaceae	*Genipa americana* L.	Diversity	Zoochoric
Rutaceae	*Dictyoloma vandellianum* A.Juss.	Diversity	Anemochoric
Rutaceae	*Helietta apiculata* Benth.	Diversity	Anemochoric
Salicaceae	*Casearia gossypiosperma* Briq.	Filling	Zoochoric
Salicaceae	*Casearia lasiophylla* Eichler	Diversity	Zoochoric
Salicaceae	*Casearia sylvestris* Sw.	Diversity	Zoochoric
Sapindaceae	*Allophylus edulis* (A.St.-Hil. et al.) Hieron. ex Niederl.	Diversity	Zoochoric
Sapindaceae	*Dilodendron bipinnatum* Radlk.	Diversity	Zoochoric
Sapindaceae	*Sapindus saponaria* L.	Diversity	Zoochoric
Sapindaceae	*Talisia esculenta* (Cambess.) Radlk.	Diversity	Zoochoric
Sapotaceae	*Pouteria torta* (Mart.) Radlk.	Diversity	Zoochoric
Solanaceae	*Acnistus arborescens* (L.) Schltdl.	Filling	Zoochoric
Solanaceae	*Solanum lycocarpum* A.St.-Hil.	Filling	Zoochoric
Solanaceae	*Solanum mauritianum* Scop.	Diversity	Zoochoric
Solanaceae	*Solanum paniculatum* L.	Filling	Zoochoric
Solanaceae	*Solanum pseudoquina* A.St.-Hil.	Filling	Zoochoric
Solanaceae	*Solanum variabile* Mart.	Diversity	Zoochoric
Urticaceae	*Cecropia glaziovii* Snethl.	Diversity	Zoochoric
Urticaceae	*Cecropia hololeuca* Miq.	Diversity	Zoochoric
Urticaceae	*Cecropia pachystachya* Trécul	Diversity	Zoochoric
Verbenaceae	*Aloysia virgata* (Ruiz & Pav.) Juss.	Diversity	Zoochoric

Verbenaceae	*Citharexylum myrianthum* Cham.	Diversity	Zoochoric
Winteraceae	*Drimys brasiliensis* Miers	Diversity	Zoochoric

It is worth noting that of the 150 species suggested for planting, only *Psidium guajava* L. is categorized as naturalized by the Virtual Herbarium of the Reflora Program. Despite this classification, this species is widely used in reforestation projects in the State of São Paulo because of its adaptive success in tropical regions, high seed production, attraction of fruit-eating birds and rapid development to cover areas in the process of recovery (PASCARELLA et al., 2000; BERENS et al., 2008). Even technical manuals of ecological restoration developed and known in the sector, such as the Laboratory of Ecology and Forest Restoration, University of São Paulo (LERF/ESALQ/USP), include and recommend Psidium guajava as a species of overlay in their lists.

In addition to the native species listed above, the reforestation project also foresees the use of non-invasive exotic species adapted to tropical regions. It is worth noting that when these species are planted, they will be fewer in number than the native ones, will represent less than 25% of the biomass of the project areas, and will not be removed or have economic use of their products and by-products. The intention of the inclusion of these individuals in the reforestation areas is focused, especially, on the enhancement of carbon storage by the trees, as well as their use as hedges, windbreaks and borders in the restoration areas. In short, commercially widespread clones of *Eucalyptus* spp., Teca (*Tectona grandis*), Mogno-africano (*Khaya* spp.) and Seringueira (*Hevea brasiliensis*) can be used, if it is in the interest of the owner and the proponents. More detailed information on these species, as well as the justification for their use and potential impacts, can be found in section 5.2.7 of this document.

5.2.6 Invasive Species (B2.5)

The project does not foresee the introduction of any potentially invasive species in the reforestation activity. Additionally, the technical field team is trained to identify and perform the control and periodic removal of any invasive species that may occur. In general, when small clumps of invasive species are identified in the restoration areas, these plants are cut down or ringed in order to avoid competition with the native species planted and regenerated.

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

As mentioned in item 5.2.5, the reforestation activities foresee the use of clones of exotic species, introduced, propagated and adapted to tropical regions. In summary, the individuals of these species will be planted in the field in a considerably smaller number than the native ones, according to the demand and interest of the rural landowner, to be defined during the implementation of the project. The use of these species in the project area aims to promote climatic and environmental benefits associated with increased biomass storage by the trees and the implementation of improvements in the areas under restoration (for example, hedges, windbreaks and borders in the areas of restoration). It is reinforced, therefore, that the use of exotic species in the reforestation project activity is not aimed at the removal of individuals or economic gains from the products and by-products of planted trees.

In the following tables, the justification for use and the potential adverse effects associated with the exotic species that the project plans to plant in the reforestation activity are presented.

Table 19 - Exotic species foreseen in the reforestation activity of the Corridors for Life ARR Grouped Project, their respective justifications for use, and potential adverse effects.

Specie	*Eucalyptus spp.* (Eucalipto)
Justification of Use	*Eucalyptus* spp. has a secular trajectory of selection and adaptation to the Brazilian climatic and soil conditions. The industry and academia have a high level of knowledge about the physiology and silviculture of this exotic species, and its use in reforestation is allowed by the environmental legislation in force in the country. It is characterized as a pioneer species that allows the rapid covering of the reforestation area, helping, especially, in the control of weeds by the overlapping of the crowns and the formation of a layer of litter by the leaflets. For presenting low germination in the field and intolerance to shade, this species does not proliferate spontaneously in areas in reforestation (CÉSAR et al., 2018). The benefits of *Eucalyptus* spp. in consortium with native species for reforestation include increased matrix permeability for connectivity of forest fragments, source of shelter and food for fauna, maintenance of the local microclimate, pest and disease control, nutrient cycling in the soil, perches for dispersing birds, windbreaks, fire/ace containment, and enhancements/living preserves for rural properties (LACERDA, 2009; BROCKERHOFF et al, 2013; BRANCALION et al., 2019).
Potential Adverse Effect	No adverse effects to the project area and its surroundings are anticipated. The project will commit to using registered clones adapted to the environmental and soil conditions of the region. It will also follow the technical and operational guidelines recommended by manuals, scientific research and studies on the climatic, edaphic, silvicultural, phytosanitary and physiological conditions of the exotic species.

