



Verified Carbon Standard

REDD+ PROJECT MAGNOLIOS DE YARUMAL



Corporación
SalvaMontes



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1 PROJECT DETAILS

1.1 Summary Description of the Project

The REDD+ Project Magnolios de Yarumal is an initiative developed in the Northern of the Antioquia Department (Colombia) to conserve the native forests of the region and preserve highly endangered flora species, such as magnolia (*Magnolia polyhypsophylla*, *M. guatapensis*, *M. yarumalensis*). REDD+ Magnolios is a grouped project which, in its first stage, includes 125 holdings belonging to 70 owners of peasant farms and three non-profit entities, located mainly in the Regional Integrated Management District (DRMI) called Alto de Ventanas, and three private reserves managed by non-profit entities. The project expansion area¹ (PEA) includes all forested areas in the municipalities of Yarumal, Briceño, Valdivia and Santa Rosa de Osos.

The main drivers of deforestation in the area are cattle ranching and agriculture. Historically, Northern Antioquia has been characterized as one of the regions of the country with the highest production of dairy cattle, with Santa Rosa de Osos being the municipality with the highest national representation in specialized dairy farming. In the absence of this project, the most likely land use scenario would be to continue deforestation by converting forests to pasture to develop agricultural activities.

The aim of the project is to reduce the emission of greenhouse gases (GHG) by implementing five strategic lines, focused on environmental aspects such as the research on biodiversity and the conservation and restoration of forests. Efforts in conservation strategies for endangered species as the magnolia (*Magnolia* spp) and wax palm (*Ceroxylon* spp) are included. The project also pursues to strengthen environmental education in rural communities through recreational activities related to environmental and biodiversity dimensions, for the management of their territory.

This initiative seeks the certification of activities that will allow to reduce 160,478 tCO₂e total, produced by unplanned deforestation during the crediting period. Starting date is February 23, 2016, considering a duration of 20 years, it may be renewed for additional 10 years for a total project crediting period of 30 years. For monitoring, the first verification project of the 2016-2020 (23 February 2016 to 23 October 2020) the net reduction of 15,431 tCO₂e was achieved (Section 6.5).

1.2 Sectoral Scope and Project Type

In general, the project is developed according to the requirements of AFOLU projects (Agriculture, Forestry and Other land use), and it is classified as an Unplanned Deforestation and Degradation Avoided (AUDD) project to Reduce Emissions from Deforestation and Forest Degradation (REDD), as it aims to decrease deforestation and preserve carbon stocks associated with above and below-ground biomass; activities

¹ Expansion area is the territory where the project area can be expanded in future validations.

consistent with REDD+ actions defined by the United Nations Framework Convention on Climate Change (UNFCCC) in paragraph 70 of Decision 1/CP.16.²

In the same way, this REDD+ project is one of the mitigation actions in the Land Use, Change in Land Use, and Forestry (USCUSS) sector that are promoted at national and regional level according to the National Development Plan 2018-2022, the Colombian Low-Carbon Development Strategy (ECDBC), the REDD+ National Strategy (ENREDD+), and the principles and goals of the National Climate Change Policy and the National Forest Policy.

1.3 Project Eligibility

The REDD+ project is eligible under the VCS program because:

- The Project and the implementation of the activities will not lead to any violation of the law, regardless of whether the law is enforced or not.
- The Project activities do not consider hydrological conservation, drainage, or degradation of native ecosystems to generate GHG credits.
- The Project certifies the reduction of net greenhouse gas (GHG) emissions by decreasing unplanned deforestation of forests, activities included in the scope of the VCS Program.
- The Project does not include carbon-footprint evaluations or carbon-neutral statements.
- The Project area meets the definition of forest³ submitted by Colombia before the UNFCCC for the purposes of the REDD+ National Strategy (ENREDD+) and, in particular, for building the proposal of the National Reference Level (NREF)⁴.

According to the requirements of the Standard, it must be proved that the project areas were covered by forests for at least ten (10) years before the project starting date.

For the selection of the eligible area of the project, a supervised classification of medium resolution satellite images (30 m) was carried out. Using satellite images from the 2005-2016 period, the eligible area was classified as stable forest during the mentioned period and as ineligible area, those areas with no stable forest or with gains or losses of forest cover.

² Report on the Conference of the Parties held in Cancun from 29 November to 10 December 2010. The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention. From: <https://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf>

³ For Colombia, the forest is defined as any portion of land where tree-covered areas predominate with a minimum canopy density of 30%, a minimum canopy height (*in situ*) of 5 m at the time of its identification, and a minimum area of 1,0 ha; excluding tree covered areas from commercial forest plantations, palm crops, and trees planted for agro-livestock production. This definition is consistent with the criteria defined by the United Nations Framework Convention on Climate Change (UNFCCC) in its Decision 11/COP.7, with the definition adopted by Colombia before the Kyoto Protocol (MAVDT, 2002), as well as with the definition of natural forest cover included in the adaptation for Colombia of the legend from the CORINE Land Cover methodology (CLC Colombia).

⁴ Proposal for a reference level of forest emissions from deforestation in Colombia for REDD+ payment for results under the UNFCCC, 2019.

The information sources and the cartographic processing carried out to evaluate the eligibility are detailed in the following paragraphs.

Baseline information

For the eligibility analysis during the period 2005-2016 in the project area, multispectral images, Landsat 7 (ETM+ Sensor⁵) and Landsat 8 (OLI and TIRS Sensors⁶), were used for each year evaluated. The images have a spatial resolution ranging from 15 m to 100 m, covering an area of 185 km x 185 km and with a revisit time of the same point on earth of 16 days. These images were provided by the United States Geological Survey (USGS) and can be viewed and downloaded free of charge from the link: <https://earthexplorer.usgs.gov/>. The Landsat 7 and Landsat 8 images, from which the land coverages were obtained, have a spatial resolution of 30 m.

Landsat 7 images from 2005 and 2010 and Landsat 8 images from 2013 and 2016 were downloaded (Table 1).

Table 1. Satellite imagery used for eligibility assessment.

Number	Satellite	Processing level	Path	Row	Date (YYYYMMDD)
1	Landsat 7 (ETM+)	L2	9	55	20050123
2	Landsat 7 (ETM+)	L2	9	55	20050819
3	Landsat 7 (ETM+)	L2	9	55	20060619
4	Landsat 7 (ETM+)	L2	9	55	20060822
5	Landsat 7 (ETM+)	L2	9	55	20060923
6	Landsat 7 (ETM+)	L2	9	55	20100121
7	Landsat 7 (ETM+)	L2	9	55	20100513
8	Landsat 7 (ETM+)	L2	9	55	20100529
9	Landsat 8 (OLI)	L2	9	55	20130716

5 Enhanced Thematic Mapper Plus. From: <https://landsat.gsfc.nasa.gov/satellites/landsat-7/>

6 Operational Land Imager (OLI) and the Thermal Infrared Sensor (TIRS). From: <https://landsat.gsfc.nasa.gov/satellites/landsat-8/>

Number	Satellite	Processing level	Path	Row	Date (YYYYMMDD)
10	Landsat 8 (OLI)	L2	9	55	20140719
11	Landsat 8 (OLI)	L2	9	55	20141226
12	Landsat 8 (OLI)	L2	9	55	20151229
13	Landsat 8 (OLI)	L2	9	55	20160521

Source: South Pole (2020).

Satellite images of medium spectral resolution (30 m) from sensors Landsat 7 (years 2005 and 2010) and Landsat 8 (years 2013 and 2016), in level 2 processing, were employed. The non-data pixels were masked out using other satellite imagery from years 2006, 2014 and 2015, from the same sensors.

Cartographic processing

The supervised remote sensing technique (pixel-based) was used by visual inspection and manual digitization of the land covers for the years 2005, 2010, 2013, and 2016 at a scale of 1:10,000, through the criteria of experts in Geographic Information Systems and Remote Sensing, taking into account the definition of forest for Colombia and areas larger than 1 ha.

Then, the classification accuracy was calculated utilizing a confusion matrix with omission and commission errors that resulted in a percentage of the global accuracy of the classification.

For the calculation of the accuracy, random control points were performed by assigning the cover classes by visual inspection of forest and non-forest. The total number of points for the evaluation was calculated from the total number of polygons in 2016, considering the methodology for finite population calculation proposed by Morrillas (2007). Then, the 2016 Google Earth satellite images were contrasted with the final 2016 forest and non-forest layers of the classifier to generate the confusion matrix.

Finally, the geospatial solutions expert evaluates this information point by point, at a scale of 1:10,000, assigning each point the forest and non-forest class. This is done using the Google Earth image repository, Microsoft Bing, the ESRI map, and the Landsat 8 image classified for the year already mentioned. The above uses the ArcMap 10.8 tool called Confusion Matrix to make comparisons and calculate the overall accuracy of the classification.

Final Layer for Forest - Non Forest

Based on the land covers obtained from the years 2005, 2010, 2013, and 2016, forest and non-forest classes were reclassified according to the country's definition of forest. Table 2 shows the result of the reclassification and the classes obtained from the classified land covers.

Table 2. Reclassification of land cover: forest and non-forest layer.

Number	Land cover	Class reclassification
1	Forest	Forest
2	Non-forest	Non-forest
3	Water	Non-forest
4	Clouds	No information
5	Cloud shadows	No information
6	No information	No information

Source: South Pole (2020).

Eligibility analysis (2005-2016 period)

From the forest and non-forest layers, a cartographic cross-mapping was performed between the years 2005, 2010, 2013, and 2016 to generate the layer of change between land covers and eligibility between the years analyzed. Eligible areas were understood as those that remained stable forests during the 11 years of the analysis and the remaining areas as ineligible. The areas without information corresponded to areas without interpretation in the original images due to sensor failures, cloud cover, and cloud shadows.

Finally, the cover change and eligibility layer were transformed to vector format (.shp), projected to Magna Colombia Bogota flat coordinates (EPSG:3116), and a cartographic cut was made with the Project area.

Results

A total of 4,319 hectares of eligible forest were identified, which corresponded to 100% of the project area in 2016 and 57% of the total area of the properties. (Table 3)

Table 3. Eligibility, period 2005-2016

Category	Total area (ha)	Total area (%)
Eligible	4,319	56.90
Non-eligible	3,274	43.10

Total	7,593	100.00
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Source: South Pole (2020).

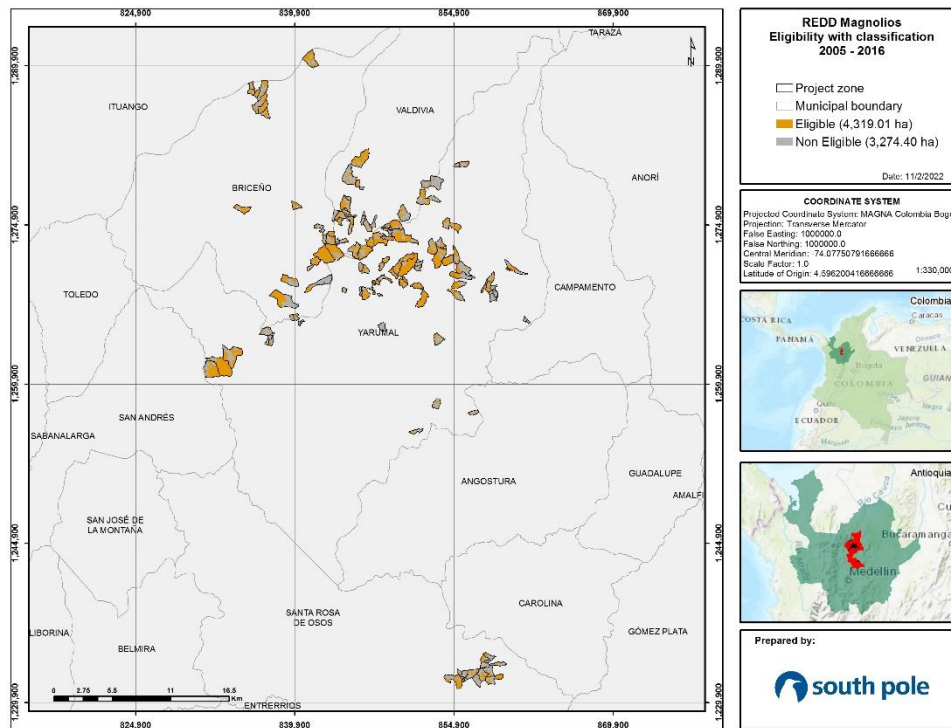


Figure 1. Eligibility map, period 2005 -2016.

Source: South Pole (2022).

1.4 Project Design

The project will employ a programmatic approach (grouped project). The first stage includes the natural reserves of Fundación Magnolios, Corporación Salvamontes, and Fundación Guanacas; and the private owners grouped by Fundación Alto de Ventanas and Fundación Magnolios. The expansion area (PEA) is the northern region of Antioquia, specifically in the jurisdiction of the Yarumal, Briceño, Valdivia, and Santa Rosa de Osos municipalities.⁷ It covers an area of 272,252 ha, and is located between the coordinates 7°26'5,10" N - 6°30'50,36" N and 75°11'46,81" W - 75°41'14,02" W.

Eligibility Criteria

⁷ It should be clarified that the property with real estate registration 037-8055 is recorded in public deed in the Campamento municipality but, according to the municipal limits established by the Geographic Institute Agustín Codazzi (IGAC), the property is located in Yarumal; therefore, as the property is equivalent to less than 1% of the total project area, Campamento is not included in the project expansion area.

The inclusion of new areas will take place in line with future verifications of the first instance. The criteria for they to be eligible are the following ones:

Technical criteria

- Areas located in the project expansion area that correspond to the jurisdiction of Yarumal, Briceño, Valdivia, and Santa Rosa de Osos municipalities.
- Having areas that meet the forest definition adopted by Colombia before the United Nations Framework Convention on Climate Change (UNFCCC), which defines forest as an essentially tree-covered area, with a minimum canopy density of 30%, a minimum canopy height (*in situ*) of 5 m at the moment of its identification and, a minimum area of 1 ha⁸ (MAVDT, 2002).
- Areas where deforestation takes place in an unplanned way produced by activities such as livestock farming, agriculture, or mining.

Methodological criteria

- The eligible area to generate Verified Carbon Units (VCU) is a stable forest for a minimum 10-year period before the project starting date.
- Same baseline scenario defined in Section 3.4.
- Proven the additionality of activities like those described in Section 3.5.
- The starting date of the new instances should be after February 23, 2016, and this must consider both the starting date of the first stage and the maximum retroactivity period allowed by the standard (five years).
- The project activities for the new instances should be in line with any of the five strategic lines defined for the first instance: Strengthening local governance, forest conservation and restoration, promotion environmental education in rural communities, biodiversity research and financial sustainability (See Section 1.11).
- Not to be included in any other project or program related to GHG emission reduction.
- To meet the applicability criteria of the VM0015 methodology⁹.

Administrative criteria

⁸ MAVDT, M. d. (2002). Definición de Bosque para proyectos de uso del suelo, cambio de uso del suelo y silvicultura para el primer período de compromiso. Bogotá D.C., Colombia.

⁹ Methodology for estimating and monitoring greenhouse gas emissions of project activities that avoid unplanned deforestation. Available in: <https://verra.org/wp-content/uploads/2018/03/VM0015-Methodology-for-Avoided-Unplanned-Deforestation-v1.1.pdf>

- The owner of new areas to be included shall prove that he/she owns the right to use the property, either as owner or possessor of the real estate.
- The new areas should be subject to consultation processes with key stakeholders similar to the ones carried out for the first stage, and they must include compliance with the free and informed prior consultation process, and compliance with REDD+ Safeguards for Colombia.¹⁰
- The owner must have available documents and requirements for entering and registering the area in the National Registry for the Reduction of GHG Emissions (RENARE), of Colombia.
- The owner must be able to prove that the properties are not included in the Single Registry of Abandoned Properties and Territories (RUPTA), or in the Registry of Land Usurped and Forcibly Abandoned (RTDAF) of the National Land Agency of Colombia

1.5 Project Proponent

Organization name¹¹	Fundación Magnolios ¹²
Contact person	Christian Dannecker
Title	Legal representative – Chief Executive Officer
Address	Callejón Posada de Posada, Finca Nro. 15 "Los Magnolios", Vereda Yarumal, Rionegro, Antioquia
Telephone	+57 311 787 0924
Email	fundacionmagnolios@gmail.com

Organization name	Corporación Salvamontes ¹³
Contact person	Carlos Mauricio Mazo

¹⁰ Camacho A., Lara I., Guerrero R. D. 2017. Interpretation of Social and Environmental Safeguards for REDD+ in Colombia. MADS, WWF Colombia, ONU REDD+ Colombia. Bogotá-Colombia

¹¹ The certificates of Existence and Representation of the proponents can be found in Soportes/2_Documentos proponentes

¹² Fundación Magnolios is a non-profit entity, whose main goal is to tackle climate change by preserving native forests and regenerating degraded ecosystems, thanks to the acquisition of land, conservation and restoration of forests, propagation of critically endangered species as the magnolia (*Magnolia* spp), as well as the community environmental education.

¹³ Corporación Salvamontes is a non-profit entity, owner of six nature reserves, whose main goal is the conservation, protection, and improvement of the environment, which is devoted to preserve and protect the flora and fauna, to propagate species critically endangered, as the magnolia (*Magnolia* spp), and to strengthen community environmental education. As well as to the development of activities aimed to preserve flora and fauna.

Title	Legal representative – Chief Executive Officer
Address	Calle 17 # 37-33 Apto 1102, Medellín, Antioquia
Telephone	+57 312 676 1663
Email	salvalaselva33@gmail.com
Organization name	Fundación Guanacas ¹⁴
Contact person	José Rodrigo Castaño Díaz
Title	Chief Officer
Address	Calle 5A # 43A-73, Medellín, Antioquia
Telephone	+57 3006084827
Email	fundacionguanacas@gmail.com

Organization name	Fundación Alto de Ventanas ¹⁵
Contact person	Mariano Esteban Taborda
Title	Legal representative – Chief Executive Officer
Address	Calle 20 # 21-67, Yarumal, Antioquia
Telephone	+57 4 8871966 – + 57 313 7088832
Email	marianotaborda582@gmail.com; fundacionaltodeventanas@gmail.com

¹⁴ Fundación Guanacas is a non-profit entity, mainly devoted to the preservation of nature and wildlife in all its manifestations, as well as to the conservation of water, botanical and biodiversity resources in general, in the Guanacas reserve of Santa Rosa de Osos, Antioquia.

¹⁵ Fundación Alto de Ventanas is a non-profit entity, whose main corporate purpose is the conservation and protection of environment, through environmental education, agro-environmental activities and raising awareness towards the recognition, appropriation, enjoyment, preservation, and sustainable use of resources and associated biodiversity. It is the entity that groups many private owners who belong to the project.

1.6 Other Entities Involved in the Project

Organization name	South Pole Carbon Asset Management S.A.S (South Pole)
Role in the project	Advice and guidance in the development of the project, monitoring and accounting of emission reduction. South Pole will also be responsible for marketing the mitigation results verified by the project. South Pole is a globally active project developer and consultant, with a successful track record in forest carbon projects.
Contact person	Claudia Marcela Rivera
Title	Head of Colombian Carbon Projects
Address	Carrera 46 # 7-59, Medellín, Antioquia, Colombia
Telephone	+57 4 520 5000
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1.7 Ownership

1.7.1 Conditions of land tenure and use rights

All the properties making up the initiative have a Tradition and Freedom Certificate, which guarantees that all natural persons and legal entities integrating the initiative are the owners of the properties; and that according to Articles 656 and 669 of the Civil Code of the United States of Colombia (Law 84 of 1873), they are granted rights of use, enjoyment, and disposal of that real estate¹⁶. In this way, it is legally guaranteed that the owners of those properties can receive the benefits from the project. Appendix I includes the information about the 70 owners and 125 properties integrating the REDD+ initiative.

Apart from the Tradition and Freedom Certificate, the private owners who are grouped under the Fundación Alto de Ventanas and the Fundación Magnolios signed a Letter of Intent endorsing these entities as their representatives in the project (Figure 2). In the event that the owner of the property could not directly be involved in the project, because of situations such as the owner living abroad, or being a senior citizen who cannot actively join the project authenticated powers of attorney have been signed through which the owner empowers a family member to represent him/her in the project.¹⁷

¹⁶ In virtue of Article 656 of Law 82 from 1873, the properties or farms or real estate are assets that cannot be transported from one place to another, such as lands and mines; and those ones that adhere permanently to them, such as, buildings, trees. Furthermore, plants are unmovable property by adhesion, because they adhere to the soil through their roots (Art. 657 of the same law).

¹⁷ The Letters of intent and Tradition and Freedom Certificate can be found in Soportes/3_Tenencia de la tierra



Figure 2. Sample of Letter of Intent signed by project participants who were grouped in Alto de Ventanas Foundation.

Source: Fundación Alto de Ventanas (2019).

1.7.2 Agreement with the owners, holders, and occupants of the project area

The three foundations participating in the project and South Pole Carbon Asset Management S.A.S. (South Pole) signed agreements for the purchase of Emission Reductions (ER) generated by the REDD+ project, within each of the properties that they manage. These instruments lay down the general terms and conditions that apply to the development of the project (from its feasibility to its verification) and to the subsequent purchase of the ER that was agreed upon by the parties. The agreements also specify the activities that shall be performed by each of the parties, regarding the formulation and implementation of the project during the crediting period, and the subsequent responsibilities related to the purchase and sale of the verified emission reduction (VER).