Specie	*Tectona grandis* (Teca)
Justification of Use	*Tectona grandis* is widely used in reforestation in tropical regions, being adapted and favorable to the local and environmental conditions of the country. Studies and research on the physiology and silviculture of this exotic species are gaining visibility in the timber sector and among the scientific community. Mainly because of the possibility of a consortium with native species in Legal Reserves, in accordance with the current environmental legislation. Teca is categorized as a pioneer species, of rapid growth in full sun, this characteristic allows the trees to store biomass in the short term, contributing to the sequestration of atmospheric carbon (FIGUEIREDO and SÁ, 2015). At the same time, the rapid shading of the crowns provides an effective control of competing grasses in the forest understory; ensuring the establishment and adequate development of native tree species. The high density of its wood also allows the species to be used as fences, firebreaks and borders in rural areas, favoring the environment and the ecology of the landscape.
Potential Adverse Effect	No adverse effects to the project area and its surroundings are anticipated. The project will commit to using registered clones adapted to the environmental and soil conditions of the region. It will also follow the technical and operational guidelines recommended by manuals, scientific research and studies on the climatic, edaphic, silvicultural, phytosanitary and physiological conditions of the exotic species.

Specie	*Khaya spp.* (Mogno-africano)

Justification of Use	*Khaya* spp. has been widely used in tropical reforestation in recent years, both in combination with native tree species and in monocultures, and is adapted to the local and environmental conditions of Brazil. Studies and research on technical information regarding the physiology and silviculture of clones of the exotic species are being encouraged by the industry and academia in order to generate knowledge about the behavior of mogno-africano under Brazilian conditions. It is known that the *Khaya* spp. is categorized as a pioneer species, of vigorous growth in full sun, whose short-term diametric increase contributes to the storage of biomass and, consequently, mitigation of climate change. This characteristic of the species also provides other ecological benefits, such as shading and control of competing grasses, favoring the survival of implanted seedlings and expression of the seed bank and improvement in the cycling of soil nutrients (SANTOS, 2019). Concomitantly, the high density of its wood allows the tree individuals to be used as hedges, borders, and windbreaks in order to prevent negative effects of fire and wind on rural properties; benefiting the environment and the ecology of the landscape (REIS, OLIVEIRA, SANTOS; 2019).
Potential Adverse Effect	No adverse effects to the project area and its surroundings are anticipated. The project will commit to using registered clones adapted to the environmental and soil conditions of the region. It will also follow the technical and operational guidelines recommended by manuals, scientific research and studies on the climatic, edaphic, silvicultural, phytosanitary and physiological conditions of the exotic species.

Specie	*Hevea brasiliensis* (Seringueira)
Justification of Use	*Hevea brasiliensis* is widely used in reforestation projects in the state of São Paulo, to recompose Legal Reserves, especially in localities with drier climates. It is a species native to the Amazon domain, adapted to and widely spread in the state. Because of its commercial capacity for latex production and versatility of uses, the knowledge about the physiology and silvicultural management of the species is widespread in the industry and in academia. The seringueira is categorized as a cover crop species, whose rapid short-term development allows the sequestration of atmospheric carbon and, consequently, the incorporation of biomass (GOLÇALVES et al., 2010). In reforestation with native species, the seringueira helps in the survival of native tree species, in the suppression of competing grass, in water maintenance, in the improvement of physical and chemical properties of the soil and in climate regulation, in the benefit of generalist species functioning as perches. As well as, its flexibility of use, allows the execution of hedges, firebreaks and windbreaks in rural properties; fighting potential intercurrences of wind, fire and extreme luminosity (VENTURIN et al., 2004; CARMO, MANZATTO, ALVARENGA; 2007).
Potential Adverse Effect	No adverse effects to the project area and its surroundings are anticipated. The project will commit to using registered clones adapted to the environmental and soil conditions of the region. It will also follow the technical and operational guidelines recommended by manuals, scientific research and studies on the climatic, edaphic, silvicultural, phytosanitary and physiological conditions of the exotic species.

5.2.8 GMO Exclusion (B2.7)

The project does not foresee the use of any Genetically Modified Organism (GMO) in reforestation activities.

5.2.9 Inputs Justification (B2.8)

All products used are registered and regulated by the competent bodies in Brazil, including the National Health Surveillance Agency (ANVISA) and the Ministry of Agriculture (MAPA). IPÊ, together with its service providers, pay attention to the strict compliance with the manufacturers' guidelines and recommendations.

Additionally, if any adverse effects of the scored inputs are identified, these will be reported in the monitoring reports and appropriate measures will be outlined and executed, ensuring the environmental benefits of the project.

Table 20 - Inputs used in the reforestation activity of the Corridors for Life ARR Grouped Project their respective justifications for use, and potential adverse effects.

Name	Formicide (bait, powder and soluble)
Justification of Use	The leaf-cutting ants of the most diverse species (for example, *Atta sexdens*, *Atta laevigata* and *Acromyrmex* spp.) harm the establishment and development of reforestations in tropical regions by defoliating seedlings and natural regeneration, delaying the development and mortality of planted trees. In this sense, it is essential to control leaf-cutting ants in reforestation to ensure the effectiveness of the actions taken. It is worth noting that the use of baits and powdered formicides as insecticides against leaf-cutting ants in reforestation are the most widely used in Brazil, precisely because of the ease of application, high operational yield and high efficiency. Bait based on sulfluramide has a slow action, and its active ingredient is the only one with characteristics of greater effective and safe control of leaf-cutting ants among those registered in Brazil (FORTI et al., 2007). Fipronil baits present fast action. Even studies show that fipronil is an active principle of low persistence in the environment (HARRIS, REES and TOFT, 2000). These inputs, when applied in the indicated dosages, protect reforestation from the harmful action of leaf-cutting ants.
Potencial Adverse Effect	No adverse effects are foreseen for the project area and its surroundings. The project is committed to using products approved by the competent registration agencies in Brazil. It also follows all manufacturers' recommendations regarding dosages, storage, transportation, and disposal of these inputs. It also ensures that the service providers use the required Individual Protection Equipment.