1.8 Project Start Date

The starting date of the emission-reduction project is February 23, 2016, which corresponds to the hiring date of forest rangers in the Fundación Guanacas to carry out —among others— control and surveillance tasks, the creation of nurseries, propagation of plant material, and caring for the facilities.¹⁸

This date was chosen taking into account that according to Resolution 1447 of 2018 —which regulates the Monitoring, Report and Verification System (MRV) of nationwide mitigation actions in Colombia and establishes the mechanism for the National Registry for the Reduction of GHG Emissions (RENARE)— the mitigation actions that are valid for less than five years can only be reported in the country for national accounting purposes, as of January 1, 2020.

¹⁸ Forest rangers' contracts are available in Soportes/1_Actividades de proyecto/Línea 1_Fortalecimiento de gobernanza local

1.9 Project Crediting Period

The credit period began on February 23, 2016 and runs until February 22, 2036. However, this period may be renewed for an additional 10 years for a total term of 30 years.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	X
Large project	

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
2016	3,293
2017	3,917
2018	4,698
2019	4,165
2020	4,638
2021	4,082
2022	3,836
2023	3,866
2024	4,410
2025	4,196
Total estimated ERs for 10 years	41,100
Average annual ERs for 10 years	4,110

1.11 Description of the Project Activity

The project is not located within a jurisdiction covered by a jurisdictional REDD+ program, it seeks to reduce GHG emissions through the implementation of five strategic lines of action focused on environmental aspects such as biodiversity research and forest conservation and restoration; activities that not only contribute to GHG reduction, but also have positive impacts on biodiversity. Some of the project proponents' efforts are focused on conservation strategies for endangered species, such as magnolias (*Magnolia* spp), wax palm (*Ceroxylon* spp), and some species of felines (cougar and ocelot). The project also seeks to promote environmental education in rural communities for the management of their territory through recreational activities related to environmental and biodiversity issues, and also seeks long-term financial sustainability for the proponents.

The REDD+ project has implemented the activities gradually following a technically oriented strategic plan that is subdivided into the five strategic lines mentioned above, which bring together transcendence and synergy between the project proponents and the associated community actors that have worked participatively for the conservation, restoration and appropriation of the high Andean forests in the region.

The strategic plan of the REDD+ project is framed within the mission objectives of the foundations, which are found in their statutes, articles of incorporation, management plans and strategic plans, where they present advances in the design and development of projects and activities aimed at the restoration, conservation and protection of forests, their financial sustainability and the strengthening of capacities at the local level with respect to environmental issues.

The scope of the strategic lines will provide the actors involved with a flow of income to improve the infrastructure for the provision of ecotourism services, expand the group of forest rangers, increase the capacity of the nurseries and establish research centers for the development of in-situ and participatory research with rural communities.

For the construction of the scopes per project activity, the Theory of Change approach was used to explain how the activities will achieve the benefits expected by the initiative. In the Theory of Change analysis for the project activities, the current situation of each activity (in terms of activities or initiatives already implemented in the project area) was determined with the help of the proponents and the objectives to be achieved in the short (10 years), medium (10 - 20 years) and long term (30 years) were identified with them. In this way, goals by activities and the relevance of these goals to achieve the achievements of the strategic lines and finally the general objective of the REDD+ project were outlined.

The Theory of Change assessment made use of a combination of information and processes, as follows:

- Needs assessment in the project area according to the proponents' past experiences in working in the territory;
- Management plans, strategic plans, long-term objectives of each organization and lessons learned from previous experiences implemented.

Once agreement was reached on the current situation and the goals that the project proposed to generate for each activity, an evaluation of the expected impacts of each intervention was carried out, in order to examine not only the goals and objectives, but also the impacts, and to generate indicators that allow their monitoring during the project's accreditation period.

The results of the Theory of Change analysis are presented in an impact pathway (Figure 3 y Figure 4) which represents the logical sequence to obtain the expected impact and contains the following elements:

- **Strategy:** is a set of one or more activities with a common focus that work together to achieve specific goals and objectives, focusing on key intervention points, integrating opportunities and setting constraints (Conservation Measures Partnership, 2020)¹⁹.
- **Activity:** a specific action or set of tasks undertaken to achieve one or more objectives (Conservation Measures Partnership, 2020)²⁰.
- **Outcomes:** outputs that are expected to be achieved in the short term. They are characterized by being concrete, measurable and comparable (FMAM, 2011)²¹.
- **Drivers:** these are important factors that would contribute to the final achievement of the desired impacts, and whose presence could be influenced by the project (FMAM, 2011)²².
- **Assumptions:** these are important factors that would contribute to the ultimate achievement of the desired impacts, but inducing their presence is beyond the scope of the project (FMAM, 2011)²³.
- **Medium-term outcomes:** these are the conditions to be achieved in the transition between the direct effects of the project and the expected impacts (FMAM, 2011)²⁴.
- **Long-term outcomes** are the desired conditions of a project (FMAM, 2011)²⁵.
- **Impact:** the desired future state (Conservation Measures Partnership, 2020).²⁶

It is important to mention that, although the Theory of Change was developed *ex ante* (also considering some activities already implemented in the project area since 2016), the targets will be revised after the

19 Conservation Measures Partnership, *Open Standards for the Practice Conservation* <<https://conservationstandards.org/wp-content/uploads/sites/3/2020/10/CMP-Open-Standards-for-the-Practice-of-Conservation-v4.0.pdf>>.

20 Conservation Measures Partnership.

21 F.M.A.M., Estudio de La Cartera de Proyectos Del FMAM En El Salvador (1994-2010).

22 F.M.A.M.

23 F.M.A.M.

24 F.M.A.M.

25 F.M.A.M.

26 Conservation Measures Partnership.

first verification, as more data is available on the financial resources that can be managed with the commercialization of carbon credits.

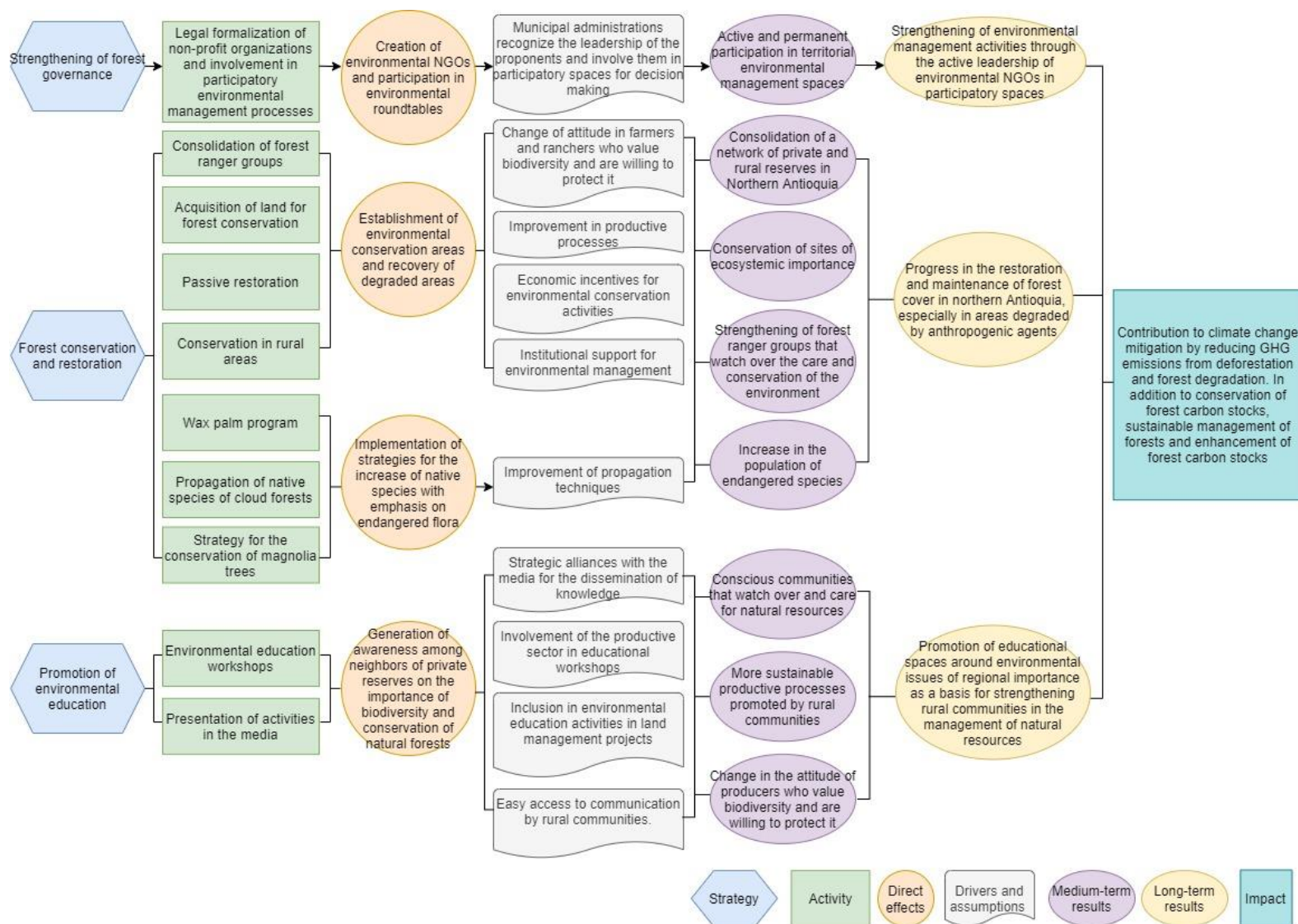


Figure 3. Theory of change outline for the REDD+ Project Magnolios de Yarumal. Part 1

Source: South Pole (2021).

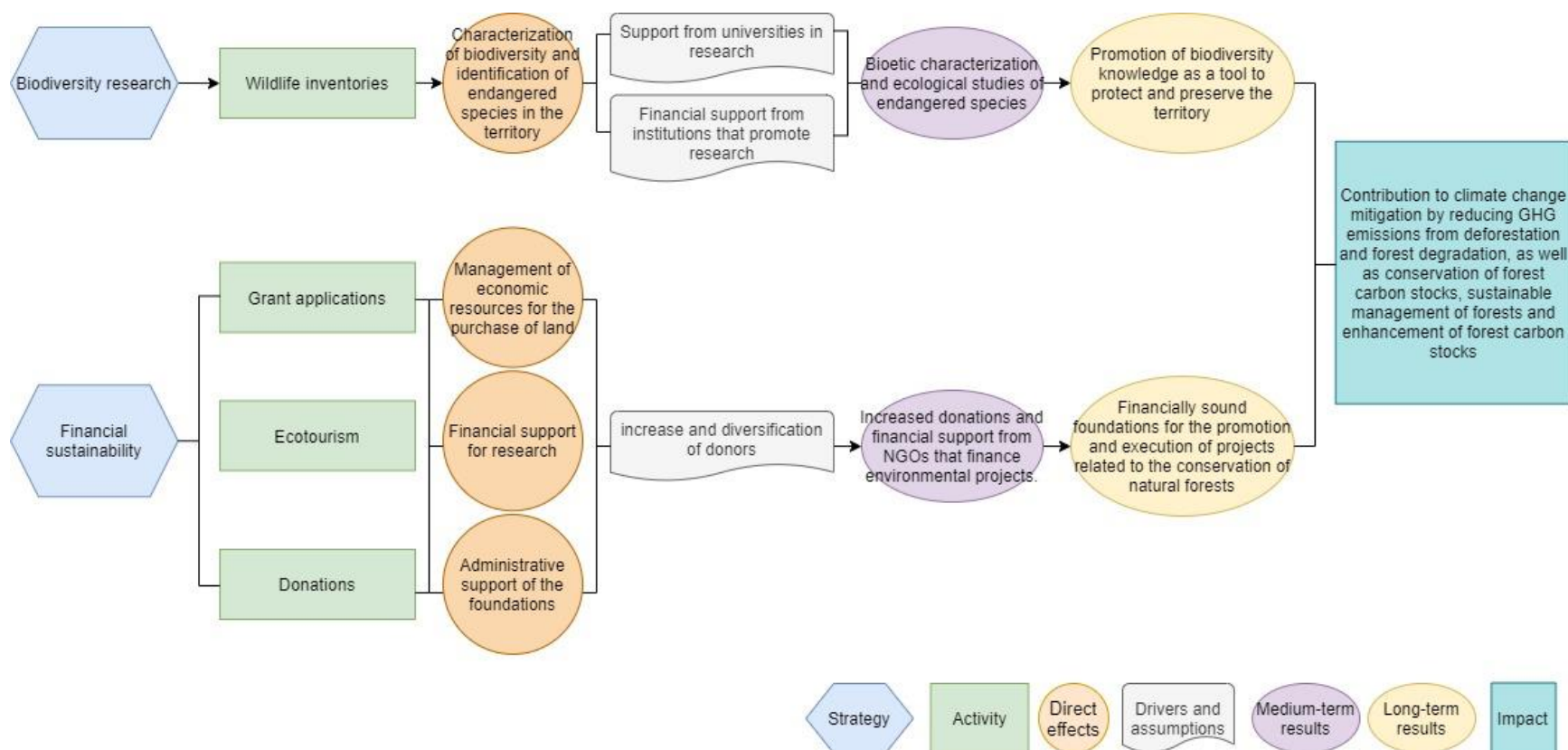


Figure 4. Theory of change outline for the REDD+ Project Magnolios de Yarumal. Part 2

Source: South Pole (2021).

The strategic lines of the project are described below:

1.11.1 Strategic line 1: Strengthening local governance

This line focuses on the legal consolidation of non-profit entities, where individuals who altruistically carried out activities for forest conservation and are concerned about the pressure generated by the advancement of the agricultural frontier in the Northern region of Antioquia, decided to group together and legally formalize Non-Governmental Organizations (NGOs) to maximize efforts in mobilizing financial resources to ensure the permanence of their local conservation initiatives.

The objective of this strategic line is to strengthen environmental management activities through the creation of non-profit entities that manage financial resources for the implementation of forest conservation and restoration activities and the recovery of endangered species.

The activities carried out are described below:

- **Legal formalization of non-profit entities and involvement in participatory environmental management processes:** the first entity to be legally constituted was Fundación Guanacas in 2007, with the social purpose of promoting and encouraging activities aimed at the care, preservation and restoration of high Andean ecosystems. These activities are carried out within a protected area, which is in a continuous process of expansion. The promoter of this Foundation is Rodrigo Castaño, who in 1990 acquired a first property of 120 hectares in the foothills of Cerro San José in the municipality of Santa Rosa de Osos, action that began to decant some conservation objectives, to which gradually new properties were integrated, consolidating not only the biological territory, but also a very strong initiative that led to the creation of the Fundación Guanacas.

On the other hand, Mauricio Mazo, a professional technician in natural resource management who participated during 2004 and 2014 in research projects on magnolias, where he contributed with the registration of new individuals of these species for the northern region of Antioquia, decided to convene in 2015 to environmental professionals and nature lovers for the creation of a conservation initiative in a region with high diversity and endemism, habitat of threatened species such as *Magnolia polyhypsophylla*. Thus, in 2016 a group of 22 people led by Mauricio Mazo created Corporación Salvamontes and acquired the first property located in the municipality of Valdivia.



Figure 5. Convening meeting for the creation of Corporación Salvamontes.

Source: Corporación Salvamontes (2015).



Figure 6. Assembly of incorporation of Corporación Salvamontes.

Source: Corporación Salvamontes (2016).

At the end of 2016, Christian Dannecker, pioneer and leader in conservation and climate protection projects, who together with three environmental professionals, founded Fundación Magnolios with the social purpose of developing activities related to research and support for projects associated with biodiversity conservation and mitigation of change. Fundación Magnolios and Corporación Salvamontes share a property and work together on some projects.

Fundación Alto de Ventanas, was created in 2019 by a group of farmers from the Northern of Antioquia, with the purpose of joining efforts for the development of projects related to the care and protection of the environment, sustainable use of natural resources, environmental education and ecotourism.

Currently, these foundations are an environmental reference in the region and actively participate in environmental working groups in their municipalities. In the case of Fundación Guanacas and Corporación Salvamontes, they are members of the Río Grande and Río Chico watershed councils.

1.11.2 Strategic Line 2: Forest Conservation and Restoration

Conservation and restoration actions include the management and care of the forests in the reserves and private properties of the proponents. This line of action aims to advance in the recovery and maintenance of forest cover in Northern Antioquia, especially in areas degraded by natural or anthropogenic agents, as a measure to mitigate and adapt to climate change. Activities in this line include:

- **Consolidation of forest ranger groups:** creation of families and forest ranger groups in the reserves to carry out control and surveillance activities, propagation of plant material, planting, maintenance, and support in educational activities with the community. This project activity began in 2016, with the hiring of the Fundación Guanacas ranger group.



Figure 7. Group of rangers and technical team of Fundación Guanacas (left) and the Magnolios Reserve ranger family (right).

Source: Fundación Guanacas and Fundación Magnolios (2018).

- **Acquisition of land for forest conservation:** the purchase of land was carried out largely thanks to the management of non-profit entities in their private reserves. These lands were acquired to ensure the protection and conservation of forests by the proponents mainly as an altruistic work and the need to take care of water sources.



Figure 8. El Reposo Reserve - Property of Fundación Magnolios and Corporación Salvamontes (left) and Guanacas Reserve (right).

Source: Fundación Magnolios and Fundación Guanacas (2019).

- **Strategy for the conservation of magnolias (*Magnoliaceae*):** this activity was led by Corporación Salvamontes and Fundación Magnolios who, since 2016, have designed mechanisms for the protection and monitoring of magnolia fruits (*Magnolia polyhypsophylla*, *M. guatapensis*, *M. yarumalensis*), through the development of an innovative technique that protects the fruits and seeds from rodents and birds and, thus, guarantees the harvest of viable seeds for their subsequent germination and reintroduction to the ecosystem.



Figure 9. Magnolia seed collection.

Source: Corporación Salvamontes (2018).

- **Program to increase wax palm (*Ceroxylon spp*) populations:** this activity was led by Fundación Guanacas who, in 2017, created the wax palm voucher. This voucher consists of a certificate that corresponds with a propagated and reintroduced palm. Each certificate indicates the location of the wax palm that is planted on the reserve's land. For each palm, Fundación Guanacas guarantees the maintenance and care necessary for the palm to survive in the long term. The Foundation is responsible for collecting the seeds of three species of wax palm: *Ceroxylon quindiuense*, *C. vogelianum* and *C. parvifrons*, germinating them and reintroducing them into the ecosystem.



Figure 10. Wax palm seed collection and germination process

Source: Fundación Guanacas (2019).

Propagation of native cloud forest species: starting in 2016, the reserves initiated the establishment of nurseries for the propagation of native cloud forest tree species. These species include, among others, oak (*Quercus humboldtii*), spurge (*Myrsine coriacea*), fence olive (*Morella pubescens*), laurel (*Aniba spp*) and seven hides (*Tibouchina lepidota*). A method for propagation from spores of tree ferns (*Cyathea spp*) was also developed. The propagated material is used in forest enrichment activities.



Figure 11. Propagation of native species in the Guanacas reserve

Source: Fundación Guanacas (2018).

- **Passive restoration:** development of passive ecological restoration processes on land degraded by agriculture and cattle ranching. Where land is fenced to prevent the passage of livestock, forest rangers carry out control and surveillance tasks and there are also signs that invite people to take care of nature.



Figure 12. Passive restoration process in the Fundación Guanacas' properties

Source: Fundación Guanacas (2018).

- **Conservation on rural properties:** private landowners, concerned about environmental problems in their territory, decide to establish a commitment to conserve the forest relicts on their properties.



Figure 13. Forest conservation in properties linked to Fundación Alto de Ventanas.

Source: Mauricio Mazo (2019).

1.11.3 Strategic line 3: Promotion environmental education in rural communities

Environmental education seeks to promote educational spaces around environmental issues of regional importance as a basis for greater participation of rural communities in the management of natural resources. The following activities have been developed within the framework of this line:

- **Environmental education workshops:** these are educational spaces led by the proponent entities where topics such as the human-feline conflict, biodiversity, water, among others, have been addressed. As a result, programs such as: felines in the fog, flora and fauna sanctuaries of Fundación Guanacas, and "educational carousels" have been established. These programs have been promoted together with rural educational institutions in the area of influence of the reserves of Corporación Salvamontes.



Figure 14. Environmental awareness workshop of Corporación Salvamontes (left). Educational activity with students from I.E. Marco Tobón Mejía and environmental police (center). Workshop at a school in the village of Corcovado- Yarumal (right).

Source: Corporación Salvamontes, Fundación Guanacas and Fundación Magnolios (2018).

- **Presentation of activities in the media:** participation of proponents in local, regional and national media, such as the Capsos and Caracol channels and digital platforms such as podcasts; to present the actions carried out in favor of environmental conservation and educate the community on conservation and care of forests.

1.11.4 Strategic Line 4: Biodiversity research

The objective of this line is to encourage knowledge of biodiversity as a tool for the conservation and protection of the territory. For this, the proponents have conducted studies with university students and researchers, where they have made inventories of fauna and flora that have been valuable to know the biotic diversity in the region and have even discovered new species of orchids such as: *Lepanthes cissyana*, *L. dougdarlingii*, *L. sabinadaleyana*.

1.11.5 Strategic Line 5: Financial Sustainability

The objective of this line is to ensure that in the long term the foundations have the economic resources to continue carrying out conservation activities. The following activities have been developed within the framework of this line:

- **Grant applications:** Foundations are actively formulating proposals to international organizations that support conservation initiatives, where they seek financial support for research development, payment of rangers, and the purchase of land and equipment.
- **Donations:** The foundations through their social networks and web pages promote donations from natural and legal persons for support in their operation and other activities such as tree planting. Table 4 shows the donation campaigns of the foundations that are proponents of the REDD+ project.

Table 4. Donation campaigns led by the foundations.

Proponent	Donation initiative	Access link
Fundación Guanacas	Through their website they promote donations for the following projects: • Wax palm voucher: initiative through which donors contribute COP 150,000 (USD 40) for the planting of a wax palm (<i>Ceroxylon spp</i>) for a long term in the Guanacas reserve. • Felinos en la niebla program: initiative through which donors contribute COP 75,000 (USD 20) for the planting of a tree in places that seek to reestablish connectivity between forest fragments habitat of the three felines registered in the reserves. In return, people receive a certificate with the information of the contribution.	https://www.fundacionguanacas.org/juntos-cambiamos-el-mundo

Proponent	Donation initiative	Access link
	• Adopt a Mountain Sparrow - Paisa: initiative through which donors contribute COP 35,000 (USD 10), for the development of activities that promote the conservation of the <i>Atlapetes blancae</i> bird, an endemic species in critical danger of extinction, registered in the Guanacas reserve. • Adopt a hectare of biodiversity: initiative through which donors contribute COP 35,000 (USD 10) that contributes to the purchase of land with high biodiversity at risk of deforestation. • Support the forest ranger families: initiative through which donors contribute COP 35,000 (USD 10) to support the payment of salaries and training for the forest ranger family. • Voluntary contributions	
Fundación Magnolios	Promotes donations for the following programs: • Protecting forests, supporting a healthy climate: with this initiative the Fundación Magnolios protects diverse forests and fights climate change by purchasing and conserving land at risk of deforestation. In addition, as agriculture is one of the main drivers of deforestation, it works with rural communities on good agricultural practices and restoring previously degraded areas. • Donate to the Land Fund: through this fund the Fundación Magnolios seeks to raise money to buy land that will help combat climate change, protect endangered species, and ensure uniquely rich forests for generations to come.	https://fundacionmagnolios.org/donate/
	• Restoring the Magnolios Reserve: With this initiative, donors provide financial resources for the planting of trees in highly degraded and eroded areas.	https://www1.plant-for-the-planet.org/
Corporación Salvamontes	In partnership with the Orchid Conservation Alliance they receive donations to support the initiatives.	https://www.salvamontes.org/

Source: Proponents Magnolios REDD+.

- **Ecotourism:** visits by small groups and researchers exploring the biodiversity of the reserves. The foundations are currently formulating projects to promote these activities. Corporación

Salvamontes will establish two lines, one for community tourism with neighboring farms in the reserves and the other for sustainable tourism aimed at nature lovers. Fundación Guanacas is working on the planning of a lookout point, the adaptation of trails, and the construction of cabins to consolidate ecotourism as a long-term financially sustainable activity.

1.12 Project Location

The REDD+ project is in the Northern region of the Antioquia Department, most of the holdings are in the Yarumal and Briceño (75%) municipalities and, in a small proportion, in Valdivia and Santa Rosa de Osos (25%) (Table 5). The project zone is located between the coordinates 7° 13'46.09" - 6° 41'6.56" N and 75° 19'32.94" W - 75° 36'14.26" W, covering an area of 7,593 hectares.

Table 5. Proportion of the project zone within the municipalities of the project expansion area.

Municipality	Area	
	Hectares	%
Yarumal	4,076	53.68
Briceño	1,709	22.51
Valdivia	1,103	14.53
Santa Rosa de Osos	706	9.30
Total	7,593	100.00

Source: South Pole (2020).

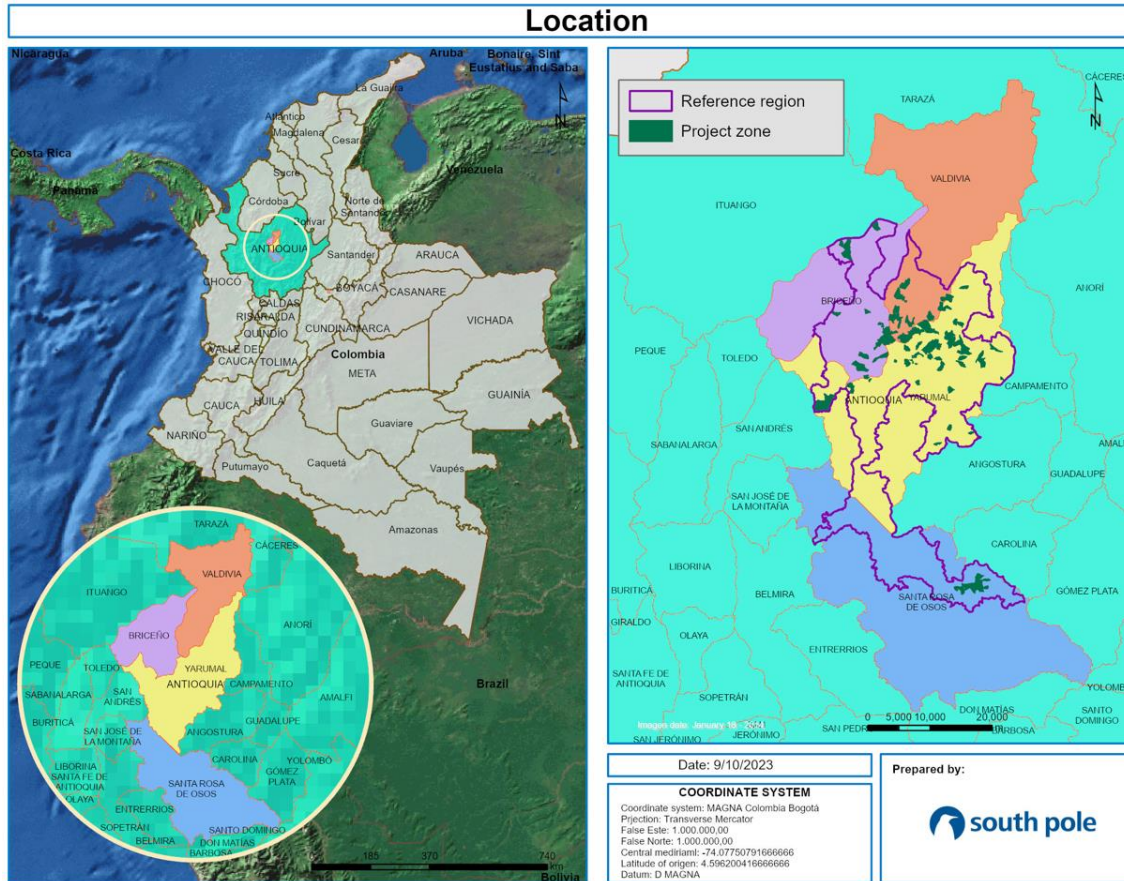


Figure 15 shows a map pinpointing the location of the project and the reference region.

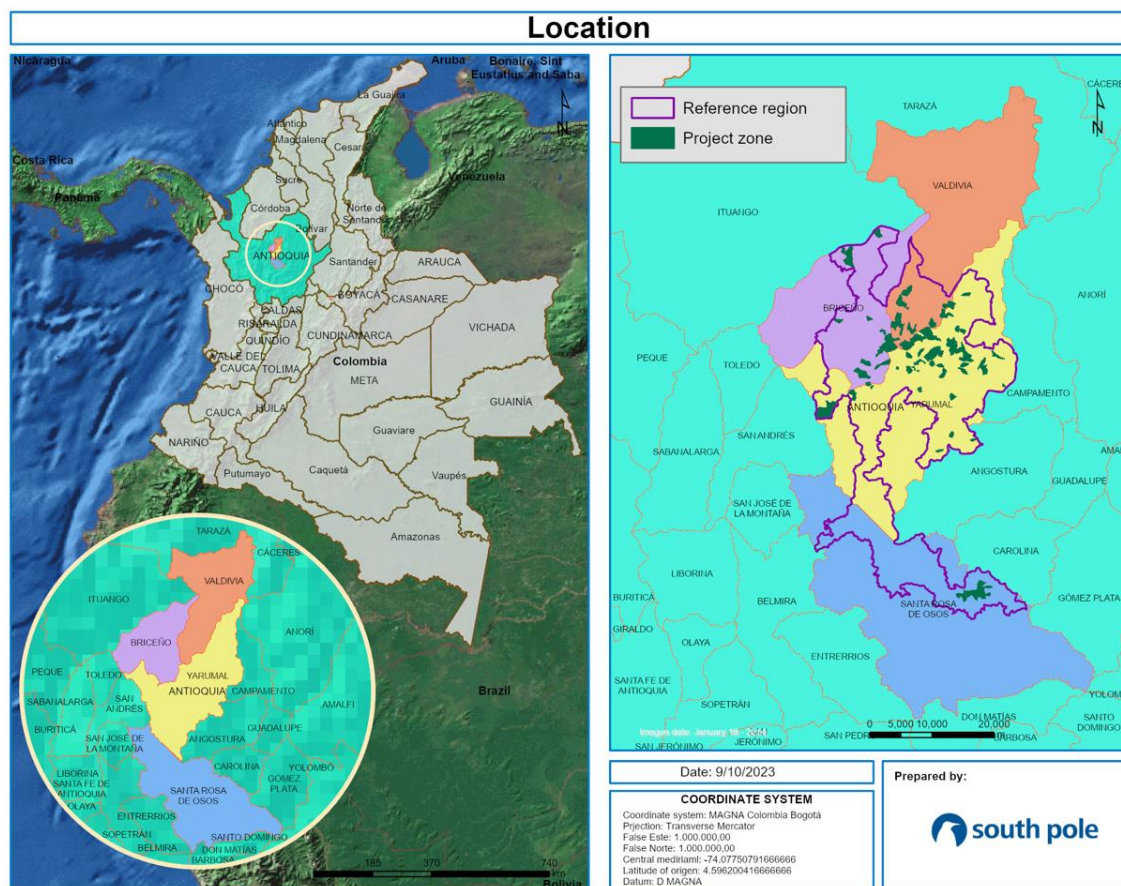


Figure 15. Project location map. (Project zone makes reference to the boundary of the properties participating in the project)

Source: South Pole (2020).

1.13 Prior to Project Initiation

The REDD+ project is being developed in a region where deforestation has historically occurred mainly due to cattle ranching. The most likely scenario, in the absence of this project, would be the continuation of deforestation due to the conversion of forests into pastures for dairy cattle ranching. Within the alternative land use scenarios, cattle ranching and agriculture are activities that by tradition and in spite of the barriers to their implementation (lack of access to credit, technological barriers, transportation difficulties and high production costs, ecological restrictions, armed conflict, lack of associativity, etc.), rural inhabitants prefer to continue implementing these practices instead of changing to a new one.

The climatic characteristics, coupled with well-drained soils with low fertility and medium erosion, favor cattle production in the northern region of Antioquia. This activity continues to be boosted by the ease of access for the extraction of its products and the climatic richness that allows the production of good quality food, milk and meat.

The following is a description of the environmental and social preconditions in the municipalities of the project's expansion zone, including biophysical, biotic and social aspects.

1.13.1 Environmental conditions

Climate

The annual average temperature in the project expansion area is 14 °C. Figure 16 shows the monthly-average track record of temperatures in the jurisdictions of two municipalities within the project expansion area. As to rainfall, annual averages fluctuate between 2,000 and 4,425 mm/year, with a multi-year average of 2,866 mm/year. Throughout the year, the area has a noticeable rainy season from April to November, and a dry season from December to March (Figure 17).

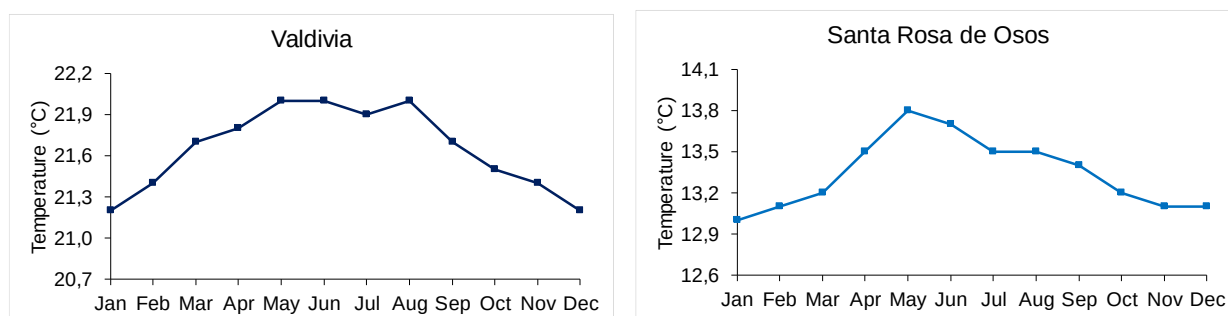
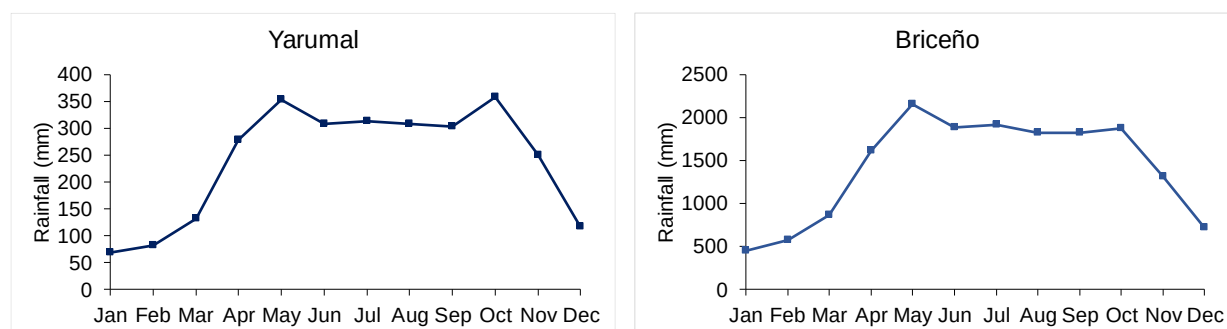


Figure 16 Monthly average temperatures in two municipalities of the project expansion region.

Source: prepared with data provided by the Hydrology, Meteorology, and Environmental Studies Institute (IDEAM), on the Open Data Platform of Colombia.²⁷



²⁷ Open Data from Colombia. Rainfall averages and mean temperature. Average for the period 1981-2010. Available at: <https://www.datos.gov.co/Ambiente-y-Desarrollo-Sostenible/Promedios-Precipitaci-n-y-Temperatura-media-Promed/nsxu-h2dh>. Accessed on December 12, 2019; Valdivia Station 26255030; Santa Rosa de Osos Station 2701055. No historical temperature information was found for the Yarumal and Briceño municipalities.

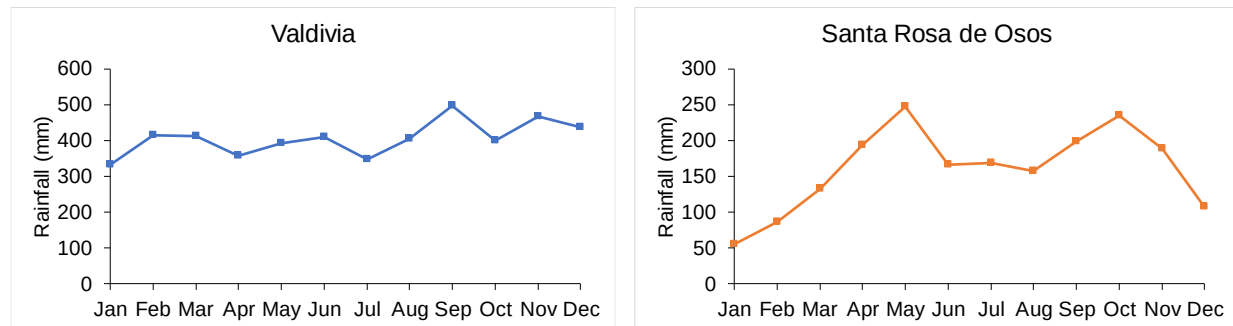


Figure 17. Monthly average rainfall in the municipalities of the project expansion region.

Source: prepared with data from the Hydrology, Meteorology, and Environmental Studies Institute (IDEAM) (2019).²⁸

Geology and geomorphology

According to the General Study of Soils and Land Zoning in Antioquia,²⁹ in the expansion area of the REDD+ project, the formation of Antioquian batholith (Ksta) predominates with 42.2%, mainly located towards the municipalities of Yarumal and Santa Rosa de Osos, followed by intercalated schists (Pz (es+ev) that occupy 23.9%, concentrated towards Yarumal and Briceño; and the Puqui meta-tonalite (Pempt), that represents 10.0% and is part of the Valdivia and Briceño municipalities. Other formations that are distributed throughout the expansion area, such as actinolitic and chloritic schists, quartz-sericitic schists; micaceous gneiss from Puquí, Yarumal stock, and amphibolites add up to 20.7%. Each of the remaining formations represent less than 1% of the territory.

The predominant formations in the Northern area, between the municipalities of Valdivia and Briceño are the graphitic, cuarzoscovitic, chloritic, and amphibolic schists, phyllites, quartzites, marbles and serpentinites (T-Mbg3); whereas, in the South, granodiorites, tonalites, and quarzodiorites predominate (K2-Pi) (Servicio geológico Colombiano, 2015) ³⁰. The project expansion area of the Antioquian batholith rocks is concentrated on the geostructure of the Cordillera Central (central mountain range), made up of two large units: the Altiplano (high plateau) (9%) and the Cauca-Nechí erosive front (91 %).

²⁸ Open Data from Colombia. Available at: <https://www.datos.gov.co/Ambiente-y-Desarrollo-Sostenible/Promedios-Precipitaci-n-y-Temperatura-media-Promed/nsxu-h2dh>. Accessed on December 12, 2019; Valdivia Station 26255030; Yarumal Station 27020190; Briceño Station 20199050100162-1; Santa Rosa de Osos Station 2701055.

²⁹ Geographic Institute Agustín Codazzi. (2007). General Study of soils and land zoning, Antioquia department. Bogotá.

³⁰ Servicio geológico Colombiano, 'Mapa Geológico de Colombia. Escala 1:100.000', 2015.

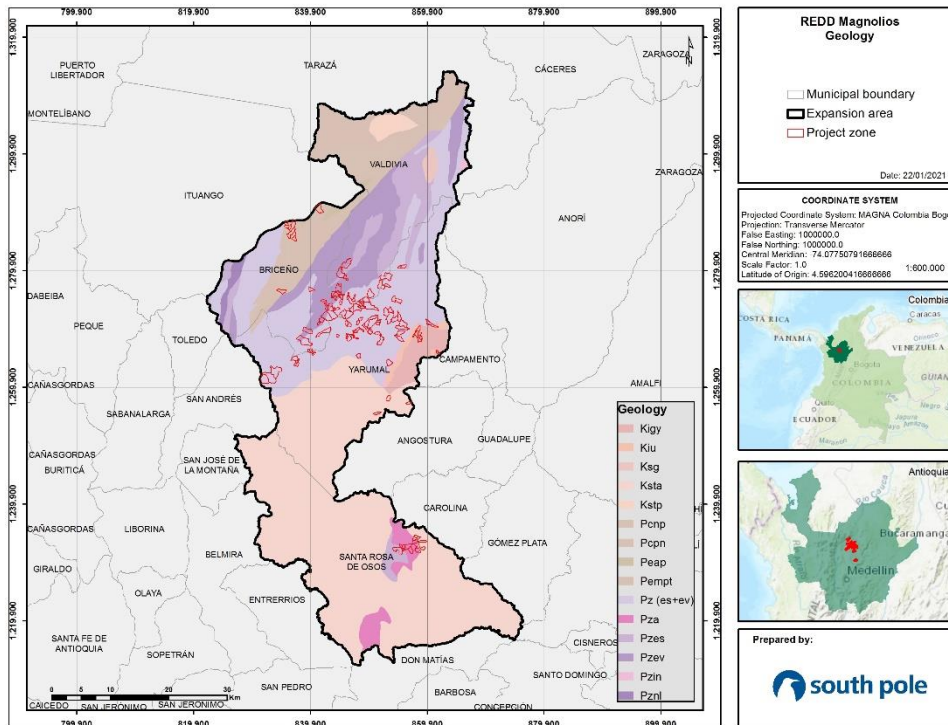


Figure 18. Geology map in the project expansion area.

Source: South Pole (2020) based on (IGAC, 2007).

The geomorphology in the Northern Altiplano of Antioquia is gentle to undulating with hills predominating, watersheds with a medium slope and long-flank hills with slopes around 12% (Cano & Fernando, 1966)³¹, and erosion and dendritic drainage patterns that promote erosive processes; whereas, in the Cauca-Nechí Erosive Front irregular watersheds of medium length predominate (Ecosistemas ESP S.A.S, 2016)³². The activity of the Romeral and Espíritu Santo faults, that cross the Yarumal and Toledo municipalities, have influenced on the geomorphological processes of the area (Secretaría de planeación del municipio de Yarumal, 1999) ³³.