Name	Pre-emergent and post-emergent herbicides (selective and non-selective)
Justification of Use	Invasive alien species, in short grasses such as colonião-grass (*Panicum maximum*), brachiaria (*Urochloa decumbens* and *Melinis minutiflora*, are considered one of the main filters of establishment and development of reforestation in tropical regions. In addition to favoring the occurrence of fires, invasive exotic plants also compete with seedlings and natural regenerants for resources, light, and space in forest restoration areas. Among the most diverse damage, this competition can cause the mortality of native trees, allowing the spread and dominance of the competing grass. Thus, it is essential to periodically control invasive alien species in reforestation - especially in the first years after planting - to avoid compromising the regional biodiversity. Chemical control is recommended through the use of herbicides to efficiently suppress invasive alien species. The use of herbicides as a technique for the control of invasive alien species in restoration areas is widespread in Brazil; it is even a management practice recommended in technical manuals and scientific research of great prestige in the country. Non-selective post-emergent herbicides, based on glyphosate, have high operational yield, high efficiency and high effectiveness in controlling

	a wide spectrum of invasive species (WEIDLICH et al., 2020). According to Flórido (2022), the characteristics of tropical soils, highly weathered, together with the physical-chemical properties of the active ingredient, make the contamination of the product in the environment unfeasible. Pre-emergent herbicides, whose active ingredient is indaziflam, has a broad spectrum of action and long-lasting efficacy even at low doses, as well as being considered a herbicide with moderate leaching potential, showing a positive correlation with sorption and organic matter content (GUERRA et al., 2013). Thus, these inputs, when applied in the indicated dosages protect reforestations from the harmful action of exotic competing plants.
Potencial Adverse Effect	No adverse effects are foreseen for the project area and its surroundings. The project is committed to using products approved by the competent registration agencies in Brazil. It also follows all manufacturers' recommendations regarding dosages, storage, transportation, and disposal of these inputs. It also ensures that the service providers use the required Individual Protection Equipment.

Name	Planting Fertilizer (Monoammonium Phosphate - MAP)
Justification of Use	In order to guarantee the appropriate establishment and development of the implanted arboreal individuals and the natural regenerants in the reforestations, preventing degradation factors from acting and compromising the plantations; the project foresees the fertilization of Monoammonium Phosphate (MAP) in the rockrose seedlings used in the reforestation activity. In short, this practice aims at the adequate vegetative and root growth of the planted native tree species and the supply of chemical energy to the seedlings for their proper development. Adequate tree growth accelerates canopy closure and the establishment of conditions that suppress shade-intolerant invasive grasses and favor natural regeneration. Several technical manuals and guidelines widely disseminated in Brazil, recommend and guide this initiative in reforestations in the country. MAP is a mineral fertilizer used as a source of phosphorus and nitrogen, of high concentration and rapid release, highly soluble in water, which ensures the survival of the seedling implanted in the short term.
Potencial Adverse Effect	No adverse effects are foreseen for the project area and its surroundings. The project is committed to using products approved by the competent registration agencies in Brazil. It also follows all manufacturers' recommendations regarding dosages, storage, transport and disposal of these inputs. The pH of the soil is also observed in order to enable the application of fertilizer only when necessary, not compromising the physical-chemical properties of the system, damaging its fertility and triggering eutrophication in water resources. It also ensures that the service providers use the required Individual Protection Equipment.

Name	Irrigation and planting gel
Justification of Use	Additional actions to favor the survival and growth of seedlings planted in reforestations are widely recommended and disseminated in technical manuals and scientific research on the subject. The use of hydrogels, organic hydroretentive polymers, and polyacrylamide when planting native arboreal individuals increases the chances of survival, especially during veranicos, acting as conditions for soil moisture, reducing the number of irrigations and nutrient losses. It should be taken into account, the type of soil and the period of deployment of reforestation; using it preferably in dry seasons, favoring the best performance of the product (BARBOSA, RODRIGUES, COUTO et al., 2013). From the environmental point of view, in the literature several studies are found that demonstrate the benefits of hydrogels with respect to increasing water retention in the soil, reducing nutrient leaching and improving cation exchange capacity.
Potencial Adverse Effect	In the case of the hydrogel derived from polyacrylamide, its degradation by the action of microorganisms, high temperatures, pH effect, ultraviolet radiation, and salts from fertilizers and liming can release substances that contaminate surface and groundwater. However, no adverse effects to the project area and its surroundings are anticipated. Should a negative event occur due to the use of this input, the fact will be reported in the monitoring report and

	appropriate measures will be taken. The project is committed to using products approved by the competent Brazilian registration agencies. It also follows all manufacturers' recommendations regarding dosages, storage, transportation, and disposal of these inputs. It also ensures that the service providers use the required Individual Protection Equipment..

5.2.10 Waste Products (B2.9)

The service providers of the Ecological Research Institute, responsible for technical and operational initiatives in the field (e.g. reforestation implementation and maintenance), are subject to the obligation of compliance with the guidelines and duties of the Regulatory Standards required by the Brazilian Labour Laws associated to the process of identification, classification and management of all residual products resulting from the project activities. This obligation to guarantee safe and healthy work is signed between IPÊ and its service providers by means of a legal contract, reinforcing the importance of mutual commitment to the fulfillment of labor requirements of health and safety regarding waste management, use of individual protection equipment and reverse logistics.

It is worth mentioning that IPÊ works continuously for the continuous improvement of this process, elaborating a Solid Waste Management Plan, paying attention to the environmental and labor legislations in force.

In general, the organization is supported by the following documents and procedures associated with safety and occupational medicine, to which all service providers that perform reforestation activities in the field are subject: NR 07 (P.C.M.S.O - Occupational Health Medical Control Program); Ordinance SEPRT 8.873 of 07/23/2021 (provides for the Management of Occupational Risks and the Management of Occupational Risks); Decree No. 3048 - INSS (L. T.C.A.T - Technical Report on Environmental Conditions at Work); Decree n° 3048, of May 6, 1999 (Social Security Regulations); NR 31 (P.G.R.T.R - Risk Management Program at Rural Work); SEPRT Ordinance n° 22.677, of 10/22/2020 (about Safety and Health at Work in Agriculture, Livestock, Forestry, Forestry and Aquaculture); and NR 01 (OS - Order of Service). It also prepares and frequently updates procedures, programs, and internal manuals on Preliminary Risk Analysis (APR), Safe Work Procedure, and PPE Matrix.

In a complementary manner, it offers and carries out training in accordance with the regulatory norms for internal workers and service providers, in particular: Safety Integration (NR 01); Use, Safekeeping and Conservation of PPE (NR 06); First Aid (NR 07); Operation of Machinery and Equipment (NR 12); Lifting and Manual Weight Transport (NR 17); Safety in the Operation of Chainsaws and Brushcutters (NR 31); Safety in the Operation of Agricultural Machinery - Tractor (NR 31); and Prevention of Accidents with Agrochemicals (NR 31).

In order to reinforce the commitment to guarantee that the guidelines and duties of occupational health and safety, with a focus on waste management, are fulfilled by service providers in reforestation activities in the field, the Occupational Safety Technician with IPÊ carries out monthly technical visits to all areas where the initiatives are taking place; preparing a photographic record report, issuing technical opinions on the environmental working conditions, applying technical guidance to workers and service providers on Occupational Health and Safety (S.S.T), performs the Daily Safety Dialogue (D.D.S) and other competent activities of the professional's competence. It should be noted that the monthly inspections are performed by the Safety Technician, while the IPÊ Forest Restoration team prioritizes weekly and daily visits.

5.3 Offsite Biodiversity Impacts

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

No potential negative effects outside the Project Zone are anticipated from the activities planned by the Corridors for Life ARR Grouped Project. Should they occur, the proponents will mobilize with the community and other stakeholders to mitigate any potential negative impacts by collectively articulating adaptive management measures through external partnerships with public organizations, the private sector, civil society, and research institutions.

5.3.2 Net Offsite Biodiversity Benefits (B3.3)

Overall, net impacts on biodiversity in the Project Zone will be positive compared to the without-project scenario (section 5.2.3). Should negative effects on biodiversity occur outside the Project Zone, mitigation measures have been outlined and planned by the proponents, taking into account engagement with communities, other stakeholders and interested parties; promoting adaptive management and ensuring the project's intended biodiversity benefits (section 5.3.1).

The proposed project activities are expected to foster more favorable conditions for biodiversity than agricultural activities. In view of this, the restoration plantings and areas in the process of natural regeneration will promote increased native forest cover, in situ conservation, landscape connectivity, favoring gene flow between ecological corridors, serving as refuge and protection for threatened species and ecosystems, which outweighs the potential negative effects of project activities outside the Project Zone.

5.4 Biodiversity Impact Monitoring

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

The monitoring of reforestation projects is a crucial step to examine and ensure the long-term sustainability of restored forest ecosystems, ensuring the effectiveness of the actions proposed by this PDD and employed in the Project Area. Seasonal monitoring and periodic assessments in areas undergoing forest restoration are crucial to ascertain whether the plantations and the areas conducting natural regeneration are following an acceptable trajectory and present the desirable structural and ecological processes to remain sustainable over time, avoiding damage to the strategic planning of the project and the aspects associated with local biodiversity (BARBOSA et al., 2003; GANN et al., 2019).

For Engel and Parrotta (2003), the fundamental principle of evaluation of reforestation is sustainability, ensuring that the restored site is self-sustaining in the long term, without the need for external anthropic interventions. Thus, in this stage temporal evaluations are carried out, according to the objectives defined in the carbon project, in order to verify the physiognomy, functioning and dynamics of the area under recovery in the Project Area. A continuous analysis of environmental parameters allows for the assessment of the current status of the recovered ecosystems, as well as providing relevant results for accurate decision-making for appropriate strategic management, and when necessary adaptive management, depending on the conclusions reached.

For this, the choice of efficient indicators is fundamental to the success of the monitoring plan in carbon projects (ANDREASEN et al. 2001). In general, the parameters focus on ecological factors such as biological diversity (species richness of fauna and flora), structure (increase in native vegetation cover, connectivity between fragments and habitat creation) and functionality (dispersal and seed bank composition) (MORAES, 2006). These indicators, when permanently evaluated, hold the proponents, the community and other stakeholders accountable and engage them in the recovery of ecosystem services, improving the quality of life of the fauna and flora populations in the Project Zone.

a) Technical description of the monitoring tasks:

Taking into account the scenario described above and the effectiveness of the monitoring aimed at biological diversity in the Project Zone, the Corridors for Life ARR Grouped Project biodiversity monitoring plan will focus on the survey and verification of indicators associated with the structure and physiognomy, and the richness of the composition of the areas under recovery in the Project Area, focusing on endemic, vulnerable and threatened species of fauna and flora. Furthermore, these monitoring parameters will be in full association with community and climate elements; in order to guarantee a better understanding of the dynamics of biological diversity in relation to the other scopes.