Soils

The soils in the Antioquia Department are characterized by being located on warm, temperate, cold, and very cold thermal floorings, with humidity conditions from dry to very humid. The Antioquia Department has eight types of landscape, among which is the alluvial plain, foothills, low hills, high plateau, and

31 M. Cano, F. Fernández, and N. Santa, *Estudio General Del Sector Yarumal-Caucasia*, ed. by Instituto Geográfico Agustín Codazzi (Bogotá, 1966).

32 Ecosistemas ESP S.A.S, 'Estudio Técnico Jurídico Para La Declaratoria de Una Área Protegida En La Región Del Alto de Ventanas', 2016.

33 Secretaría de planeación del municipio de Yarumal, Plan Básico de Ordenamiento Territorial (Yarumal, 1999).

mountains which, in turn, are formed by reliefs and land forms that are closely related to the original lithology and/or sediments, degree of alteration, slope, and climate. The topography of the Antioquian region is very rough, as it is crossed by the Central and Occidental Mountain Ranges of the Andes, that separate the valleys of Cauca and Magdalena rivers. The geographical units in which the Department soils have specialized are consociations, associations, and complexes (IDEAM, 2007)³⁴.

The expansion area of the REDD+ project is characterized by well-drained soils, low fertility, and medium erosion. They are divided into 15 geographical units (IDEAM, 2007)³⁵ (Figure 19). The Zulaibar Association, is the unit with the greatest influence in the project expansion area, with 38.23%; followed by the Ituango Association (27.06%), Raudal Association (9.14%), Ventanas Consociation (7.62%), El Cinco Association (5.17%), and Yarumal Association (4.42%), the remaining associations are represented by less than 2% of the territory. The geographical units integrating the expansion area are described as follows:

- **Zulaibar Association (ZL):** derived from igneous rocks (granites, quartzodiorites, and granodiorites), and the presence of volcanic ash in some areas. These are deep, well-drained soils, textures ranging from lime to sandy type and loamy soils, low fertility, and light to severe erosion.
- **Ituango Association (IT):** mountain soils composed of metamorphic rocks (schists), well-drained soils, with fine to medium texture, low erosion, and fertility, with a slight reaction to a strongly acidic one.
- **Raudal Association:** mountain with rows and beams and hot-humid climate. Deep and shallow, well-drained soils, fine to medium textures, light and moderate erosion, low fertility, very strongly acidic reaction.
- **Ventanas Consociation (VC):** soils developed from metamorphic rocks (schists of different type), with gneiss intrusion; they are deep and shallow, limited by compact rock. They are well-drained (in some areas excessively), from moderately coarse to fine textures and from low to low fertility.
- **El Cinco Association:** mountain with rows and beams and from hot-humid to very humid climate. Deep and shallow, well-drained soils, fine to moderately coarse textures, light to moderate erosion, from low to moderate fertility.
- **Yarumal Association:** Mountain with rows and beams and from temperate humid to very humid climate. Deep, well-drained soils, medium and fine textures, light and moderate erosion, low fertility, from very strong to strongly acidic reaction.

³⁴ IDEAM, 'Estudio General de Suelos y Zonificación de Tierras Departamento de Antioquia'.

³⁵ IDEAM, 'Estudio General de Suelos y Zonificación de Tierras Departamento de Antioquia'.

- **La Pulgarina Association:** high plateau with small valleys and cold-humid and very humid-cold climate. Moderately deep soils, imperfect to moderate natural drainage, medium to moderately coarse textures, from very strong to strongly acidic reaction, low fertility.
- **Guadua Association:** high plateau with hillocks and hills; and cold-humid and very humid-cold climate. Deep to moderately deep, well-drained soils; medium textures, from strong to moderately acidic reaction, low fertility, from light to moderate erosion.
- **Amagá Association (AN):** soils developed from mafic plutonic igneous rocks of gabbro type, they are well drained, from deep to moderately deep; from moderately coarse to fine textures, and from low to moderate fertility.
- **Remedios Association:** Low hills with hillocks and mounds, and from hot-humid to very humid climate. Shallow and deep, limited by rock, well-drained soils; fine textures, from very strong to strongly acidic reaction, low fertility.
- **Aldana Association (AL):** soils developed from volcanic ashes deposited on different type of rocks, from heterogeneous and heterometric colluviums and alluviums; they are medium to fine textures, the natural drainage is good, slight to moderate erosion is observed produced by diffuse runoff, furrows, and small mass movements. There are occasional deposits of new materials, either by gravity or from water; and stones of different sizes can be found on the surface.
- **Zaragoza Association:** mountain with rows and beams, and from hot-humid to very humid climate. Deep and moderately deep, well-drained soils; fine and moderately fine textures sometimes with rock fragments, from extreme to strongly acidic reaction, high aluminum saturation, low fertility.
- **Margarita Association:** Low hills with hillocks and mounds, and hot-humid climate. Deep, well-drained soils developed from sedimentary rocks located in areas with slopes below 12°.
- **Yali Association:** mountain with colluvial glacis and colluvia from earth moving, and hot-humid climate. Deep, well-drained soils; moderately fine and fine textures in some horizons, from very strong to strongly acidic reaction, high content and saturation of aluminum, from low to very low fertility.
- **Poblanco Association (PO):** Soils have developed from heterometric deposits with mixed colluvial and colluvium-alluvial materials; they are deep to moderately deep, limited by the presence of rock fragments, including fine gravel, rubble, and stones in the profile; well-drained with natural drainage, from fine to moderately coarse textures; some soils have high aluminum saturation, causing toxicity to most plants. The soils of this unit present from very low up to very high pedogenetic evolution, with structure especially in the upper horizons, and from very low to high fertility.

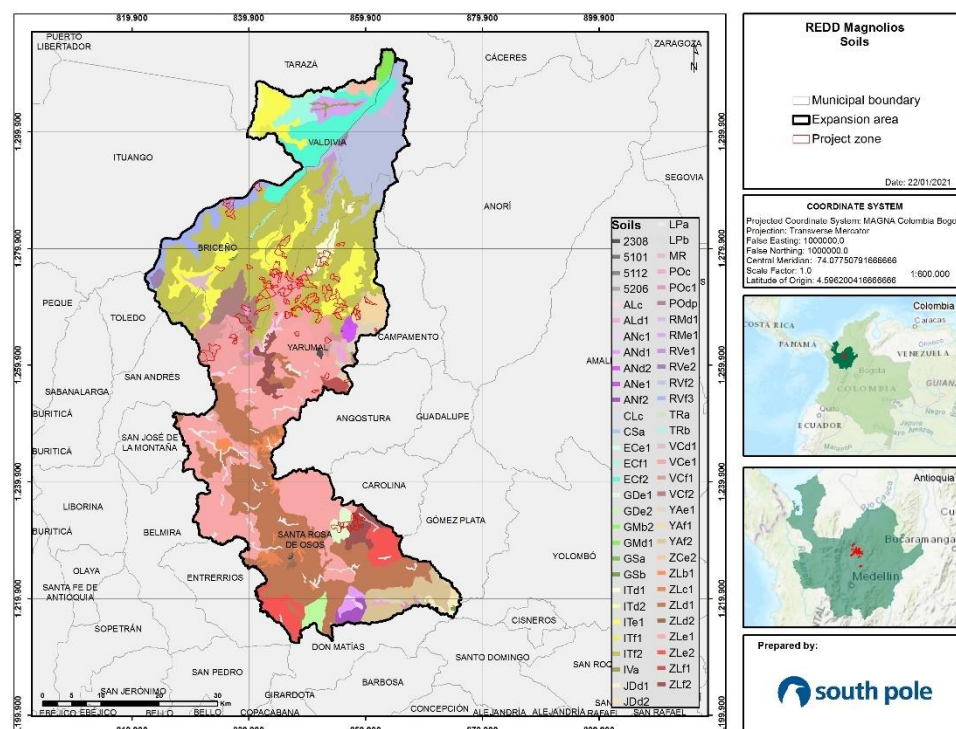


Figure 19. Soil map in the project expansion area.

Source: South Pole (2020) based on (IGAC, 2007)³⁶.

The information about soils is the basis for interpreting the National Reference Level (NREF³⁷) of soil organic carbon (COS) in Colombia. Through plots from different regions of the country, the Ministry of Environment and Sustainable Development (MADS) collected samples to determine the COS content by region, in the case of the Andean region (where the Antioquia Department and the project expansion area are located) estimation was: a soil organic carbon content of 6 tC/ha (MADS & IDEAM, 2019)³⁸.

Hidrology

The expansion area of the REDD+ project is in an area with huge water resources, in the basin of the Nechí river, that covers a large part of the North and Northeast of Antioquia and flows into the Cauca river. The hydrological characteristics of the main municipalities in the project expansion area are described as follows.

³⁶ IGAC, *Estudio General de Suelos y Zonificación de Tierras Departamento de Antioquia* (Bogotá).

³⁷ Proposal for a reference level of forest emissions from deforestation in Colombia for REDD+ payment for results under the UNFCCC, 2019.

³⁸ MADS and IDEAM, *Propuesta de Nivel de Referencia de Las Emisiones Forestales Por Deforestación En El Bioma Amazónico de Colombia Para Pago Por Resultados de REDD+ Bajo La CMNUCC* (Bogotá, D. C, 2019).

The Yarumal municipality is part of the Nechí river basin, located in the North and Northeast of the Antioquia Department, that flows into the Cauca river. This municipality has huge water resources, mainly integrated by the Nechí, Espíritu Santo, San Julián rivers, and El Rosario, El Popal, Berlín, San Mateo, Yarumal, Media Luna and Lejía creeks. Piedras Blancas, el Rosario, San Antonio, Santa Juana, Santa Bárbara, and Santa Isabel are other important creeks that can be included (IGAC, 2018)³⁹.

The microbasins that feed the urban centre aqueduct are Santa Ana, Chorros Blancos, and Picadores I and II, where the erosive processes and poor-quality water triggered by livestock farming are evident. For the rural area, Llanos de Cuivá, Ochalí, La Loma, El Cedro, el Pueblito, and Cedeño are available, they characterize by having large paddocks for livestock farming (Municipio de Yarumal, 2012)⁴⁰.

Despite the strong water capacity of the municipality, water bodies are contaminated by garbage, chemicals used in crops, and organic matter from houses and paddocks (Municipio de Yarumal, 2012)⁴¹.

In the same way, Briceño distinguishes by having a large water supply distributed throughout the municipality. The Espíritu Santo is its main river, it runs along the eastern part the municipality, where it is intended to set up a small hydroelectric power station (SHPS). The most extensive and important creeks include Quebrada Socavones, San Vicente, San Bernardo, located in the southeast of the municipality and tributaries of the Espíritu Santo river. The creeks Purí, Chiri and El Pescado are in the southwest; Cañaveral, in the center; La Quintana and Cenizas, in the west; and Santa Juana in the northwest (IGAC, 2018). Furthermore, it relies on the creeks Marianitos, Cusumbí, La Trinidad, and La Triana, which are supply sources for the aqueduct (Ecosistemas ESP S.A.S, 2016)⁴².

In the Valdivia municipality, the Cauca river basin (Ecosistemas ESP S.A.S, 2016)⁴³ and three main rivers called El Pescado, Puqui and Espíritu Santo stand out. There are other important basins, including the creeks El Oro, that flows into the Espíritu Santo river, the Valdivia creek flowing into the Cauca River, and another smaller ones as the creeks El Corcovado, Candela, Dolores, Lanchas, Neri, Honda, Guamera, Santa Barbara, Cachirime, among others (Muñoz Herrera, 2015; IGAC, 2018)⁴⁴. Some of these creeks supply water to the municipality through the aqueduct and sewerage network (Muñoz Herrera, 2015)⁴⁵.

Lastly, Santa Rosa de Osos holds two of the most emblematic rivers of the region, the Grande and Guadalupe rivers, which flow into the Porce river and supply water to two hydroelectric power stations for the production of energy that serves the Medellín metropolitan area and other Antioquian municipalities

³⁹ IGAC, 'Drenajes Sencillos', 2018.

⁴⁰ Municipio de Yarumal, Plan de Desarrollo Municipal Yarumal 2012-2015.

⁴¹ Yarumal.

⁴² Ecosistemas ESP S.A.S.

⁴³ Ecosistemas ESP S.A.S.

⁴⁴ Jorge Eliecer Muñoz Herrera, *Valdivia*, 2015; IGAC, 'Drenajes Sencillos'.

⁴⁵ Muñoz Herrera.

(UMATA, 2012). Among the main creeks are Cuestas, del Medio, Guanacas, La Chorrera, El Haitón, El Atajo, Vallecitos, Orobajo, and La Mina (IGAC, 2018)⁴⁶.

Vegetation and land uses

The delimitation of land cover in the municipality was based on the Map of Inland, Coastal, and Marine Ecosystems of Colombia, scale 1:100,000, version 2.1 (IDEAM, 2017)⁴⁷. The minimum categories are defined in line with the categories proposed by the adaptation of the Corine Land Cover methodology for Colombia (CLC Colombia), and their definitions are presented in detail in the National Legend of Land Covers (IDEAM, 2010)⁴⁸.

Figure 20, shows the land cover from the project and expansion area. Pastures mostly dedicated to dairy farming cover 64% of the area (CORANTIOQUIA , 2006)⁴⁹. Secondary vegetation covers 8% of the area, followed by heterogeneous agricultural areas that correspond to crop mosaics, pastures, and natural spaces in different layers.

The riverside areas remain with poor vegetation cover, and the significant forest areas are concentrated towards the uplands of Briceño, Valdivia, and Yarumal municipalities. Santa Rosa has high-Andean forests, mainly oak groves (CORANTIOQUIA , 2006)⁵⁰, tall stubbles, and natural forests highly intervened by livestock activity and timber harvesting for domestic purposes.

As to mining, the area has a talc deposit of great importance, with reserves over 20 million tons at a depth of less than 200 meters. Furthermore, there are mining operations, mainly illegal ones (Muñoz Herrera, 2015)⁵¹. On account of the high mining potential of the region (CORANTIOQUIA , 2006)⁵², the extraction of materials is important in the construction sector and as a source of employment for a portion of the population.

Regarding agro-livestock activities, the production of dairy cattle, poultry, breeding of pigs and pisciculture constitute most of the economic activity in the territory. Plantain, cassava, maize, and bean crops stand out. Sapote and avocado are produced on a small scale and, in recent years, the cultivation of coffee, cocoa, and rubber has been implemented to replace illicit crops.

46 IGAC, 'Drenajes Sencillos'.

47 Updating (2017) of the Map of Inland, Coastal and Marine Ecosystems of Colombia (MEC), scale 1:100.000, Hydrology, Meteorology and Environmental Studies Institute (IDEAM). Available at: http://181.225.72.78/Portal-SIAC-web/faces/Dashboard/Biodiversidad2/mapa_ecosistemas/estadoEcosistemasColombiano.xhtml

48 IDEAM, 'Leyenda Nacional de Coberturas de La Tierra. Metodología CORINE Land Cover Adaptada Para Colombia, Escala 1:100.000' (Bogotá D. C: Instituto de Hidrología, Meteorología y Estudios Ambientales, 2010).

49 Corantioquia, 'PGAR, Plan de Gestión Ambiental Regional 2007-2019', 2006.

50 Corantioquia, 'PGAR, Plan de Gestión Ambiental Regional 2007-2019'.

51 Muñoz Herrera.

52 Corantioquia, 'PGAR, Plan de Gestión Ambiental Regional 2007-2019'.

With the increasing economic potential and the globalization of markets, the soils in Santa Rosa are mainly used for high-tech livestock production (CORANTIOQUIA , 2006)⁵³, which increases the progressive deterioration of natural resources and the productivity in the country (Municipio de Santa Rosa de Osos, 2000). The pressure on areas of ecological and economic value is mainly exerted by the expansion of the livestock and cropping frontier. The main crops are focused on the production of potato and tree tomato (UMATA, 2012)⁵⁴.

In most of the cases, harvested timber is used as prop of tree tomato and other fruit trees, large stakes, and wood-burning stoves (UMATA, 2012)⁵⁵. It is part of the dissected and hilly highlands region comprising the central range on the north of the Antioquia Department, characterized by agro-livestock production, and dairy farming with improvement in pastures and management of paddocks with electric-wire fences and pig-slurry based irrigation (Corantioquia, 2006)⁵⁶.

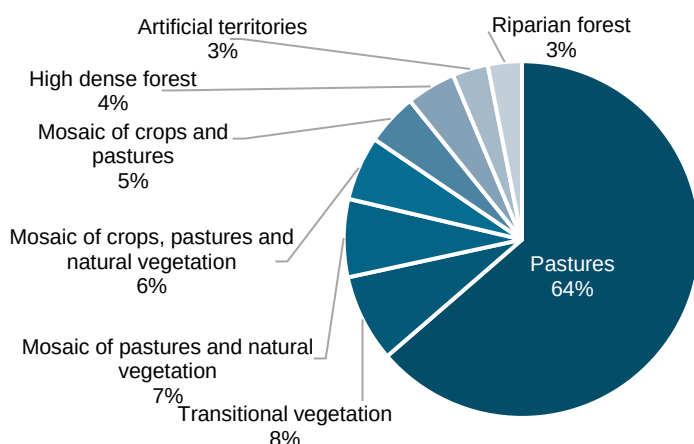


Figure 20. Representativeness of land covers in the project expansion region.

Source: South Pole (2020) based on IDEAM (2017)⁵⁷.

53 Corantioquia, 'PGAR, Plan de Gestión Ambiental Regional 2007-2019'.

54 Municipio de Santa Rosa de Osos UMATA, 'Plan Ambiental Municipal 2012-2015', 2012.

55 UMATA.

56 Corantioquia, 'PGAR, Plan de Gestión Ambiental Regional 2007-2019'.

57 IDEAM, 'Updating of the Map of Inland, Coastal and Marine Ecosystems of Colombia (MEC), Scale 1:100.000', 2017
<http://181.225.72.78/Portal-SIAC-web/faces/Dashboard/Biodiversidad2/mapa_ecosistemas/estadoEcosistemasColombiano.xhtml>.

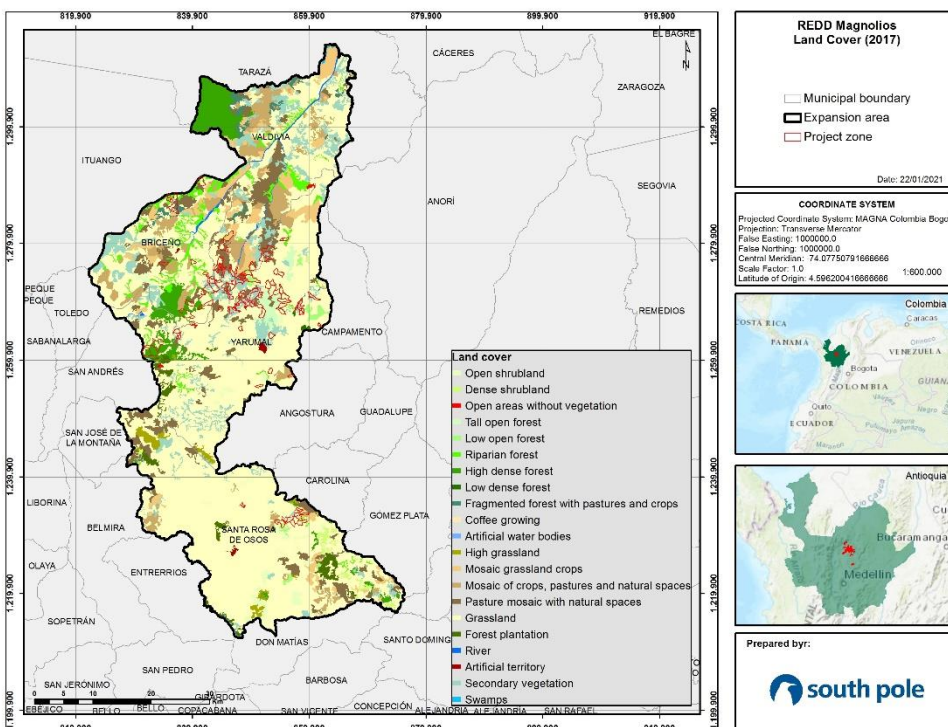


Figure 21. Map of land covers in the project expansion region.

Source: South Pole (2020) based on the Map of Inland, Coastal, and Marine Ecosystems of Colombia (2017)⁵⁸.

Holdridge life zones

The expansion area of the REDD+ project is recognized by the diversity of its life zones; that is, biogeographical regions with similar conditions of temperature, rainfall, and humidity that determine the plant communities of a given area (Holdridge , 1967)⁵⁹. There are eight life zones in the expansion area (Figure 22), that enable the distribution of flora and fauna from different ecosystems and the growing of lowland and highland forest. The life zones in the project expansion area are described as follows.

58 IDEAM, 'Updating of the Map of Inland, Coastal and Marine Ecosystems of Colombia (MEC), Scale 1:100.000',.

59 L Holdridge, 'Ecología Basada En Zonas', 1967.

Table 6. Holdridge life zones in the expansion region.