For the parameters associated with the ecology and functioning of the reforestations; mainly regarding the diversity of natural regenerants recruited and established in the areas under recovery, the monitoring protocol of the Secretary of Environment of the State of São Paulo (SMA Resolution N°. 32, April 3, 2014) will be used and applied in the field for all polygons belonging to the Project Area, according to the guidelines, guidelines and criteria of current environmental legislation. The wealth of species planted will also be determined, according to the lists provided by the nurseries responsible for providing seedlings for the development of the activity, throughout the Project Area. The indicators associated with the structure and physiognomy of the reforestations, especially the connectivity of the landscape by forest fragments, both in the process of recovery and remaining native vegetation, will be determined and analyzed at the landscape level through the use of remote sensing tools accurate and widespread by the scientific community. These strategies will guarantee more robust and assertive results about the status of the reforestations subject to the carbon project activities.

At the same time, with a focus on the biological diversity of fauna species, widely present in the Project Zone, as shown in section 5.1, seasonal field expeditions will be conducted in the polygons implemented for the measurement and analysis of the diversity of these animals that use the reforestations in the Project Area. Methodologically, data collection and information verification will be carried out in partnership with researchers from IPÊ and its partners who have historically led studies on this theme in the Pontal do Paranapanema. For this, innovative and accurate equipment will be used so that robust and important results can be generated with quality on these parameters; especially on the endemic, vulnerable and endangered species in the region.

In these field expeditions, as well as in the analysis of information from the nurseries that supply seedlings for the implementation of planting activities of native species and in the survey of natural regenerants, according to the environmental legislation of the state of São Paulo, a special emphasis will be given to species of relevance, whether endemic, threatened, and rare flora and fauna. An exceptional focus will be given to the species Ipê-felpudo (*Zeyheria tuberculosa* (Vell.) Bureau ex Verl.) and Cedro-rosa (*Cedrela fissilis* Vell.) considered "Vulnerable"" by the IUCN Red List, as well as for the Tapir (*Tapirus terrestris*) also

categorized by the same list, the Jaguar (*Panthera onca*) classified as "Endangered" and the Black Lion Tamarin (*Leontopithecus chrysopygus*) indicated as "Threatened".

With this, a vigorous framework of data, information and results will be generated on the structural and ecological viability of native species plantations and areas undergoing natural regeneration, as well as the on-site conservation status of species of fauna and flora in the Project Area, with a more accurate estimate of the abundance and population trends of the identified species. In addition to this database allowing temporal comparisons, including with the scenario without the project, it will also subsidize various studies, research and work to generate understanding, spread knowledge and better management of the project regarding its adaptive management, providing the realization of adjustments and repairs relevant to the pursuit of the desired objectives.

Finally, it is worth mentioning that this Plan will also seek to protect the High Conservation Value Areas (HCVAs), stimulating, improving and complementing the knowledge about local biodiversity through this long-term monitoring, given the intense effort and interest in research and studies about the landscape, fauna and flora in the region of the Project Zone.

b) Data to be collected:

Theme	Activity (Theory of Change)	Indicator	Unit	Frequency	Method Description
Biodiversity	Reforestation through seedling planting and regeneration conduction	Number of species planted in reforestation	Number of species	1 year	Measurement of the number of species that are planted in the field in the Project Area, considering its total scale, from the survey of the lists of species made available by the nurseries responsible for supplying seedlings for the implementation of the reforestation activity foreseen by the ARR project.
Biodiversity	Reforestation through seedling planting and regeneration conduction	Number of seedlings of endangered species planted	Number of seedlings	1 year	Measurement of the number of species considered "vulnerable", "endangered" and "critically endangered", according to the IUCN Red List, that are planted in the field in the Project Area, considering its total scale, from the survey of species lists made available by the nurseries responsible for supplying seedlings for implementation of the reforestation activity planned by the ARR project.
Biodiversity	Reforestation through seedling planting and regeneration conduction	Reforestation canopy cover	%	6 months, 3 years, 5 years, 10 years, 15 years, 20 years and 30 years	Measurement of soil cover with native vegetation according to the guidelines and criteria of the current legislation of the State of São Paulo on ecological restoration (SMA Resolution N° 32, April 3, 2014), sampling plots

					of 4x25 m (100 m^2) will be installed on the diagonal of the planting lines and areas in conduction of natural regeneration in places with implementation of reforestation activity planned by the ARR project for measurement of the relative coverage of the native tree canopy along a line 25 m long (the use of a tape measure is suggested) along the sample plot in the polygons under restoration in the Project Area. The sum of the stretches covered by native trees in relation to the total length of the plot (25m) will be used to calculate the percentage of cover in the plot, and consequently, the value of the indicator, also in percentage, will be given by the average cover considering all the plots. Non-native species will not be counted when measuring tree ground cover. The total number of plots will be equal to the number of hectares in restoration plus four, up to a maximum of 50 plots.
Biodiversity	Reforestation through seedling planting and conduction of regeneration	Number of trees in natural regeneration	Number of trees	6 months, 3 years, 5 years, 10 years, 15 years, 20 years and 30 years	Measuring the number of regenerating native tree individuals according to the guideline and criteria of the current legislation of the State of São Paulo on ecological restoration (SMA Resolution N° 32, of 03 April 2014), sample plots of 4x25 m (100 m^2) will be installed on the diagonal of the planting lines and areas in conduction of natural regeneration in places with implementation of the reforestation activity planned by the ARR project for counting planted tree individuals and in spontaneous regeneration with height>0.5m and CBH<15 in the polygons in the restoration process in the Project Area. The total number of plots will be equal to the number of hectares under restoration plus four, up to a maximum of 50 plots.