Life zone	Description	Area (hectares)
Lower-montane very humid forest (vhf-LM)	It is located between 1,800 – 2,800 m above sea level, it has a humid cold climate between 12 °C and 18 °C, and annual rainfall between 2,001 – 3,000 mm.	87,522
Pre-montane pluvial forest (pf-PM)	It is located between 800 – 1,800 m above sea level, with a very humid temperate climate, mean temperature between 18 °C and 24 °C, and rainfall ranging between 3,001 – 7,000 mm/year	61,869
Very humid tropical forest (vhf-T)	Climate is very cold humid, between 6 °C and 12 °C, with rainfall ranging between 2,001 – 3,000 mm/year It is located between 2,800 – 3,700 m above sea level.	38,530
Lower-montane pluvial forest (pf-LM)	It is located between 800 – 1,800 m above sea level, with a very humid temperate climate, mean temperature between 18 °C and 24 °C, and rainfall ranging between 3,001 – 7,000 mm/year	34,916
Lower-montane humid forest (hf-LM)	Cold dry climate, it is located between 1,800 – 2,800 m above sea level, with temperatures between 12 °C and 18 °C, and rainfall ranging between 1,001 – 2,000 mm/year	15,975
Montane pluvial forest (pf-M)	Very cold humid climate, between 6 °C and 12 °C, with rainfall ranging between 2,001 – 3,000 mm/year It is located between 2,800 – 3,700 m above sea level. The project expansion area is in the Yarumal municipality, and a small portion in Santa Rosa de Osos.	5,221
Pre-montane very humid forest (vhf-PM)	It is located between 800 – 1,800 m above sea level, with a humid temperate climate between 18 °C and 24 °C, and rainfall ranging between 2,001 – 3,000 mm/year	4,205
Humid tropical forest (hf-T)	Hot-humid climate with temperatures above 24 °C, it is located between 0 – 800 m above sea level, and rainfall between 2,001 – 3,000 mm/year.	3,670

Source: South Pole (2020) based on (IDEAM, IGAC, IAvH, IIAP, INVEMAR, 2008)⁶⁰.

60 IDEAM and others, 'Ecosistemas Continentales, Costeros y Marinos de Colombia', 2008.

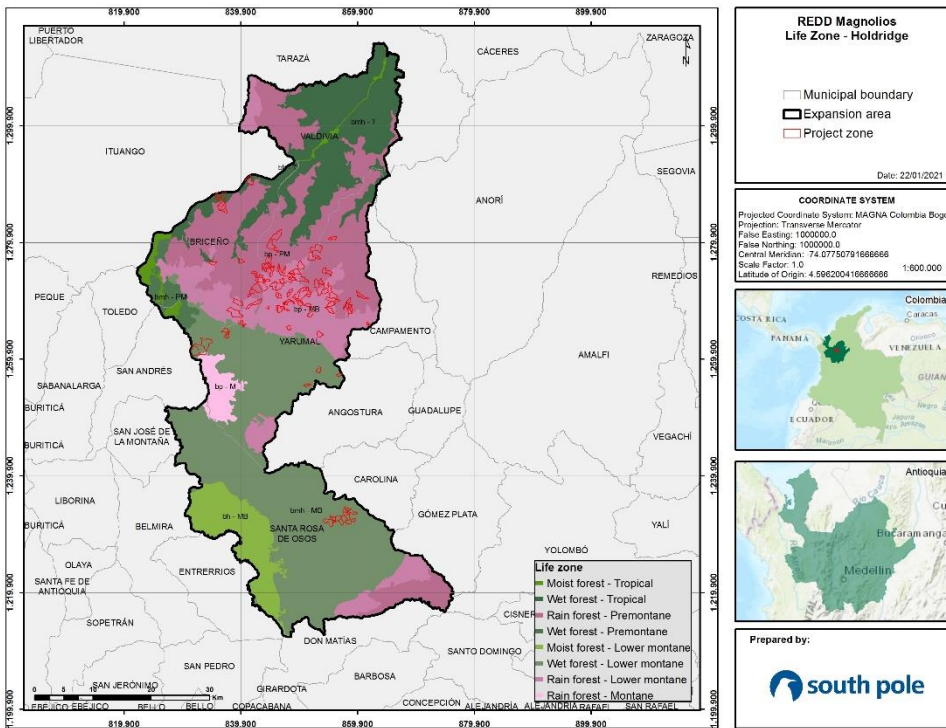


Figure 22. Map of life zones in the project expansion region.

Source: South Pole (2020) based on (IDEAM, IGAC, IAvH, IIAP, INVEMAR, 2008)⁶¹.

Biodiversity

Cloud forests mainly predominate in the project expansion area, they are mostly characterized by the amount and density of species of angiosperms, mosses, birds, mammals, amphibian, and reptiles they have. Those ecosystems hold many endemic species, representing up to 10% of bird and amphibian species worldwide (Alvarez-Aquino, Williams-Linera, & Newton, 2004; Wilson & Rhemtulla, 2016; Ramírez-Soto, et al., 2018)⁶².

Specifically, in the private reserves integrating the project, where biodiversity is being monitored, 700 plant species, 421 bird species, 18 mammal species, and 50 herps species have been registered. Among this great diversity, it stands out that 57 plant species are threatened in some degree or that they are

⁶¹ IDEAM and others.

⁶² Claudia Alvarez-Aquino, Guadalupe Williams-Linera, and Adrian C Newton, 'Experimental Native Tree Seedling Establishment for the Restoration of a Mexican Cloud Forest', *Restoration Ecology*, 12.3 (2004), 412–18 <<https://doi.org/https://doi.org/10.1111/j.1061-2971.2004.00398.x>>; Sarah Jane Wilson and Jeanine M Rhemtulla, 'Acceleration and Novelty: Community Restoration Speeds Recovery and Transforms Species Composition in Andean Cloud Forest', *Ecological Applications*, 26.1 (2016), 203–18 <<https://doi.org/https://doi.org/10.1890/14-2129>>; Anibal Ramírez-Soto and others, 'Restoration of Tropical Montane Cloud Forests: A Six-Prong Strategy', *Restoration Ecology*, 26.2 (2018), 206–11 <<https://doi.org/https://doi.org/10.1111/rec.12660>>.

endemic; and as to the fauna, thanks to trap cameras, there are records of five feline species out of the six ones registered for Colombia, and of endemic species such as the Antioquian chocolate frog (*Hyloscirtus antioquia*) (Figure 23).



Figure 23. Cougar (*Puma concolor*) registered through trap camera (left) and chocolate frog (*Hyloscirtus antioquia*) registered in the project area (right).

Source: Fundación Guanacas (2018).

Regarding plant species, three magnolia species stand out in the project area: (*Magnolia polyhypsophylla*, *M. guatapensis* y *M. yarumalensis*). Their populations have severely decreased because of their good-quality wood; the most critical case is *Magnolia polyhypsophylla*, only 25 specimens of them are registered in natural conditions (communication with Mauricio Mazo, coordinator of the program Salvando Magnolios from Salvamontes Corporation, January 2020) (Figure 24). The great diversity of orchids also stands out, even in the Salvamontes Reserve they have the only known natural population of *Dracula lemurella* classified as an endangered species according to the International Union for Conservation of Nature (IUCN). Three new species of Lepanthes (*Lepanthes cissyana*, *L. dougdarlingii* y *L. sabinadaleyana*) have been described (Viera-Urbe & Moreno, 2019)⁶³ (Figure 25).

63 S Viera-Urbe and J S Moreno, 'Three New Lepanthes (Orchidaceae: Pleurothallidinae) from the Alto de Ventanas Ecoregion in Antioquia, Colombia', Lankesteriana, 2019, 63–75.



Figure 24. Magnolia species registered in the Magnolios and Salvamontes reserves: *M. polyhyposphylla* (left), *M. guatapensis* (center), *M. yarumalensis* (right).

Source: Corporación Salvamontes (2018).

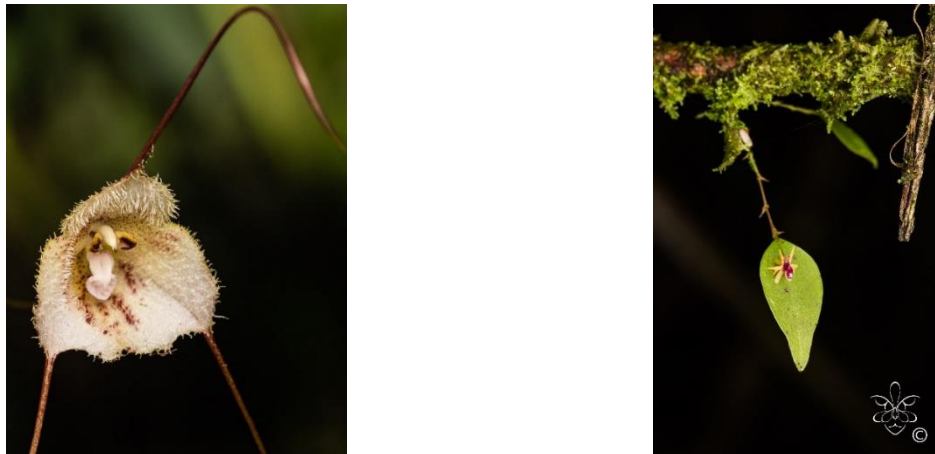


Figure 25. Orchids registered in Salvamontes reserve. *Dracula lemurella* (left), *Lepanthes alcicornis* (right).

Source: Corporación Salvamontes (2018).

1.13.2 Social conditions

The historical, socioeconomic, cultural and territorial context of the REDD+ project expansion area brings us closer to knowledge and understanding of the causes or activities that lead to deforestation and degradation, in addition to identifying the motivations of stakeholders in the territory regarding conservation. At the same time, it allows us to identify possible alternatives for sustaining the initiative over time. The following is a description of the main social characteristics of the territory where the REDD+ project is being developed (for more details see Annex 2):

Socio-cultural and economic dimension

The population dynamics of the Northern sub-region of Antioquia has been influenced by the increase in Andean crops, the geostrategic location, the increase in trade and the armed conflict that has generated, among other things, massive migrations of both national and international population producing high levels of poverty (Municipality of Yarumal, 2020) (Fundación Universitaria Católica del Norte, 2015)⁶⁴.

This has been the case of the municipalities in which the project area is located, in which, despite the conflict and public order difficulties, they have had a parallel economic growth, such is the case of Santa Rosa de Osos and Yarumal, which, having better opportunities, became receiving territories for displaced population or in search of better living conditions. For their part, the municipalities of Valdivia and Briceño, given their location, the political, economic, social and armed conflict dynamics, have placed them in an unfavorable position with respect to the other two municipalities, as they are the ones with the highest levels of poverty, which is why population growth is lower or has even been negative in some periods.

In terms of cultural aspects, in the municipalities and rural areas where the REDD+ project initiative is being developed, there are two variants of the Antioquian campesino socio-cultural group or system: the campesino dedicated to dairy farming in the municipality of Santa Rosa de Osos and to a lesser extent in Yarumal and Briceño; and the campesino farmer present in Briceño, Valdivia and Yarumal. Both have economic affinities centered on subsistence production or scarce surpluses, although in Santa Rosa they have a relatively secure market, such as dairy production.

Although these inhabitants are currently dedicated mainly to agriculture and cattle raising, some activities from the past persist, such as mining gold and other metals, and coal extraction, which although during the conquest and the colony were the most relevant economic activity, over time lost importance in some sectors where overexploitation in previous centuries depleted some metals such as gold, however, these activities are still in force, although to a lesser extent.

In municipalities such as Yarumal, Briceño and Valdivia, peasants are mostly farmers, an activity that is combined with smaller-scale livestock raising, one of its characteristics is the dedication of work to the plot of land, where family labor is key to support the subsistence economy. It is important to note that Briceño and Valdivia where environmental conditions are not equally optimal for the development of economic activities that allow them a more secure market, the levels of poverty and the constant presence of the armed conflict, has caused the agricultural activity to be replaced by the planting of illicit crops, an economic activity that becomes a more profitable choice for this population and can even be considered as a family business, as has occurred in Valdivia (Delgado, 2019)⁶⁵. Undoubtedly, this condition generates changes in the relationship process among neighbors, distrust, emergence of tensions, as well as different ways of using and managing the territory and its forests.

64 Fundación Universitaria Católica Norte, 'Territorios de Estudio: Yarumal', 2015.

65 J A Delgado Martinez, La Coca Como Propulsor de Nuevas Prácticas Culturales y Económicas En Territorios Campesinos de Valdivia (Antioquia, Caucaasia: Universidad de Antioquia, 2019).

In Santa Rosa de Osos, farmers are mainly engaged in dairy or dual-purpose livestock farming, followed by coffee. This farmer is also characterized by his rootedness to his land and his animals, religiosity and care for the family are the driving force of his work, and family labor is key to subsistence. However, their connection and contact with the inhabitants of eastern Antioquia and the crisis in the dairy sector has led to the establishment of potato and tree tomato crops, among others, putting pressure on the forests with the expansion of the agricultural frontier.

Socio-environmental dimension

The population of the municipalities where the REDD+ project is being developed and the rural areas closest to this initiative use the territory and the resources it offers to develop the productive activities that make up the region's economy. In this way, natural resources are essential since the economy in the rural area belongs mainly to the primary sector, which includes activities related to the production of food and other basic products derived from the exploitation of natural resources. However, production systems are not sustainable, generate conflicts in land use, and their expansion threatens forest areas and the services they provide.

It is important to highlight that the rural inhabitants of these municipalities, although they have some similarities in terms of territoriality, identities and vocations, there are also differences marked by the various connections to support centers and different services, such as the closer relationship between Santa Rosa de Osos and the Metropolitan Area of the Aburrá Valley, while Briceño communicates more easily with the municipality of Yarumal for services, which historically rivals Santa Rosa de Osos in terms of regional competitiveness. Valdivia, on the other hand, connects more easily with Yarumal and Bajo Cauca, a matter that characterizes its population more of the coastal cultural type, with a calmer way of life, less conservative than the people of the mountains and cold land. This shows a diversity of actors or different socio-cultural systems, which, in different ways, with different visions and beliefs, have and make use of their territories, posing challenges in terms of achieving common objectives associated with the care and conservation of the spaces or environments in which they live.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

1.14.1 National laws, statutes, and other regulatory frameworks related to mitigation projects

The regulations applicable to this emission-reduction initiative are limited to laws, decrees, resolutions and other national and sectoral rules regarding forest, climate change, management and conservation of natural resources, special protection zones, and biodiversity associated to private property, as well as national forest programs, and international agreements signed about these subject matters.

It is important to highlight that the scope of application of the recognition of forestry programs and international agreements on REDD+ is national, which implies that the recipient of the provisions derived from such programs and agreements is the National Government and not the individual citizen or entity proposing the mitigation initiative at the local level. In this sense, it is the National Government who must materialize the commitments it acquires in terms of mitigation and adaptation to climate change and

control of deforestation and forest degradation, in public policy instruments that provide guidelines on what to do at the territorial level.

As mentioned in Section 1.2, the REDD+ project is part of the mitigation actions in the Land Use, Land Use Change and Forestry (USCUSS) sector that are being carried out at the regional and national levels within the framework of the National Development Plan 2018-2022, the Colombian Low Carbon Development Strategy (ECDBC) and the National REDD+ Strategy (ENREDD+); which coupled with compliance with the guidelines of the Colombian Monitoring, Reporting and Verification (MRV) System (Resolution 1447 of 2018), ensures that international programs and agreements are more understandable and applicable at the local level by the Project. However, the responsibility for assessing the compatibility of REDD+ related regulations with international programs and agreements rests with the Ministry of Environment and Sustainable Development (MADS) as the focal point for coordination.

The most important regulations in the country that are considered as a general framework for the introduction of the implementation pilots (REDD+ programmes and projects) of the ENREDD+ described below:

- Political Constitution:⁶⁶ the Colombian Magna Carta of 1991 is the ultimate compendium of rules within the set of national laws, stating specifically in Articles 8 and 79, the obligation of all citizens of protecting the natural endowments and cultural wealth of the Nation and watch over the preservation of a healthy environment. The REDD+ initiative fosters the conservation of forests and their biodiversity among its beneficiaries; consequently, it watches over the preservation of ecosystem services associated to forest ecosystems that are closely linked to the provision of water, improvement of air quality, maintenance of native-and-migratory-species habitat, among others.
- National REDD+ Strategy:⁶⁷ the mitigation project is aligned with the Comprehensive Strategy for Deforestation Control and Forest Management (EICDGB), which aims to curb deforestation and degradation of forests, addressing the complex causes that produce them; it starts by recognizing the strategic meaning of those ecosystems for the country, because of their sociocultural, economic and environmental importance, their potential as a development option in the framework of the peacebuilding process, and because they contribute to the mitigation and adaptation to climate change.
- Law 164 of 1994:⁶⁸ it approved the United Nations Framework Convention on Climate Change (UNFCCC) which made visible on a global scale the problem of climate change resulting from greenhouse gas (GHG) concentrations in the atmosphere, and fostered the development and adoption of mechanisms for their stabilization, including the REDD+ projects, to a level that prevents dangerous anthropogenic interference in the historic climate system, and within a

⁶⁶ Constituent Assembly. Political Constitution of the Republic of Colombia. Colombia; 1991. http://www.secretariasenado.gov.co/senado/basedoc/constitucion_politica_1991.html.

⁶⁷ Ministry of Environment and Sustainable Development, Institute of Hydrology M y EA-I. Comprehensive Strategy for Deforestation Control and Forest Management. Bogota D.C.; 2017.

⁶⁸ Presidency of the Republic of Colombia. Law 164 of 1994. Colombia; 1994. http://www.secretariasenado.gov.co/senado/basedoc/ley_0164_1994.html.<0

timeframe sufficient to allow ecosystems to adapt naturally to the climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner.

- Law 165 of 1994:⁶⁹ deforestation, habitat destruction, and hunting are the main reasons for the increase in the number of endangered species and decline in their populations (species with a reduced distribution area). An example of this are the species of the Magnolia genus in the Yarumal, Valdivia, Santa Rosa de Osos, and Briceño municipalities, that have been decimated due to the quality of their wood and their limited distribution. The activities of the project include to encourage the protection of these species, as well as of other vulnerable ones, such as the river otter, the laurel tree (*Aniba perutilis*), and the cougar, through educational workshops on the protection of biodiversity and, at the same time, offer fair financial incentives to the owners of the holdings affiliated to the initiative. Thus, the project aligns with the Convention on Biological Diversity, adopted by Colombia in virtue of the Law 165 of 1994, referring to the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.
- Law 99 of 1993:⁷⁰ The REDD+ initiative is ruled by the guidelines of national regulations issued by the Presidency of the Republic and the Ministry of the Environment, today Ministry of Environment and Sustainable Development, and by the regulations, standards and directives of the Regional Autonomous Corporation of the Center of Antioquia (CORANTIOQUIA), with jurisdiction in the project area.
- Paris Agreement: the greenhouse gas reductions (GHG) produced by the decrease in deforestation rates in the project area contribute to give effect to the commitment entered into by signing the Paris Agreement on April 22, 2016, on the Day of the Earth, in which Colombia committed to reduce its GHG emissions by 20% compared to projections until 2030, or 30% if it relies on international cooperation. In order to meet this goal, national strategies such as the National Climate Change Policy (PNCC)⁷¹ were created, which aims to guide and articulate all national efforts through different mechanisms, including the Colombian Low-Carbon Development Strategy (ECDDB), the National Plan of Adaptation to Climate Change (PNACC), and the Comprehensive Strategy for Deforestation Control and Forest Management (EICDGB).
- The following international agreements: United Nations Framework Convention on Climate Change (UNFCCC), Convention on Biological Diversity, International Tropical Timber Agreement, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the Kyoto Protocol.

⁶⁹ Presidency of the Republic of Colombia. Law 165 of 1994. <https://www.cancilleria.gov.co/convenio-sobre-diversidad-biologica-cbd>. Published in 1994. Revised: February 19, 2020.

⁷⁰ Presidency of the Republic of Colombia. Law 99 of 1993. Colombia; 1993. http://www.secretariassenado.gov.co/senado/basedoc/ley_0099_1993.html. Revised: February 19, 2020.

⁷¹ Ministry of Environment and Sustainable Development. National Climate Change Policy – PNCC. Bogota D.C.; 2016. <https://www.minambiente.gov.co/index.php/politica-nacional-de-cambio-climatico#politica-nacional-de-cambio-climatico-pncc>. Revised: February 19, 2020.

- National policies: Comprehensive Strategy for Deforestation Control and Forest Management, National Plan for Forest Development (PNDF), National Climate Change Policy (PNCC), and the Policy for Comprehensive Management of Biodiversity and its Ecosystem Services.

1.14.2 Compliance with regional and local regulations

The implementation of the initiative's activities is compatible with the figures of special protection, land use planning and sectoral laws applicable to the environment for the first monitoring period 2016-2020, which are set out in Table 7. However, within the monitoring plans and for future verifications, the REDD+ project will consider the revision of the updates to the land use planning guidelines mentioned in Table 7 and will list in the monitoring reports the new considerations that modify the project design or the procedures validated in the Project Document (PD).

Table 7. Regional regulatory framework.