Biodiversity	Reforestation through planting seedlings and conducting regeneration	Number of tree species in natural regeneration	Number of species	6 months, 3 years, 5 years, 10 years, 15 years, 20 years and 30 years	Measuring the number of regenerating native tree species according to the guideline and criteria of the current legislation of the State of São Paulo on ecological restoration (SMA Resolution no. 32, of 03 April 2014), sample plots of 4x25 m (100 m2) will be installed on the diagonal of the planting lines and areas in conduction of natural regeneration in places with implementation of reforestation activity planned by the ARR project for counting and classification of morphospecies planted and in spontaneous regeneration with height>0.5m and CBH<15 in polygons in the restoration process in the Project Area. Non-native species will not be counted for morphospecies richness. The total number of plots will be equal to the number of hectares under restoration plus four, up to a maximum of 50 plots.
Biodiversity	Reforestation through seedling planting and regeneration conduction	Relative increase in the integral connectivity index of the landscap	%	1 year	Measurement of the connectivity of the landscape between forest remnants and reforestation implemented and conducted by the ARR project through the comparative analysis of the Integral Connectivity Indices of the current year of monitoring with the previous period through Geographic Information Systems. The indices associated with the polygons in restoration belonging to the Project Area will be used to determine the current IIC in detriment of the IIC at the landscape scale when all the target areas of the project are restored.
Biodiversity	Research and management of endangered fauna species	Number of species per taxon monitored	Number of species	2 years	Measuring the number of species per fauna taxon recorded by camera traps (for mammals installed for a 30-day period in each monitoring area) and audio recorders (for birds hosted for a 15-day interval in each evaluation site) that use and move around the reforestations and areas undergoing regeneration implemented by the ARR project.

					There will be periodic expeditions to collect information that can subsidize different taxa per monitoring event.
Biodiversity	Research and management of fauna species threatened with extinction	Number of fauna species threatened with extinction	Number of species	2 years	Measuring the number of fauna species considered "vulnerable", "endangered" and "critically endangered", according to the IUCN Red List; recorded by camera traps (for mammals installed for a period of 30 days in each monitoring area) and audio recorders (for birds hosted for a 15-day interval in each evaluation site) that use and move around the reforestations and areas undergoing regeneration implemented by the ARR project. There will be periodic expeditions to collect information that can subsidize different taxa per monitoring event.
Biodiversity	Research and management of endangered fauna species	Number of scientific publications	Number of publications	1 year	Measuring the number of studies, papers, research and scientific publications in journals, TCCs/dissertations/theses and events on the biological diversity of the fauna and flora that are based on the reforestations and areas undergoing natural regeneration in the ARR project area.

5.4.2 Biodiversity Monitoring Plan Dissemination (B4.3)

The Biodiversity Monitoring Plan and all of its results will be publicly disclosed on the official website of the Biofílica Ambipar Environmental Investments, in the tab specially dedicated to the Corridors for Life ARR Grouped Project. All relevant information, the summary of the monitoring plan and its conclusions will be made available to the community, proponents, partners and other interested parties through meetings and lectures, with emphasis on the monthly meeting "Friday with Science", idealized by IPÊ, historically implemented by the organization and aimed at the communities and other stakeholders in the Project Zone. In addition, in a physical way, at the office premises of the Ecological Research Institute, in Teodoro Sampaio (SP).

5.5 Optional Criterion: Exceptional Biodiversity Benefits

5.5.1 High Biodiversity Conservation Priority Status (GL3.1)

As detailed descriptions in Sections 5.1.1 and 5.1.2, the Project Zone can be considered a high priority area for the conservation of biodiversity, both at the local and national levels, presenting characteristics characteristic of areas of high conservation value, such as which, significant concentration of biodiversity; seasonal concentration of species; threatened and rare ecosystems; presence of endangered species

and provision of essential ecosystem services. In this sense, the Corridors for Life ARR Grouped Project Area is home to a high rate of biological diversity, with many of the species of fauna and flora found in the Project Zone categorized with some degree of threat, according to the IUCN listing.

The presence of forest remnants, especially the Morro do Diabo State Park and the Mico-Leão-Preto Ecological Station, together with the reforestation areas in Permanent Preservation Areas and Legal Reserves promoted by this ARR project, form ecological corridors in the territorial extension. of the Project Zone that justify the high biodiversity found in the region.

Thus, the presence of threatened species of fauna and flora found in the scenario without Project, were verified according to the IUCN Red List of Threatened Species, following the vulnerability criteria required in the CCB Standards and Program Rules documents:

Fauna:

- **Endangered (EN)**: *Leontopithecus chrysopygus* and *Amazona vinacea*

- **Vulnerable (VU)**: *Alouatta guariba; Myrmecophaga tridactyla; Priodonts maximus; Tapirus terrestris* and *Tayassu pecari.*

- **Near Threatened (NT):** *Crypturellus noctivagus; Leopardus wiedii; Panthera onca; Pseudastur polionotus* and *Tinamus solitarius*.

- **Safe or Least Concern (LC)** - *Ara ararauna; Ara chloroptera; Boa constrictor; Caiman latirostris; Eunectes murinus; Leopardus pardalis; Puma concolor; Sarcoramphus papa; Spizaetus tyrannus and Spizastur melanoleucus.*

Flora:

- **Endangered (EN)** - *Aspidosperma polyneuron; Balfourodendron riedelianum.*

- **Vulnerable (VU)** - *Cariniana legalis; Cedrela fissilis, Zeyheria tuberculosa.*

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

In order to deepen and restrict the selection of trigger species, the Official National Lists of Endangered Species of Flora and Fauna[1], developed by the Chico Mendes Institute for Biodiversity Conservation (ICMBio, 2014), and subsidized by the guidelines of the IUCN, and which assess the national risk of extinction of fauna and fauna, were also consulted for a more careful and realistic definition of these species in their local context. It is worth mentioning that all the selected species, except for the *Balfourodendron riedelianum* and the *Aspidosperma polyneuron* that were not found on the national list, are found to have extinction degrees equal to or more critical than those on the international list. The two species absent from the national list, which were restricted only to international categorization, were also selected as key by this project due to the comments made by nurseries in the stakeholder consultation on the difficulty of accessing and collecting seeds in the Project Zone.