Regulatory framework	Description	Compatibility with the project
Municipal development plan	Development Plan 2016-2019 Yarumal ⁷²	The environmental dimension of the development plan promotes the enjoyment of a healthy environment and low-carbon growth with a view to ecological and sustainable projects and activities, such as reforestation, protection of micro-basins, and ecological trails, which harmonize with conservation initiatives such as carbon projects.
	Development Plan 2016-2019 Briceño ⁷³	The REDD+ initiative aligns with the fourth strategic line of the Development Plan: Briceño sustainable and protector of the environment. It invites rulers and inhabitants to manage the Briceño's natural endowment and biodiversity in a sustainable way, it also pursues to reduce the climate change impact by strengthening the culture of care, protection, responsible exploitation of natural resources, development of a forest planning and management plan, forest stewardship, and support for environmental projects.
	Development Plan 2016-2019 Valdivia ⁷⁴	The sixth strategic line of the Development Plan, included in the environmental dimension, focuses on environmental management, adaptation to and mitigation of climate change by improving

⁷² Municipal mayoralty of Yarumal. Municipal Development Plan 2016-2019: It is the time Yarumal. Yarumal; 2016. www.yarumal.gov.co. Revised: February 19, 2020.

⁷³ Municipal mayoralty of Briceño. Agreement 012 of 2016: Approving the Municipal Development Plan 2016-2016 Opportunity for Change and Progress for Briceño. Colombia; 2016:1-34

⁷⁴ Municipal mayoralty of Valdivia. Development Plan 2016-2019: Standing together for Valdivia. Valdivia; 2016. <http://www.valdivia-antioquia.gov.co/planes/plan-de-desarrollo-20162019>. Revised: February 21, 2020

Regulatory framework	Description	Compatibility with the project
		production systems, in order to reduce GHG emissions, and increase the planted area of the municipality
	Development Plan 2016-2019 Santa Rosa de Osos ⁷⁵	The environmental dimension of the Santa Rosa Development Plan focuses mainly on the protection of the territory's water resources, as well as on research activities that enable to identify areas with strategic ecosystems for purchase and conservation by the municipal administration. The areas of interest include Guanacas Village, where the lots of the Guanacas Cloud Forest Foundation are located, they present a proposal for declaration of a private protected area and a regional one, a corridor linking cloud forests from the mountain range of the village (Cordillera) to the Carolina del Príncipe municipality, the Angostura forests, the moorland system, and the Porce-Nechí biological corridor
Local System of Protected Areas (SILAP)	Consolidation of conservation initiatives in the Santa Rosa de Osos municipality - Antioquia ⁷⁶	Thanks to the participation of the Fundación Guanacas, the Magnolios REDD+ initiative promotes that the goal of the Santa Rosa Local System of Protected Areas is met; it aims —among other activities— to ensure the permanence of high-Andean forests, to conserve and promote the enjoyment of areas and elements of the landscape that are benchmarks of identity, roots, and social cohesion, and to preserve the ecosystems that guarantee the municipality's environmental services, in particular, water supply and regulation.
Action plan of Regional Autonomous Corporation (CAR) with jurisdiction in the project area	Action Plan 2016-2019: For the sake of the environmental heritage of our territory ⁷⁷	The project area is distributed throughout the Tahamies territorial offices (Yarumal, Briceño and Santa Rosa de Osos) and Panzenú (Valdivia) of Corantioquia, they are areas of importance for the conservation of biodiversity with 718 species reported, including the Alto de Ventanas Regional Integrated Management District, that encourage the creation of a fauna corridor to protect vulnerable species such as the cougar and the jaguar. The relevant properties located in this area are of special interest for conservation, because most of them are located in areas classified as hazard zones, which have been considerably degraded by anthropogenic activities that

⁷⁵ Mayorality of Santa Rosa de Osos. Development Plan 2016-2019: For the sake of Santa Rosa investment and social justice for all. Santa Rosa de Osos; 2016. [http://www.santarosadeosos-antioquia.gov.co/MiMunicipio/Programa de Gobierno/Plan de Desarrollo 2016-2019.pdf](http://www.santarosadeosos-antioquia.gov.co/MiMunicipio/Programa%20de%20Gobierno/Plan%20de%20Desarrollo%202016-2019.pdf).

⁷⁶ Autonomous Corporation of the Center of Antioquia CORANTIOQUIA, Mayorality of Santa Rosa de Osos. Consolidation of conservation initiatives in the Santa Rosa de Osos municipality – Antioquia – Local System of Protected Areas. Santa Rosa de Osos; 2015

⁷⁷ Regional Autonomous Corporation of the Center of Antioquia CORANTIOQUIA. Action Plan 2016-2019: For the sake of the environmental heritage of our territory. Medellín, Colombia; 2016. http://www.corantioquia.gov.co/sitios/ExtranetCorantioquia/ciadoc/AGUA/AIRNR_CN_8832_2011.pdf

Regulatory framework	Description	Compatibility with the project
		entail the fragmentation of forest areas, including extensive livestock farming, very common throughout the subregion.
National System of Protected Areas (SINAP) - regional protection figures in Corantioquia's jurisdiction.	Alto de Ventanas Integrated Regional Management District (DRMI)	The declaration of this figure seeks to promote in the territory a combination of preservation, conservation and sustainable use strategies at the regional level to (i) preserve the forest relicts of the Alto de Ventanas area due to the high number of endemic species found there, and (ii) guarantee the survival of flora and fauna species categorized as endangered according to the red list of the International Union for Conservation of Nature (IUCN), through the implementation of seven strategic lines related to: • Reconversion to sustainable systems (agroecology). • Environmental control and procedures • Landscape ecological connectivity • Environmental management • Primary information monitoring network • Territorial governance • Environmental education and outreach However, at the end of the monitoring period, the DRMI did not have an approved Environmental Management Plan (EMP) as a guideline document for the implementation of the strategic lines, so the REDD+ project linked the environmental entity (Corantioquia) in charge of the formulation and implementation of this EMP to the REDD+ project's socialization and consultation processes generated within the framework of the Participation Strategy, Communication and Knowledge Appropriation Strategy (EPCAC), in order to ensure the recognition of the forest governance structures present in the project area and to generate a communication mechanism to coordinate actions in the near future for the compatibility of the objectives of the DRMI and the REDD+ project (see Section 2.5).

Source: South Pole (2020).

1.15 Participation under Other GHG Programs

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

The project is not registered, nor has it applied for registration in any other GHG program.

1.15.2 Projects Rejected by Other GHG Programs

The project has not been rejected in any other GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The project is not part of emission trading programs or other binding limits.

1.16.2 Other forms of environmental credit

The project has not requested or received any other type of environmental credit related to GHG, including renewable energy certificates.

1.17 Additional Information Relevant to the Project

1.17.1 Leakage Management

For leakage management, enrichment and passive restoration activities will be carried out on 607 ha of the proponent Foundations (see Section 4.1.1 for details).

1.17.2 Comercially Sensitive information

Confidential documents such as trade agreements are considered highly sensitive.

1.17.3 Sustainable Development

According to the 2030 Agenda Transforming Colombia, the fundamental basis for ensuring sustainable development lies in the conservation and sustainable use of natural resources, so environmental sustainability is based not only on reducing damage to ecosystems, but also on the efficient management of ecosystem services that favor human development by increasing economic opportunities and social and ecological resilience. In this sense, the management of ecosystem goods and services is represented in the Sustainable Development Goals (SDGs), associated with water, climate, biodiversity and oceans, and from these, a series of interactions are generated that make it possible to meet other major global goals such as the eradication of hunger, poverty reduction and the quality of health services, among others.

In line with what is expressed in the 2030 Agenda, the fulfillment of the 17 SDGs represents the easiest way to enhance sustainable development at the national level since, by being constructed in a universal manner, the participation of various stakeholders is guaranteed to achieve their success. Furthermore, these goals place special emphasis on the inclusion of vulnerable and excluded groups, through the pursuit of the fulfillment of human rights and social equality. Finally, by having a transdisciplinary scope, they recognize needs in social, economic, and environmental terms and promote human development together with environmentally sustainable practices.

As previously indicated, Colombia has even more reasons to ensure the implementation of this agenda, since in the post-conflict stage it is currently facing, these SDGs are the optimal way to achieve full peace since, as emphasized in the 2030 Agenda, sustainable development is not possible without lasting peace

and vice versa, having as a fundamental step this interconnection to achieve success and move forward as a country. This being so, the Agenda recognizes the need to build peaceful, just and inclusive societies, providing equality and based on respect for human rights, with good governance at all levels, accompanied by transparent and effective institutions (United Nations, 2015).

In this sense, to achieve the goals transacted under the SDGs, it is important to define their fulfillment through intersectoral, multilevel and participatory public policies, having a multidimensional approach. In Colombia, the implementation of the SDGs is a fundamental part of national action plans and policies such as, for example, the National Development Plan (NDP) 2018-2022 "*Pact for Colombia, Pact for Equity*", which presents the structural and transversal government guidelines to comply with the agreements and commitments adopted under the SDGs, and highlights the goals set at the environmental, social and economic levels framed in the global commitment to improve the quality of life of all people.

Similar to how the National Development Plan (NDP) does, other policies and strategies integrate the SDGs as a fundamental part of their scope, based on the guidelines set out in the framework of CONPES Document 3918 of 2018, which presents the indicators, baseline and proposed targets associated with each of the SDGs under national policies (Republic of Colombia - National Planning Department, 2019). Colombia, through CONPES 3918 of 2018, prioritized about 147 targets and 156 indicators with which it will measure its progress in achieving its SDGs. Among the most relevant indicators are:

- Increase the percentage of stations meeting World Health Organization air quality standards from 14.5% in 2015 to 70% in 2030.
- Increase the percentage of water quality monitoring points with good or acceptable category from 36% in 2015 to 43% in 2030.
- Increase from three Watershed Management Plans - POMCA implemented in 2015 to 135 in 2030.
- Increase the percentage of solid waste effectively recycled from 17% in 2015 to 30% in 2030.
- Increase from five departments with Comprehensive Climate Change Plans in 2015 to 32 in 2030.
- To go from 276,669 ha in 2015 of annualized loss of natural forest in Colombian territory to 0 ha in 2030.
- Increase the areas under restoration process from about 408,000 ha in 2015 to 1,000,000 ha in 2030.

It should be noted that the 20 fundamental goals of the National Development Plan (NDP) cover topics such as education, greater investment in research led by young people, improvements in the connection and provision of basic services, in addition to improving the quality of employment and new proposals for development, objectives for the protection of ecosystems and reduction of deforestation rates, adoption of clean energy and increased public and private investment in science and technology, which in the medium and long term will contribute to the reduction of extreme poverty and the improvement of the quality of life of Colombians.

In addition to the NDP, it is necessary to develop strategies at the regional and local levels that contribute to the fulfillment of the SDGs, since the basic needs and requirements of the different regions or departments of Colombia may be different. For this reason, and in support of the NDP, the different Territorial Development Plans, as is the case of the Regional Pacts or the Land Management Plans (POT), both at the departmental and municipal level, must orient their structure to the fulfillment of the guidelines in relation to the country's goals included in the SDGs.

The Ministry of Environment and Sustainable Development (MADS), published an update of the proposed goals for the Nationally Determined Contribution (NDC) until 2030, with the objective of making them more congruent with the country's vision, and to have synergy between national, regional and local initiatives with respect to Colombia's priorities in the search for sustainable development. With this as a precedent, Table 8 shows this process of interrelation between these two adopted strategies (SDGs and NDC), where the NDC goals are grouped by priority sectors of the economy, among which climate change considerations are included. More information on these goals can be found in the document on climate (Ministry of Environment and Sustainable Development, 2020).

Table 8. Integration of NDC targets in relation to the SDGs.

SDG	NDC sectoral goals	SDG	NDC sectoral goals
	Protected areas		Mines and Energy Transportation
	Health Agriculture 10 agricultural subsectors Agro-climatic technical roundtables		Transportation Environmental management and control of projects (ANLA) Early warning system monitoring network
	Health		Trade, Industry and Tourism Transportation 10 agricultural subsectors Agro-climatic technical roundtables
	Water resources management Housing, water and basic sanitation Health Agriculture		Mines and Energy Protected areas

SDG	NDC sectoral goals	SDG	NDC sectoral goals
	Transportation Environmental management and control of projects (ANLA)		Water resources management Mining and Energy Transportation Paramo delimitation Protected areas
 It is linked to all NDC goals.			

Source: South Pole, (2020) based on the Ministry of the Environment and Sustainable Development document, (2020).

In light of the above, the REDD+ project will seek to contribute as much as possible to meeting the 2030 goals proposed by the Ministry of Environment and Sustainable Development (MADS), within the framework of the implementation of the four strategic lines outlined above. The project's commitments with respect to its contribution to the priority activities for sustainable development are summarized in Table 9.

The monitoring of contributions to priority activities for sustainable development will be carried out in coordination with the monitoring of project activities and unplanned deforestation. Detailed information on the monitoring plans is presented in Section 5.

Table 9. Identification and prioritization of sustainable development priorities for the REDD+ Project Magnolios de Yarumal.

Expected project achievement	SDG	Does it contribute to national sustainable development priorities?	Target associated with SDG	Indicator	Expected project contribution
Strengthen environmental management activities through the creation of non-profit entities that manage financial resources for the implementation of forest conservation and restoration activities and the recovery of endangered species.	SDG 8 DECENT WORK AND ECONOMIC GROWTH	Yes	8.3 - Promote policies to support job creation and enterprise growth. Promote development-oriented policies that support productive activities, the creation of decent jobs, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro and small enterprises.	Number of people employed in project activities, expressed as total number of full-time jobs.	Increases
	SDG 15 TERRESTRIAL ECOSYSTEM LIFE	Yes	15.4 - Ensuring the conservation of mountain ecosystems By 2030, ensure the conservation of mountain ecosystems, including their biological diversity, in order to enhance their capacity to provide essential benefits for sustainable development	Area of protected mountain ecosystems in hectares	Increases
Advance in the recovery and maintenance of forest cover in northern Antioquia, especially in	SDG 13 CLIMATE ACTION	Yes	13.2 - Integrate climate change measures Incorporate climate change measures into national policies, strategies and plans.	Reduction in total Greenhouse Gas (GHG) emissions	Increases
	SDG15	Yes	15.5 - Protecting biodiversity and natural habitats	Number of propagated wax palms (<i>Ceroxylon</i> sp)	Increases

Expected project achievement	SDG	Does it contribute to national sustainable development priorities?	Target associated with SDG	Indicator	Expected project contribution
areas degraded by natural or anthropogenic agents, as a measure to mitigate and adapt to climate change.	TERRESTRIAL ECOSYSTEMS LIFE		Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect threatened species and prevent their extinction.		
			<i>15.A - Increase Financial Resources to Conserve and Sustainably Use Ecosystems and Biodiversity</i> To mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.	Total investment in Colombian pesos (COP) in activities for the conservation, restoration or sustainable use of biodiversity and ecosystems	Increases
Promote educational spaces around environmental issues of regional importance, as a basis for strengthening rural communities in the management of natural resources.	SDG4 QUALITY EDUCATION	Yes	<i>4.7 - Global Citizenship Education</i> By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including through education for sustainable development and sustainable lifestyles	Number of educational spaces or sensitizations carried out to educate about sustainable development and sustainable lifestyles.	Increases
	SDG13 CLIMATE ACTION	Yes	<i>13.3 - Building knowledge and capacity to address climate change challenges</i> Improve education, awareness and human and institutional capacity regarding climate	Number of landowners, integrated into the project, who have signed agreements to implement	Increases

Expected project achievement	SDG	Does it contribute to national sustainable development priorities?	Target associated with SDG	Indicator	Expected project contribution
			change mitigation, adaptation, mitigation and early warning.	climate change mitigation activities.	
Promote knowledge of biodiversity as a tool to preserve and protect the territory.	SDG15 TERRESTRIAL ECOSYSTEM LIFE	Yes	<i>15.5 - Protect biodiversity and natural habitats</i> Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect threatened species and prevent their extinction.	Number of investigations, monitoring processes, inventories or biodiversity characterization activities carried out in the project expansion area.	Increases

Source: South Pole, (2020) based on DPN, (2019).⁷⁸

⁷⁸ Available at: <https://www.ods.gov.co/es>

1.17.4 Further Information

Colombia Monitoring, Reporting and Verification System Requirements (Resolution 1447 of 2018)

The justifications for the applicability of Resolution 1447 of 2018 in the design of the REDD+ project is presented below.

Table 10. Compliance with the requirements of Resolution 1447 of 2018.

Resolution Guidelines		Information required	Project compliance
Title I	Article 2.	Scope of application	The project proponent as a private entity intends to register the GHG mitigation initiative, REDD+ Project Magnolios de Yarumal, to demonstrate its mitigation results in the framework of compliance with the national climate change goals established under the UNFCCC, because of the implementation of different conservation activities. Therefore, the provisions of Resolution 1447 of 2018 are considered for the formulation, registration, validation, and verification of the project.
	Article 10 and 13.	National GHG Emissions Reduction Registry and Initiative phases in RENARE	Considering that the Project is an initiative classified according to Art. 10 of the resolution as a REDD+ project, the project proponent must register this initiative in the National Registry of GHG Emissions Reduction (RENARE). On February 9, 2021, the project was registered in the RENARE platform in the feasibility phase and requested IDEAM approval and moved to the formulation phase. The public can consult the platform for information on the REDD+ project regarding: • Location • Participants in the project • Project activities • Baseline and emission sources • Cost of the Project
Title II. Chapter 2. Section 2.	Article 39.	Use of methodologies for the formulation of REDD+ projects.	The REDD+ project uses a methodology that complies with UNFCCC REDD+ guidelines. The methodology is VM0015 Methodology for Avoided Unplanned Deforestation, v1.1. This methodology provides a set of methodological

Resolution Guidelines		Information required	Project compliance
REDD+ projects			guidelines for quantifying GHG emission reductions due to avoided deforestation. Additionally, the project has a mechanism for quantifying the risk of leakage of GHG emission reductions, managing the risk of non-permanence of GHG emission reductions and a mechanism for managing uncertainty in the quantification of the baseline and mitigation results in line with the selected methodology.
	Article 40	Maximum GHG mitigation potential for REDD+ projects, subject to national accounting.	The MADS and IDEAM, through RENARE, will establish the maximum GHG mitigation potential subject to national accounting of GHG emission reductions. This potential shall be calculated based on the methodological reconstruction of the Reference Level of Forest Emissions (NREF) assessed by the UNFCCC applicable to the REDD+ project area, as the REDD+ project will validate its baseline after 2020, its maximum mitigation potential is calculated based on the methodological reconstruction of the NREF assessed by the UNFCCC applicable to the project area.
	Article 41	Establishment of baselines for REDD+ projects	Definition of forest according to information provided by the Colombian Forest and Carbon Monitoring System (SMByC). For the reconstruction of the NREF and REDD+ Project Magnolios de Yarumal, the following definition of forest was used: “any portion of land where tree-covered areas predominate with a minimum canopy density of 30%, a minimum canopy height (in situ) of 5 m at the time of its identification, and a minimum area of 1,0 ha; excluding tree covered areas from commercial forest plantations, palm crops, and trees planted for agro-livestock production”. This definition is consistent with the criteria defined by the United Nations Framework Convention on Climate Change (UNFCCC) in its Decision 11/COP.7, with the definition adopted by Colombia before the Kyoto Protocol (MAVDT, 2002), as well as with the definition of natural forest cover included in the adaptation for Colombia of the legend from the CORINE Land Cover methodology (CLC Colombia). Global warming potentials According to the NREF, the carbon contained in the biomass for each biome was obtained from the carbon fraction of dry matter suggested by the IPCC Guidelines

Resolution Guidelines		Information required	Project compliance
			(2006): 44/12. This same fraction was used for estimates in REDD+ Project Magnolios de Yarumal. Emission factor by forest type According to the Proposal for a reference level of forest emissions from deforestation in Colombia for payment for REDD+ results under the UNFCCC (MADS & IDEAM, 2019), the emission factors in the NREF include aboveground biomass, belowground biomass and soil organic carbon, whose estimates were made at the national level and for each of the biomes in Colombia. In REDD+ Project Magnolios de Yarumal, the emission factors for the Andes biome determined in the NREF were used, which correspond to 265 tCO₂e/ha for aboveground biomass, 60 tCO₂e/ha for belowground biomass and 326 tCO₂e/ha for total biomass. Historical deforestation data for the project area and its emissions estimation method The reference region was defined according to the VCS VM0015 methodology, and following the NREF for Colombia (MADS Radicado 20196020000091 of December 27, 2019;see Annex 4). Historical deforestation data for the historical reference period (2005-2016) was obtained through a supervised classification using the polygon digitizing technique. Satellite images of medium spectral resolution (30 m) from sensors Landsat 7 (years 2005 and 2010) and Landsat 8 (years 2013 and 2016), in level 2 processing, were employed. The non-data pixels were masked out using other satellite imagery from years 2006, 2014 and 2015, from the same sensors. (See Section 5 for more details) The emissions estimation method was performed according to the VCS VM0015 methodology (See Section 4.1.10 for more details).
	Article 42.	Establishment of mitigation targets for REDD+ projects	The mitigation goals of the REDD+ project are articulated with the goals of the Comprehensive Strategy for Deforestation Control and Forest Management and the other national goals on climate change presented by the country before the UNFCCC, with respect to: Zero gross deforestation (50 ha of forest loss reduced in the project area, measured relative to the without-project scenario for the monitoring period 2016-2020).

Resolution Guidelines		Information required	Project compliance
			- Increased quality of life for the local population. - Strengthened territorial governance of rural groups that live and depend on forests. - Reduction of 31.5 Mton of CO₂e emissions from avoided deforestation (31,532 tCO₂e net emissions reduction in the project area, measured relative to the without-project scenario for the monitoring period 2016-2020). - Sustainable Development Goals (SDGs 4, 8, 13, 15)
	Article 43.	Additionality criteria for REDD+ projects	See Section 3.5
	Article 44.	Validation and Verification Criteria for REDD+ projects	The project proponents took the necessary steps to contract the Validation and Verification Body (VVB) and to ensure that it considers the guidelines established by Art. 44 of the Resolution. Ruby Canon Management Ltda.; VVB accredited by ANAB (formerly ENSI) with all sectorial scopes, including VCS and CCB.
	Article 45.	REDD+ project Registration	On February 9, 2021 the project was registered in the RENARE platform in the feasibility phase and requested IDEAM's approval and move to the formulation phase.
		Environmental and social safeguards	With respect to compliance with the REDD+ Environmental and Social Safeguards, Table 11 presents the identification of the main instruments available to the Project to enforce compliance with each of the safeguards, associated with the participatory and capacity building processes that have been developed to date by the participating entities and community groups. Due to the level of development of the safeguards issue in the country and considering the status of implementation of the Monitoring, Reporting and Verification System (MRV) and the Safeguards Information System, specific interventions have not yet been carried out in the territories and the implementation of participation and communication mechanisms within the framework of the EPCAC of the REDD+ project was the strategy to demonstrate compliance with the safeguards at the local level.

Resolution Guidelines		Information required	Project compliance
Title II. Chapter 3. REDD+ projects and programs in non-compatible status.	Article 47.	Exclusion of the project area to the REDD+ Program holder.	The REDD+ project has no overlap with any other mitigation initiative in the country.
	Article 49.	Finalization Feasibility and Formulation	
		Inform the REDD+ Program holder of intention to exclude	
		Project area in overlap not compatible with the REDD+ program.	

Source: prepared by South Pole (2021) based on MADS Resolution 1447 of 2018.

National Emission Reduction Registry (RENARE)

To avoid double counting at the national level of mitigation results, particularly for credits sold as offsets in the voluntary market and those generated for trading in the Colombian domestic market, the project proponent advanced the necessary actions to register and update the information of the initiative in the National Registry of GHG Emissions Reduction (RENARE), under the guidelines of Art. 54 of Resolution 1447 of 2018.

With the registration of the project in the RENARE, the generation of non-compatible overlaps with future programs or projects that intend to be developed in the same project area will be avoided. Only until September 2020, RENARE was enabled for the registration of initiatives and to date, the Ministry of Environment and Sustainable Development (MADS) and the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM) were in the first phase of entry into operation of the platform, which consisted of testing and stabilization, in addition to a process of training in the use and filling out of information on the platform, aimed at the holders of GHG mitigation initiatives in the country.

The project was registered in the feasibility phase on February 9, 2021, once IDEAM authorized the proponent to access the platform. Within the registration, the presence of overlaps of the project with other initiatives was evaluated and no overlaps were found with other REDD+ initiatives, either programs or projects. (See Figure 26).

Factibilidad

Información General

Datos básicos

Participantes

Fuentes de emisión

Actividades

Autoridades ambientales

Costos y financiación

PDD

Formulación

Datos básicos

Participantes

Fuentes de emisión

Actividades

Autoridades ambientales

Costos y financiación

Documentos

PDD

Potencial máximo de mitigación

Revisión de requisitos

Iniciativa Proyecto REDD+ Magnolios de Yarumal

Tipo iniciativa PY REDD+

Datos Básicos

Nombre del proyecto

Proyecto REDD+ Magnolios de Yarur

Descripción del proyecto

Es una iniciativa desarrollada en el norte de Antioquia, es un proyecto agrupado, que en primera instancia incluye propietarios privados y reservas

Autoridad ambiental que autorizó el usuario

No Aplica

Departamentos y Municipios

Ubicación de la iniciativa

Regional

Antioquia	Briceño	
Antioquia	Santa Rosa de Osos	
Antioquia	Valdivia	
Antioquia	Yarumal	

Figure 26. REDD+ Project Magnolios de Yarumal registered in the RENARE platform in the feasibility phase.

Source: RENARE (2021).

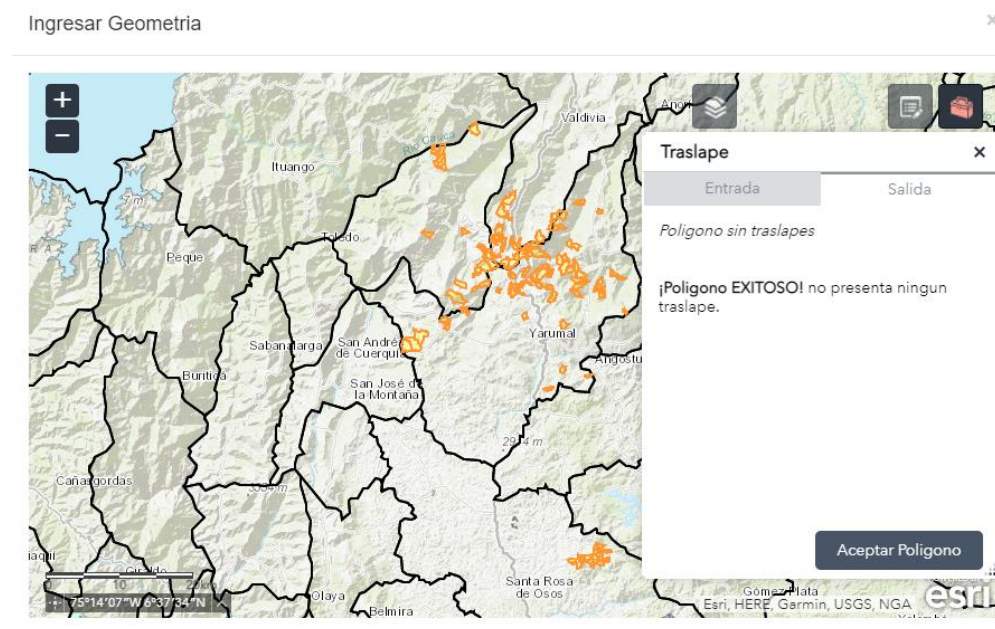


Figure 27. Verification of overlaps between mitigation initiatives in the RENARE platform.

Source: RENARE (2021).

REDD+ safeguards Colombia

Colombia submitted the country's national interpretation of safeguards for REDD+ to the United Nations Framework Convention on Climate Change (UNFCCC), as part of the adoption of the measures mentioned in paragraph 70 of decision 1/CP.16 (UNFCCC, 2011)⁷⁹ of the UNFCCC. These safeguards apply to initiatives to reduce deforestation and forest degradation that are developed in Colombia, whether at local, regional, or national scale, becoming a guide of good practices to prevent risks and attract benefits. Table 11 shows the identification of the main instruments available to the project to ensure compliance with each of the safeguards.

⁷⁹ UNFCCC, 'Report of the Global Environment Facility to the Conference of the Parties', 2011.

Table 11. Main instruments for compliance with safeguards identified by the REDD+ Project Magnolios de Yarumal.

N	Type	National interpretation of safeguards	Instruments for safeguards compliance identified in the Emission Reduction Project
1	Institutional	Correspondence with international agreements signed by Colombia on forests, biodiversity, and climate change.	The scope of application of the recognition of forestry programs and international agreements on REDD+ is national, which implies that the recipient of the provisions derived from such programs and agreements is the National Government and not the individual citizen or entity proposing the mitigation initiative at the local level. In this sense, it is the National Government who must materialize the commitments it acquires in terms of mitigation and adaptation to climate change and control of deforestation and forest degradation, in public policy instruments that provide guidelines on what to do at the territorial level.
2		Transparency and access to information	As mentioned in Section 1.2, the REDD+ Project Magnolios de Yarumal is part of the mitigation actions in the Land Use, Land Use Change and Forestry (USCUSS) sector that are being carried out at the regional and national levels within the framework of the National Development Plan 2018-2022, the Colombian Low Carbon Development Strategy (ECDDB) and the National REDD+ Strategy (ENREDD+); which coupled with compliance with the guidelines of the Colombian Monitoring, Reporting and Verification (MRV) System (Resolution 1447 of 2018), ensures that international programs and agreements are more understandable and applicable at the local level by the Project. However, the responsibility for assessing the compatibility of REDD+ related regulations with international programs and agreements rests with the Ministry of Environment and Sustainable Development (MADS) as the focal point for coordination. The EPCAC developed under the project ensures that stakeholders and landowners involved in this initiative have the appropriate information channels and means to learn about the context of the project from its formulation (see Section 2.2.1) as well as a communication mechanism during the implementation phase (see Section 2.5.3). In the socialization and consultation sessions with stakeholders, information was shared on: - the entities in charge of formulating and implementing the project. - the benefits to be delivered to the participants of the initiative; and - the commitments made by these participants during the implementation phase of the project activities.

N	Type	National interpretation of safeguards	Instruments for safeguards compliance identified in the Emission Reduction Project
			These consultation and information sessions were conducted in the local language (Spanish), as well as with appropriate material to facilitate the understanding of all attendees (slides, videos and bulletins). Questions, comments, requests, and complaints from interested parties will be answered through the complaints and claims mechanism (see Annex 10). Project information is also available in the VCS project database and on the National Registry for the Reduction of GHG Emissions (RENARE) platform.
3		Accountability	Mechanisms will be designed for the Foundations that are part of the initiative to present the project accounts to the private landowners they group together. The strategy will be defined by the proponents of the initiative in the framework of the design of the Benefit Sharing System, after the validation and verification of the REDD+ project, and will consider at least an annual socialization of each proponent foundation where the following will be included: • Presentation of project activity management reports to other proponents and participants. • Accountability spaces where the results of the management reports are presented to the identified stakeholders. • Availability of management reports on platforms accessible to the various stakeholders.
4		Recognition of forest governance structures	Through the implementation of the Participation, Communication and Knowledge Appropriation Strategy (EPCAC), the REDD+ project ensured the recognition and respect of institutional and community decision-makers at the local and regional levels. In the socialization and consultation sessions, the articulation mechanisms for decision-making were discussed and communication channels were established with these stakeholders to ensure their recognition in all phases of the initiative. At the local level, all the owners of the properties that are part of the initiative endorse the proponents to represent them in this initiative, as described in Section 1.7.2.

N	Type	National interpretation of safeguards	Instruments for safeguards compliance identified in the Emission Reduction Project
5		Capacity building	Educational spaces will be managed with non-profit entities and private landowners (see Section 2.2.1 and 1.11).
6	Social and cultural	Free, prior and informed consent	From the outset of the project, it has ensured that participation is effective in decision-making for its formulation (see Section 2.2.1). The Project reviewed and applied the national provisions on consultation and free, prior and informed consent applicable to REDD+ projects in accordance with current legislation, jurisprudence and guidance provided by the Ministry of the Interior as the competent entity in this area. Although the REDD+ project was not formulated or implemented on collectively owned territories and no communities are identified that may be directly affected by the implementation of the activities, the proponents applied the RENARE guidelines with respect to requesting the certificate of existence of indigenous communities from the Ministry of the Interior to validate these aspects. In addition, the project proponents managed the signing of consents with all land holders linked to the REDD+ project to avoid violating the rights of use or enjoyment of these holders due to the implementation of the initiative.
7		Respect for traditional knowledge	Within the framework of the implementation of the EPCAC, the project sought to recognize, respect and promote the traditional knowledge systems and visions of the territory of the local communities participating in the initiative, respecting their ways of understanding and relating to the environment and so that the traditional knowledge, uses and customs of these communities would not be affected. The project activities, being designed and implemented by the proponents and participants of the initiative, incorporate, recognize, and respect their traditional knowledge and practices.
8		Profit sharing	Considering that when an intervention is going to generate economic resources directly, there must be clarity on who, how and when these resources will be invested and the commitments involved, the REDD+ project proponents will design a Benefit Sharing System (BDS) that specifies the type of benefits generated (whether economic, social, cultural, or ecosystemic), the interventions to be developed, the rules or mechanisms to

N	Type	National interpretation of safeguards	Instruments for safeguards compliance identified in the Emission Reduction Project
			distribute them fairly and equitably among the parties involved, and the responsibilities assumed by the project parties in the management of these benefits. The Project's Benefit Sharing (or Distribution) System (BDS) is still under construction and will be socialized and subsequently validated in the accountability spaces defined within the BDS proposal. As a first approach, this BDS will be made up of at least: • an income structure, which will identify the activities that generate income, the participation of the communities, previously generated financial obligations and the life horizon of the income and values. • an environmental or surroundings structure, which will consider the forest areas included in the Project and related strategic or threatened ecosystems; and • the priorities for investment of benefits to ensure the permanence of project activities.
9		Land Rights	All project participants are owners and possessors of the areas that are part of the initiative, and therefore have rights of use over these lands (see Section 1.7).
10		Participation	Effective participation of project proponents has been ensured through the implementation of the EPCAC (see Section 2.2.1).
11	Environmental and territorial	Forest conservation and biodiversity	The REDD+ Project Magnolios de Yarumal is a financial instrument that will contribute to the development of measures to promote conservation processes and the maintenance of ecosystem services at the local level. The project activities are aimed at reducing deforestation through direct conservation actions, research and environmental education in rural communities (see Section 1.11).
12		Provision of environmental goods and services	The implementation of activities will never encourage the replacement of natural forests with plantations or agricultural crops, nor the introduction of exotic species that threaten local biodiversity. With respect to sustainable development priorities, the REDD+ project generated benefits as:

N	Type	National interpretation of safeguards	Instruments for safeguards compliance identified in the Emission Reduction Project
			• Incorporation of climate change measures in national policies, strategies and plans as a contribution to the national goal of reducing total greenhouse gas (GHG) emissions. • Improved education, awareness and human and institutional capacity for climate change mitigation, adaptation, mitigation, and early warning. • Adoption of urgent and significant measures to reduce deforestation/degradation of natural habitats, halt biodiversity loss, and protect endangered species and prevent their extinction. • Mobilization and increase of financial resources to conserve and sustainably use biodiversity and ecosystems. Finally, the REDD+ project foresees forest monitoring and surveillance through the monitoring of changes in forest cover in each verification period (at least every 5 years), to establish the effectiveness of the conservation activities implemented and adjust in their design and implementation based on primary information.
13		Environmental and territorial planning	The REDD+ Project Magnolios de Yarumal recognizes and respects the environmental determinants of the territory, such as the Alto de Ventanas DRMI and the land use plans of the municipalities that are part of the initiative (see Section 1.14.2).
14		Sector planning	In the municipalities where REDD+ project is being developed, there are no formal plans to develop new roads; there are road improvement plans (paving of secondary and tertiary roads) financed mainly by the Hidroituango project. The development of new roads is mainly done illegally by people who create new branches that bring the roads closer to their properties (Corantioquia, 2020) ⁸⁰ .

80 Corantioquia, Plan de Manejo 2020 - 2025 Distrito Regional de Manejo Integrado DRMI Alto de Ventanas, 2020.

N	Type	National interpretation of safeguards	Instruments for safeguards compliance identified in the Emission Reduction Project
15		Forestry Control and monitoring to prevent emissions displacement	The REDD+ Project Magnolios de Yarumal foresees forest monitoring and surveillance by tracking changes in forest cover in the project area and in the leakage belt in each verification period in accordance with the guidelines of the monitoring plan of the methodology used for the quantification of GHG emission reductions (see Section 5).

Source: South Pole (2020).

2 SAFEGUARDS

2.1 No Net Harm

The negative environmental impacts that some stakeholders perceive during project implementation are effect on the economy following the reduction in the use of land for livestock and agriculture and possible conflicts of use, occupation, and tenure. Section 2.3 details both the positive and negative environmental impacts and their mitigation.

The description of stakeholder risks in the REDD+ project listed in section 3.16.13 of VCS Standard 4.1 are described below:

- **Food security:** REDD+ Project Magnolios de Yarumal does not generate food security risk for the proponents and other stakeholder in the territory, due to local tradition the inhabitants are dedicated to livestock production despite the low productivity (Annex 6), therefore, less than 30% of the food consumed in Northern Antioquia comes from the same region (Universidad de Antioquia y Gobernación de Antioquia, 2019). In addition, prior to REDD+ Project Magnolios de Yarumal, the region had food and nutritional problems due to social and economic conditions, where food insecurity reached 73.7% (Universidad de Antioquia y Gobernación de Antioquia, 2019). Likewise, the properties where the initiative is being developed do not have family agriculture and, on the contrary, the income received by the farming families could contribute to improving access to food.
- **Land loss:** The project does not promote the sale, expropriation, or dispossession of land and all the proponents of the initiatives have legal tenure (see Section 1.7).
- **Loss of yields:** The region has low livestock and agricultural productivity (see Annex 6), but despite this and the lack of technical assistance, these activities continue to be carried out due to local traditions (see Section 3.5.3). The project will not contribute to increasing pre-existing production yields in the region.
- **Climate change adaptation.** Corantioquia's jurisdiction has a Regional Climate Change Plan (Corantioquia, 2018)⁸¹ that includes 26 measures related to climate change adaptation, mainly focused on environmental planning and risk management tools, modelling and studies, protection of water supply ecosystems and infrastructure. Magnolios REDD Project does not affect the development of these measures and, on the contrary, favors climate resilience in the territory through the conservation and protection of high Andean ecosystems. Updates to the plan and other planning instruments related to climate change adaptation will be reviewed at each verification.

2.2 Local Stakeholder Consultation

For the consultation process with stakeholders in the territory, a Strategy for Participation, Communication and Knowledge Appropriation (EPCAC) was designed, which is framed within the REDD+

⁸¹ Corantioquia, 'Plan Regional Para El Cambio Climático En La Jurisdicción de Corantioquia', 2018.

principles and social and environmental safeguards, using methodologies and instruments that guide the development of projects from a participatory and differential approach. Among its purposes, the EPCAC seeks that the processes within the framework of the formulation and implementation of the project are known, understood, and appropriated by the communities and other stakeholders, in order to promote the sustainability of the initiative, the care of forests, ecosystems and life in general.

In summary, the EPCAC consists of the development of planned and concerted actions to ensure REDD+ social safeguards, enhance the benefits of the projects for the parties involved and reduce the socio-environmental risks that may be generated in the contexts where such initiatives are developed. It also ensures participation, assertive communication and adequate implementation and monitoring of the project, through the construction of a participatory baseline with communities, institutions, and local authorities in both the formulation and implementation phases.

In conceptual terms within the social strategy, **participation** has been understood as an engine for mobilization and dynamization of the stakeholders; as a right and duty to be informed and participate in the activities developed in the territory, and as a mechanism for the reaffirmation of autonomy and the exercise of local participation. **Communication** has been understood as the transversal axis of the strategy for the participation and appropriation of the project and knowledge, the common agreement of the diversity of visions, knowledge, experiences, etc., from the dialogue and exchange of knowledge, the decentralization of information for its democratization, the collective and purposeful creation. And finally, **appropriation**, which has been understood as the space for collective production of information and its dissemination, dialogue and exchange of different knowledge for the understanding among the actors, in function of the permanence of the processes.

The EPCAC has been developing in five interrelated phases (Figure 28).



Figure 28. Participation, Communication and Knowledge Appropriation Strategy Phases (EPCAC).

Source: South Pole (2020).

REDD+ Magnolios the EPCAC has been carried out as follows:

- **Phase 1 Preparation:** The necessary information was gathered to get to know the territory and approach key stakeholders, preliminary context reading (Annex 2). Stakeholder groups or sectors were identified, and stakeholder mapping and analysis was carried out (see Section 2.5.1 and Annex 3).
- **Phase 2 and 3 Socializations and participatory construction of the Participatory Baseline:** socializations were carried out with stakeholders to inform them about the project and its objectives. Activities were also carried out to collect primary and secondary information, communication mechanisms were investigated and information letters, invitation cards, newsletters, etc. were sent. A contest was organized to choose the logo and slogan as symbols of the project's identity. Spaces were opened for the dialogue of knowledge about the REDD+ project and its connection with climate change and the actions carried out in the territories.
- **Phase 3 Validation, complementation of information and perceptions:** activities were carried out to validate and complement the information to be included in the project document. The perceptions of key stakeholders on the REDD+ initiative and its importance in the territory, as well as the positive and negative impacts, were also compiled.
- **Phase 4 Presentation of results:** activities were developed to present the main results of the project in its first monitoring period, to continue the dialogue of knowledge about the initiative and strengthen the process of dissemination and ownership of the project.
- **Phase 5 Implementation, follow-up, and continuity:** a process of interrelation developed exclusively by the project proponents with the stakeholders. Development of implementation and follow-up activities that will be extended to new verification processes.

2.2.1 Balance of participation, communication, and ownership mechanisms

Recognition of prioritized stakeholders: the stakeholders with whom contact was established in the first phases of relationship building and the call for participatory meetings, and with whom the information was validated, were as follows:

Table 12. Prioritized stakeholders in the project area.