In parallel, in addition to the guidelines of the CCB standard documents, it is reinforced that all the key species defined by the Corridors for Life ARR Grouped Project were meticulously determined according to the activities proposed in this PDD, as well as the Monitoring Plan developed to the life cycle of this project. In line with the initiative “Research and management of endangered species of fauna” and the evaluation parameters “Number of seedlings of endangered species planted” and “Number of endangered species of fauna”.

In addition, based on secondary studies, the key species were also carefully chosen based on their ecology and behavior in reforestation areas, such as demand, occupation, transit and use of forest restorations. As well, they were determined according to the scientific research being developed by the IPÊ team, with the project being in direct contact with its responsible researchers.

Table 18 - Identification and description of key species and population trends for scenarios with and without Corridors for Life ARR Grouped Project.

Trigger Specie	Mico-leão-preto (*Leontopithecus chrysopygus*)
Population Trend at the beginning of the Project	The species is considered Endangered (EN) of extinction by the IUCN and is categorized as endemic to the Semideciduous Forest of the Atlantic Forest of western São Paulo state, limited to the Paranapanema and Tietê rivers. Currently, only the subpopulation of Morro do Diabo State Park can be considered demographically and genetically viable in the long term (Rezende, 2013). In general, its population has a tendency to decrease, especially due to fragmentation and habitat reduction events, advance of agriculture and forest fires.
Without Project Scenario	In a scenario without a Project, environmental degradation and forest fragmentation are expected to remain in the Project Zone. The continued isolation of the Black Lion Tamarin would lead to inbreeding and population decline in forest fragments in the process of degradation with carrying capacity below the number indicated for viable populations of the species, due to the difficulty of translocation and genetic dispersion (Ayala -Burbano et al., 2017). Currently, taking into account that only the subpopulation of the Morro do Diabo State Park can be identified as demographically and genetically viable in the long term, the other subpopulations present in the interior of São Paulo are considered unviable in the medium and long term, and may become extinct in this century. (Paranhos, 2006). In parallel, in certain scenarios, climate change, resulting from environmental degradation; may also pose a future threat to the population viability of the black lion tamarin, especially by affecting the extent and quality of available habitat for the species (Meyer, Pie and Passos, 2014).
Project Scenario	The Corridors for Life ARR Grouped Project with the purpose of creating ecological corridors through the implementation and conduction of reforestation, tends to promote the maintenance of the viability and the population increase of *L. chrysopygus* in the Project Zone. In this sense, the efforts of this carbon project are focused on the expansion and creation of continuous forest areas for the occupation and translocation of the species; stimulation of studies and scientific research on metapopulation management strategies in order to guarantee its survival and population viability; and promotion of environmental education on sustainable development for local communities and other stakeholders. In this sense, the Corridors for Life ARR Grouped Project, in partnership with the Mico-Leão Preto Conservation Program, a research and management initiative led by IPÊ scientists in Pontal do Paranapanema for decades, will promote continuous monitoring and genetic and demographic of the population of this species in the ecological corridors for the conservation of the biological diversity of the black lion tamarin in the Project Zone in the long term. Also, the in-depth knowledge about the biology and ecology of the species; the consonance of habitat restoration and the preservation of existing forest remnants; facilitating gene flow and reducing the possibility of inbreeding; the periodic evaluation of the results obtained in studies and researches; and the environmental awareness of local communities about sustainable development and the importance of preserving the species promoted by the Corridors for Life ARR Grouped Project will be positive in relation to the scenario without the project for *L. chrysopygus*, resulting in improvements in the population trend of the referred species.

Trigger Specie	*Tapirus terrestris*
Population Trend at the beginning of the Project	Considered Vulnerable (VU) to extinction by the IUCN. The Project Zone, especially in the Morro do Diabo State Park and its immediate surroundings, has approximately 150 individuals of this species (Medici, 2010). In general, its population tends to decrease, especially due to fragmentation and habitat reduction events, agricultural advances, hunting pressure and roadkills.
Without Project Scenario	Environmental degradation and forest fragmentation are expected to continue in the Project Zone. Taking into account that the tapir is a species that is strongly dependent on the forest for its survival, the loss of habitat for T. terrestris would lead to population decline, especially due to depletion and loss of genetic variability, as well as the difficulty in accessing resources. (mainly food and water) (Flesher and Medici, 2022). It is known that, in anthropic landscapes, tapirs can tolerate large-scale radical changes in habitat, as they persist in commercially produced grain plantations (such as soybeans), jointly permeating the remaining forest fragments (Rossi, Panachão and Arasaki, 1999). However, this fact exposes the animal to a different diet, subject to a wide range of agrochemicals, as well as making it more susceptible to poaching events and roadkill (Medici and Desbiez, 2012; Gonzales, 2022). In parallel, the reproduction of the species is characterized as slow, making it difficult to recover the viable number of its population in the long term (Pukazhenthi et al. 2013).
Project Scenario	The Corridors for Life ARR Grouped Project with the purpose of creating ecological corridors through the implementation and conduct of reforestation, tends to promote the maintenance of the viability and the population increase of *T. terrestris* in the Project Zone. Thus, the efforts of this project aim at the expansion and formation of continuous forest areas for shelter and facilitating the movement of the tapir between the forest restoration areas and the remaining forest fragments. Many of the trees planted in reforestation activities are consumed by the tapir, also known as the “gardener of the forests”, due to its high capacity to disperse seeds of native species of flora. As well, it seeks to stimulate studies and academic research on the biology, ecology and management of the tapir for the development of priority conservation actions for the species and its habitat. In parallel, environmental education strategies and awareness campaigns will also be components of the initiatives of this carbon project for the conservation and improvement of the population viability of tapirs in the landscape, making the local population aware of the negative effects of hunting and running over animals on the roads. Of region. Therefore, the Corridors for Life ARR Grouped Project, together with the National Initiative for the Conservation of Lowland Tapir, a program established and conducted by researchers from IPÊ in Pontal do Paranapanema since the 1990s, will encourage and promote the periodic monitoring of spatial ecology, reproduction, demography, food ecology, genetics and health of T. terrestris in ecological corridors to assess the long-term population viability of the species, favoring assertive adaptive management to ensure positive benefits for the conservation of the species, to the detriment of the scenario without the project.

Trigger Specie	*Aspidosperma polyneuron*
Population Trend at the beginning of the Project	The species is considered Endangered (EN) of extinction by the IUCN and, in Pontal do Paranapanema, especially near the Rio do Peixe, an average of 21 individuals per hectare of this species was recorded (Vieira et al. 1989; Toledo Filho et al. ., 2000). In general, its population has a trend of verified and/or projected decline, especially due to illegal logging events due to its high commercial value.
Without Project Scenario	In a scenario without the Project, environmental degradation and forest fragmentation are expected to continue in the Project Zone. Taking into account that seed production by A. polyneuron occurs naturally in a period of 2 to 4 years and is dispersed over short distances, maintaining the use and occupation of land by crops

	and pastures to the detriment of native forests would be harmful to the maintenance, dispersion and establishment of *Aspidosperma polyneuron* in the Project Zone, especially due to the isolation of individuals (Carvalho, 2004). That is, habitat reduction negatively affects the dynamics of viable population maintenance of the species, especially with regard to recruitment, establishment, growth, reproduction and genetic variability of arboreal individuals (Lindenmayer and Fisher, 2007). This species also has wood with high density, resulting in great commercial interest and high pressure for irregular extraction in its natural environment (Martinelli and Moraes, 2013).
Project Scenario	The Corridors for Life ARR Grouped Project, with the intention of creating ecological corridors through the implementation and conduct of reforestation, seeks to promote the maintenance of the viability and the population increase of A. polyneuron in the Project Zone. For this, the in situ conservation of *Aspidosperma polyneuron* and other native tree species is sought, as well as the favoring of species richness in reforestation, from the motivation for planting seedlings in the field and training and qualifications regarding the collection and production of several native tree species, including those categorized as threatened. With this, the ecological corridors will serve as shelter and seed dispersion source for the appropriate recruitment, establishment, development and reproduction of *Aspidosperma polyneuron*. At the same time, the project will also stimulate studies and scientific research on the richness of native tree species, especially threatened ones, in the reforestation areas of the Project Zone, in order to understand population viability and for strategic management recommendations for the conservation of the species in situ. Likewise, it will promote environmental education initiatives so that the local community and other stakeholders can acquire and disseminate information about reforestation activities and their importance for the conservation of *Aspidosperma polyneuron* in the Project Area. Therefore, these proposals by the Corridors for Life ARR Grouped Project, mainly with regard to the commitment of implantation of seedlings of the species and the continuous monitoring of the same in the restoration polygons, will guarantee positive benefits to the population of A. polyneuron in relation to the scenario without the carbon project.

APPENDICES

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

5.6 Appendix 1: Stakeholder Identification Table

Use this appendix, if necessary, to identify stakeholders and fulfil the requirements of Section 2.1.8 above. Modify the table, if necessary, to suit the project activities, or delete if not used.

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.	

5.7 Appendix 2: Project Activities and Theory of Change Table

Use this appendix, if applicable, to identify project activities and fulfill the requirements of Section 2.1.11 above. This is an example of just one method of representing the theory of change. Results chains/flow diagrams are another effective way to represent the theory of change. Modify the table, if necessary, to suit the project activities, or delete if not used.

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	

5.8 Appendix 3: Project Risks Table

Use this appendix, if necessary, to identify project risks and fulfill the requirements of Section 2.1.18 above. Modify the table, if necessary, to suit the project activities, or delete if not used.

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

5.9 Appendix 4: ECOnsulta Programme

ECOnsulta – ARR Corridors for Life Grouped Project

IPÊ / Biofílica

Teodoro Sampaio / Brazil – September 16th, 2022

Summary Program

07:45H - 08:00H - **ARRIVAL OF THE PARTICIPANTS** - Arrival snack and welcome.

- 08:00 AM - 08:30 AM - **OFFICIAL OPENING, AGREEMENTS, PRESENTATION OF THE EVENT PROGRAM AND ITS OBJECTIVES** - Presentation of the participants
- 08:30 AM - 09:00 AM - **WHAT IS PUBLIC CONSULTATION** - Where this action fits into the flow of the whole process of establishing the project in the territory
- 09:00 AM - 10:30 AM - **WHAT IS THE CORRIDORS FOR LIFE PROJECT AND HOW THE CARBON CREDIT IS IN THIS PROCESS** - dual presentation, IPÊ / Biofílica about the Project - with presentation of territory, times and deadlines, goals and objectives, attributions of the actors involved, expected gains, commitments, risks...
- 10:30AM - 11:15AM - **WHAT ARE THE MAIN QUESTIONS ABOUT WHAT WAS PRESENTED** - debate in plenary.
- 11:15AM - 12:00pm - **WHAT ARE THE MAIN PERCEPTIONS OF THE PROJECT THAT EACH SOCIAL GROUP HAS** - discussion in groups based on triggering questions.

12:00 PM - 1:30 PM - **LUNCH**

- 1:30PM - 1:45PM - **RESUMPTION OF THE DISCUSSIONS BASED ON WHAT WAS DISCUSSED IN THE MORNING**
- 1:45 PM - 2:30 PM - **WHAT ARE THE MAIN PERCEPTIONS ABOUT THE PROJECT THAT EACH SOCIAL GROUP HAS** - discussion in groups based on triggering questions (continued)
- 2:45PM - 3:30PM - **PRESENTATION OF GROUP DISCUSSIONS IN PLENARY** - Followed by plenary debate and space for clarification of issues that emerge and that may be presented by IPÊ and Biofílica.
- 3:30 PM - 4:00 PM **- CONSOLIDATION OF DISCUSSIONS, FORWARDING AND NEXT STEPS**

4:00 PM - 4:20 PM - **SNACK**

5.10 Appendix 5: People during the ECOnsulta