Stakeholders	Description
Proponents of the REDD+ Project Magnolios de Yarumal	Representatives of Fundación Magnolios, Fundación Guanacas, Corporación Salvamontes, and Fundación Alto de Ventanas. The first three foundations are non-profit organizations that focus their activities on conservation and own the reserves where the project is being developed.

Stakeholders	Description
Farmers involved in the REDD+ Project Magnolios de Yarumal	67 owners of 106 plots of land. These farmers are linked to the Fundación Alto de Ventanas and Fundación Magnolios.
Local Institutional Stakeholders	Institutional stakeholders in the municipalities of the project expansion area: Yarumal, Briceño, Santa Rosa de Osos and Valdivia, specifically the Municipal Agricultural Technical Assistance Units (UMATA) and the Regional Autonomous Corporation of Central Antioquia Corantioquia.
Other local stakeholders	Minority representation in the participatory meetings of environmental roundtables, presidents of community action boards and forest rangers.

Source: South Pole (2020).

Convening of participatory workshops: for the process of socialization of the project, spaces were arranged at the offices of South Pole, the Botanical Garden of Medellin, the House of Culture of Yarumal, the community hall of the village of Santa Ana in the municipality of Briceño and, due to the health emergency caused by the Covid-19 pandemic, virtual meetings were organized using the Google Meet platform. For these virtual meetings, virtual invitation cards were designed, written offices were drafted and sent, phone calls were made, and emails and WhatsApp messages were sent. Some examples are presented in Figure 29.



Figure 29. Design of virtual card and example of invitation sent by e-mail.

Source: South Pole (2020).

Relations, previous meetings, and socialization with stakeholders: The following is a record of the meetings held within the framework of the EPCAC, showing the date, description of the objectives, place and number of attendees at each meeting.⁸²

Table 13. Record of the meetings held.

Date	Description of the meeting	Number of attendees
November 19 - 21, 2019	Meeting in the auditorium of the house of culture of the municipality of Yarumal to socialize the project and carry out a day of social mapping with stakeholders to delimit properties and also collect information on land tenure.	140
March 14, 2020	Meeting with the board of directors of Corporación Salvamontes to socialize the project, clarify key concepts and explain the carbon credit market process.	ND
July 8, 2020	A virtual meeting to present the progress of the project was held with local and regional institutional actors and proponents, and to discuss some of the conceptual issues of REDD+ projects, climate change and its relationship with local conservation initiatives.	19
August 26, 2020	Virtual meeting through the Google Meet platform in which the basis for a contest to develop a logo and slogan to identify the REDD+ Project Magnolios de Yarumal was agreed upon.	5
September 30, 2020	Virtual meeting-workshop with project proponents to socialize progress and to validate and complement the project's secondary information on stakeholder mapping, deforestation drivers and agents, and project impacts and benefits.	13
October 19, 2020	Face-to-face meeting-workshop with peasant landowners. This meeting was held at the Casa de la Cultura in Yarumal to socialize progress and validate and complement secondary information, in addition to updating the letters of intent for the National Registry for the Reduction of GHG Emissions (RENARE). One day was held in the morning and another in the afternoon to comply with Covid-19 biosafety protocols.	51
October 20, 2020	Face-to-face meeting-workshop with peasant landowners. This meeting was held in the community hall of the Santa Ana village in the municipality of	22

⁸² The invitations, minutes, photographic record and attendance lists of the meetings held can be found at Soportes/5_Estrategia social

Date	Description of the meeting	Number of attendees
	Briceño to socialize progress, validate and complement the information. The biosafety protocols were followed.	
October 27, 2020	Virtual meeting-workshop with local institutional actors and representatives of the proponent foundations to socialize progress, validate and complement project information and ask about conservation development trends in the territory.	13
Planned socialization meeting	A meeting is planned for the presentation of project results with the project proponents and institutional stakeholders. In addition, other local stakeholders such as environmental committees, forest rangers, rural schoolteachers and presidents of community action boards involved in some way in the project. The realization of this socialization will be defined considering the current conditions of the pandemic.	N/A

Source: South Pole (2020).

Despite the current conditions due to the pandemic, some face-to-face and virtual meetings were held that allowed the development of communication, participation, and ownership mechanisms (in short, local consultation) to validate the primary and secondary information described in the project document, using qualitative research techniques such as focus groups. Thus, the participation and communication strategy for the formulation phase of the REDD+ Project Magnolios de Yarumal contributed to complement the information of the participatory baseline, since it was possible to collect important documentation for the project, such as land tenure documents, updating of landowner consents for the National Registry for the Reduction of GHG Emissions (RENARE), among others. In addition, contributions from local stakeholders were collected on the agents and drivers of deforestation, leakage and impacts, and development trends in the territory.

For the different socialization meetings, including the workshops, a PowerPoint presentation was designed with the following structure:

- Reflection questions on conservation and climate change to initiate dialogue
- Climate change policy context
- Project background and progress
- Key REDD+ project concepts (agents, drivers, leakage, underlying causes, impacts, among others).
- Co-construction workshop for the identification of actors, drivers, drivers, leakage and impacts

The structure of the presentation was always the same, but some adjustments were made taking into account the audience attending the event. Matrices were designed to present and collect information, guiding questions and triggering statements that encouraged dialogue with participants.

The secondary information from the stakeholder map was arranged in a Venn diagram (see Section 2.5.1 and Annex 3) and based on the guiding questions the dialogue was opened to discuss: Do you think there is an important stakeholder missing for the conservation initiative? Which of these stakeholders do you think is not relevant for the project? What role or function does this stakeholder fulfill in the REDD+ project? Which sector does he/she belong to? What is his/her scale of action? among other questions. The participants mentioned forest rangers, environmental committees, community action boards, production companies in the region such as Colanta and Lácteos Betania, mining activities, and identified some conservation initiatives within the territory, such as the government's Más Bosques program, the UN illicit crop substitution program, the Semillas de Vida initiative of the Briceño Environmental Roundtable, the Santa Ana 2 Educational Center's initiative to educate students about the importance of the environment and reforest the water source that supplies them, and the Alto de Ventanas DRMI project, among many others.

Some of the activities mentioned above are detailed in the stakeholder map document of the REDD+ Project Magnolios de Yarumal. The final document distributes the identified stakeholders into the following five sectors: institutional, civil society and NGOs, productive and business, community, academic and knowledge. More information on the identified stakeholders can be found in Section 2.5.1 and Annex 3.

In relation to impacts, one of the questions asked was: What impacts can the REDD+ Project Magnolios de Yarumal have on the territory? In the case of local institutional actors, they made contributions regarding development trends related to conservation and triggering statements were made such as "Forest conservation does not generate impacts or benefits in the territory". The results were as follows:

Table 14. Development trends in the territory identified in the EPCAC.

Main line of action	Actions
Secretary of Natural Resources Santa Rosa de Osos	Payments for environmental services
	SILAP grants benefits for tax payments by cadastre to those who participate in conservation actions.
	SILAP's co-regional roundtables
Umata Yarumal	Implementation of agroforestry practices on different farms and characterization of these practices.
	Development of a silvopastoral project with 15 producers.

Main line of action	Actions
	Nurseries and ecological homes with Corantioquia.
	Watershed management plan that supplies water to the municipality.
	Alliance with Corporación Salvamontes to plant trees with volunteers; the goal is 40,000 trees and so far 36,000 have been planted.
	Planting trees with Reforestadora Integral de Antioquia (RIA) in the reserves as part of the "Cuencas abastecedoras" project.
	Purchase of land for conservation
	Reduction of land registry taxes for land that participates in conservation actions, by the mayor's office and the government secretary's office.
Secretariat of Environment and Tourism Briceño	Purchase of land for the conservation of water resources.
	Payment for environmental services initiatives
	Responsible management of agricultural expansion
	Implementation of pasture improvements
	Recovery of green areas in the urban area
	Environmental workshops on waste collection

Source: South Pole (2020).

Table 14 shows that no actions were identified for the municipality of Valdivia, however, the forester who attended on behalf of the municipality a posteriori, in a telephone interview, pointed out that there is an inter-administrative agreement between the municipality of Valdivia and Corantioquia for the contract of two foresters to supervise the protected areas of the Alto de Ventanas Regional Integrated Management District⁸³; This initiative has yet to be agreed upon and reaffirmed in the territory through the implementation of its Management Plan.

⁸³ Information provided in a telephone interview with the forester of the municipality of Valdivia. October 31, 2020.

Design of communication and dissemination pieces

With regard to the issue of calls and dissemination, it is important to point out that communication pieces were designed for the calls to participatory meetings and socialization of the project. The informative pieces were shared digitally with the stakeholders who have e-mail and delivered in printed form to the stakeholders in the veredal zones who do not have internet access. The following informative pieces were designed and distributed, with the purpose of expanding the messages about the initiative, its purposes and the results of the project. In addition to explaining in an understandable way, part of the carbon cycle process, among other issues.

Table 15. Evidence of newsletters.

Informative brochure	Newsletter number 1
Issued in November 2019	Issued in July 2020
Newsletter number 2	Newsletter number 3
Issued in October 2020	Issued in December 2020

Source: South Pole (2020).

Participatory management of the project's image: a contest was held to develop a logo and slogan to identify the REDD+ Project Magnolios de Yarumal. The basis for the contest was designed, providing information about the project, and a call for proposals was made throughout September 2020 with interest groups that the proponents considered relevant for this purpose. Eleven proposals were received and a first, a second and a third place were established, who were chosen considering the following elements:⁸⁴

- **Simplicity:** The logo should be easy to remember and easily recognized in any format.
- **Color:** That the colors present in the image had a purpose and were linked to the project.
- **Flexible:** Adaptable to all media (social networks, web, print communication).

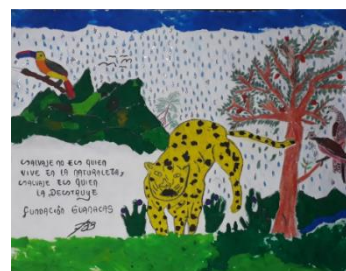
The jurors agreed that the winning logo, besides being simple and original, has elements such as: the trunk, which represents the earth and nature, and the hands as human intervention. Thus, it is possible to see a balanced relationship between the natural and the anthropic (Figure 30).



First place



Second place



Third place

Figure 30. Competition winning logos.

Source: South Pole (2020).

After the jury's verdict, the REDD+ Project Magnolios de Yarumal logo was adapted and digitized (Figure 31) and prizes were awarded to the winners.

⁸⁴ The terms and conditions of the contest and the proposals submitted to the contest can be found at [Soportes/5_Estrategia social/Concurso logo](#)



Figure 31. Digitized logo of the REDD+ Project Magnolios de Yarumal.

Source: South Pole (2020).

Photographic record: The following is a photographic record of the face-to-face and virtual meetings held during the formulation phase of the REDD+ Project Magnolios de Yarumal.



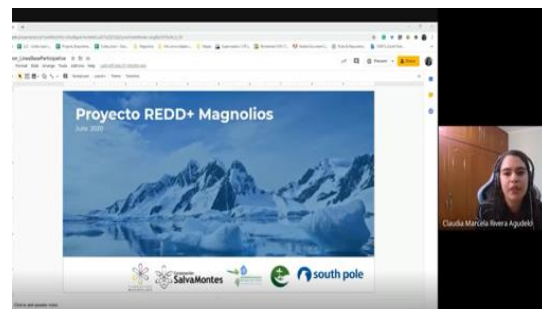
Social Mapping Workshop
Date: November 19, 2019



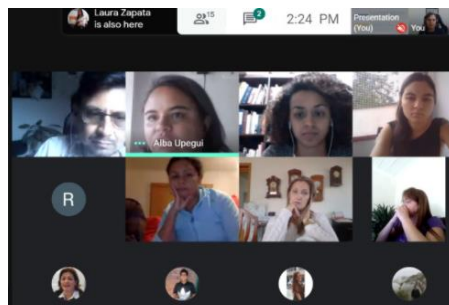
Interview in social mapping workshop
Date: November 20, 2019



Meeting with Salvamontes Board of Directors
Date: March 14, 2020



Meeting with proponents and authorities
Date: July 8, 2020



Virtual meeting with proponents
Date: August 26, 2020

Virtual meeting-workshop with proponents
Date: September 30, 2020



Meeting-workshop with farmer-owners - Yarumal
Date: October 19, 2020



Meeting-workshop with farmers - village Santa Ana
Date: October 20, 2020



Virtual meeting-workshop with local institutional stakeholders - Date: October 27, 2020

Figure 32. Photographic record of face-to-face and virtual meetings.

Source: South Pole (2020).

2.2.2 Projection of participation, communication and appropriation mechanisms

The Participation, Communication and Knowledge Appropriation Strategy (EPCAC) for the REDD+ Project Magnolios de Yarumal has been developed within the framework of project formulation and validation, and is expected to continue in the implementation, follow-up, and monitoring phase. In the first phase, participatory spaces were created to convene stakeholders who contributed to the construction of the project document by contributing their experience in the territory. In addition, the project was socialized and informed about the project, and important documentation and technical information was compiled.

In the phase of implementation of activities, follow-up and monitoring, we intend to continue the participatory exercise and propose internal coordination actions among the proponents so that they are in permanent contact for decision making. Similarly, the proponents will continue with the exercise of dissemination and socialization of the project with the stakeholders identified during the process, to establish links that favor the common objectives of the project and enable coordination strategies and alliances.

Similarly, actions are proposed to reinforce the strategic lines of the project, such as local governance and environmental education based on knowledge management. As well as follow-up actions and systematization of information as important inputs, not only for the project report, but also as support for future project verifications.

As complementary activities, the proponents will promote the identity of the project through the creation of their own media such as a Facebook page. In this sense, it would be important that the winning logo of the identity contest held during the formulation phase be visible and gain strength so that the community feels represented and motivated to continue working in favor of the conservation of the environment of its territory.

Communication opens the possibility to deliver and receive information from the different actors involved in the REDD+ Project Magnolios de Yarumal and represents an opportunity for the conservation of the forests and life itself in this territory. Therefore, it is important to focus the project's dissemination actions and pay attention to the requirements and ideas of the communities, to understand their dynamics, their way of life and how they feel and perceive their territory.

2.3 Environmental Impact

With regard to impacts, it is important to understand not only the benefits that a REDD+ initiative generates in a territory, but also the possible risks to prevent or mitigate them if necessary. In this sense, a comprehensive analysis of the impacts should consider the type of impact, whether positive or negative, the affected area and stakeholders involved, and the duration. It is proposed that the risks, impacts and benefits can be classified according to the 15 national elements for the national interpretation of REDD+ safeguards, as they are the set of instruments, agreements, processes and tools that allow addressing REDD+ measures and actions in the best possible way, ensuring the respect and guarantee of the rights of the populations in the territories, as well as the integrity of the forests and ecosystems where such actions are implemented.

Based on the Socio-Cultural and Territorial Baseline (LBSCT) (See Section 1.13.2 and Annex 2) and the Strategy for Participation, Communication and Knowledge Appropriation (EPCAC), which relates the meetings, information, consultations, agreements with stakeholders or interest groups, with the different topics of the REDD+ initiative, the positive and negative impacts were identified in general, which were socialized during the EPCAC for discussion and feedback from key stakeholders. As a result of the participation and dialogue process, key stakeholders identified the following impacts within the framework of the REDD+ Project Magnolios de Yarumal:

Table 16. Impacts identified in the Magnolios REDD+ EPCAC.

Impacto	Description
Positive impacts (Benefits)	Forest conservation resulting in benefits such as: - Prevent soil erosion. - Minimize landslides and natural disasters. - Maintain and conserve air quality. - Ensure well-being for future generations. - Provide benefits to animal and human health. - Conserve biodiversity. - Recovery of vegetation cover and return of native species. Strengthening local governance by allowing: - Generate spaces and opportunities for community meetings, to be able to relate and support each other. - Spaces to give visibility to the communities. Environmental awareness and education that allows: - Learning on the part of the communities with respect to forest conservation in the project area. - Historical value, memory of the environmental wealth of yesteryear. - Changes in people's way of thinking as they become aware of environmental conservation issues, and therefore practice more sustainable productive activities. Environmental management of strategic ecosystems
Negative impacts (Damages)	Effect on the economy following the reduction in the use of land for livestock and agriculture. Which translates as: - Reinforcement of the idea that the land is not productive if the benefits of environmental conservation are not maximized. - Limits the development of the dairy and agricultural sector, for which the proposed solution is to technify the farms so that it is not necessary to expand the agricultural frontier. Possible conflicts of use, occupation and tenure.

Source: South Pole (2020).

As shown in Table 16, the positive impacts or benefits of the project are associated with four main lines **(1) Forest conservation**, which therefore results in benefits such as prevention of soil erosion, mass movements and natural disasters, maintenance of air quality, protection of the well-being of future generations, beneficial contributions to animal and human health, biodiversity conservation, recovery of vegetation cover and return of species. **(2) Strengthening of local governance by promoting the creation of spaces and opportunities for community meetings**, for a better relationship and the creation of inter-verbal alliances; also, the REDD+ initiative as an opportunity to open spaces for the visibility of the communities. **(3) Sensitization and environmental education** that allows communities to learn about the conservation of forests in the project area, appreciation for history and memory of the environmental wealth they have had since the past; the REDD+ project as a promoter of changes in the way of thinking of people, who are acquiring higher levels of awareness about conservation, which in turn leads to awareness about making productive activities more sustainable. **(4) environmental management of strategic ecosystems**, efforts, and articulations of private and civil society groups for conservation initiatives.

Similarly, the negative impacts and risks in social and environmental terms, which the stakeholders mentioned in the dialogue and joint construction spaces, are mainly related to **(1) economic impacts** after the reduction of land use for livestock and crops, which is reflected in pastures that become stubble, reinforcement of the idea that the "territory is unproductive" if conservation benefits are not made evident, limitations for the development of the dairy and agricultural sector. **(2) Possible conflicts over use, occupation and tenure**.

Based on the above, and as a result of the description and analysis of the social context and discussions with key stakeholders in the workshops, the most appropriate mitigation actions for the management of negative impacts in the territory where the Magnolios REDD+ initiative is being developed were compiled. Some of these actions will be related to the strategic lines and short-, medium- and long-term projects that will be developed during the implementation of the REDD+ initiative, once the incentives are received (Table 17).

Table 17. Impact mitigation actions resulting from participatory work with stakeholders and interested parties.

Main line of action	Actions
Governance and consolidation of management and its continuity.	a) Institutional strengthening and articulation (Governance). b) Consolidation of the diversity of funding sources and articulation with companies in the territory. c) Alliances in various sectors, not only institutional, to seek and guarantee resources for conservation and sustainable economic activities.

Main line of action	Actions
Participation, dialogue, and conflict and risk concertation.	d) Voluntary conservation agreements e) Community workshops for conversation, recognition and articulation and agreements for sustainable development. f) Guidelines for use regimes.
Management of economic impacts	g) Sustainable partnerships: sustainable production, research and productive reconversion. h) Incentives for conservation (payments for environmental services), incentives for agricultural activities.
Mitigation of climate change and prevention of deforestation	i) Consolidation of conservation corridors j) Awareness-raising and knowledge generation: strengthening the memory of the environmental wealth of yesteryear to generate awareness of the present and the need for conservation.

Source: South Pole (2020).

All these actions are considered in this analysis of negative impacts for the REDD+ Project Magnolios de Yarumal, as the necessary measures to mitigate, manage and reduce the risks that have been identified. Part of these measures will be, in turn, those that in practice should be observed through the monitoring system that is developed from the EPCAC report item, the communication plan or matrix and the mechanism for requests, complaints, comments, queries and suggestions (see Section 2.5.3). Table 18 contains the impact matrix that allows associating the most appropriate actions defined from the analysis of the social context and the spaces for participation and joint construction with stakeholders and interested parties.

This matrix of impacts and mitigation measures (Table 18) shows how certain management actions contribute most to the mitigation, management and reduction of the two negative impacts identified in the construction workshops. These actions are institutional strengthening and articulation; consolidation of a diversity of financing sources and articulation with companies in the area; voluntary conservation agreements, promotion of community meeting and relationship spaces for conversation, recognition and articulation and sustainable development agreements; use regime guidelines; sustainable production, research and productive reconversion alliances, as well as conservation incentives. However, this analysis should be comprehensive, i.e., it should take into account the recommendations of stakeholders and all current and potential problems identified in the territory from the forestry component, but also include any other important component.

Table 18. Matrix of impacts and mitigation measures Magnolios REDD+.

Negative impact and risk	Management measure									
	A	B	C	D	E	F	G	H	I	J
Effect on the economy due to the reduction in the use of land for livestock and agriculture.	x	x	x		x	x	x	x		
Possible conflicts of use, occupation and tenure.	x	x		x	x	x	x	x	x	x

Source: South Pole (2020).

2.4 Public Comments

The draft project document was available during the listing phase for public comment from July 16, 2020 through August 15, 2020 but did not receive any comments.

2.5 AFOLU-Specific Safeguards

2.5.1 Identification of relevant stakeholders

Stakeholders were identified based on secondary information available from official sources from municipal, regional, and national governments. Subsequently, the secondary information was complemented with primary information from virtual and face-to-face meetings in the different participation spaces of the REDD+ Project Magnolios de Yarumal. Annex 3 presents the methodology, results, and analysis of the identification of relevant stakeholders.

Figure 33 presents the stakeholders identified in the participation spaces for the REDD+ Project Magnolios de Yarumal.

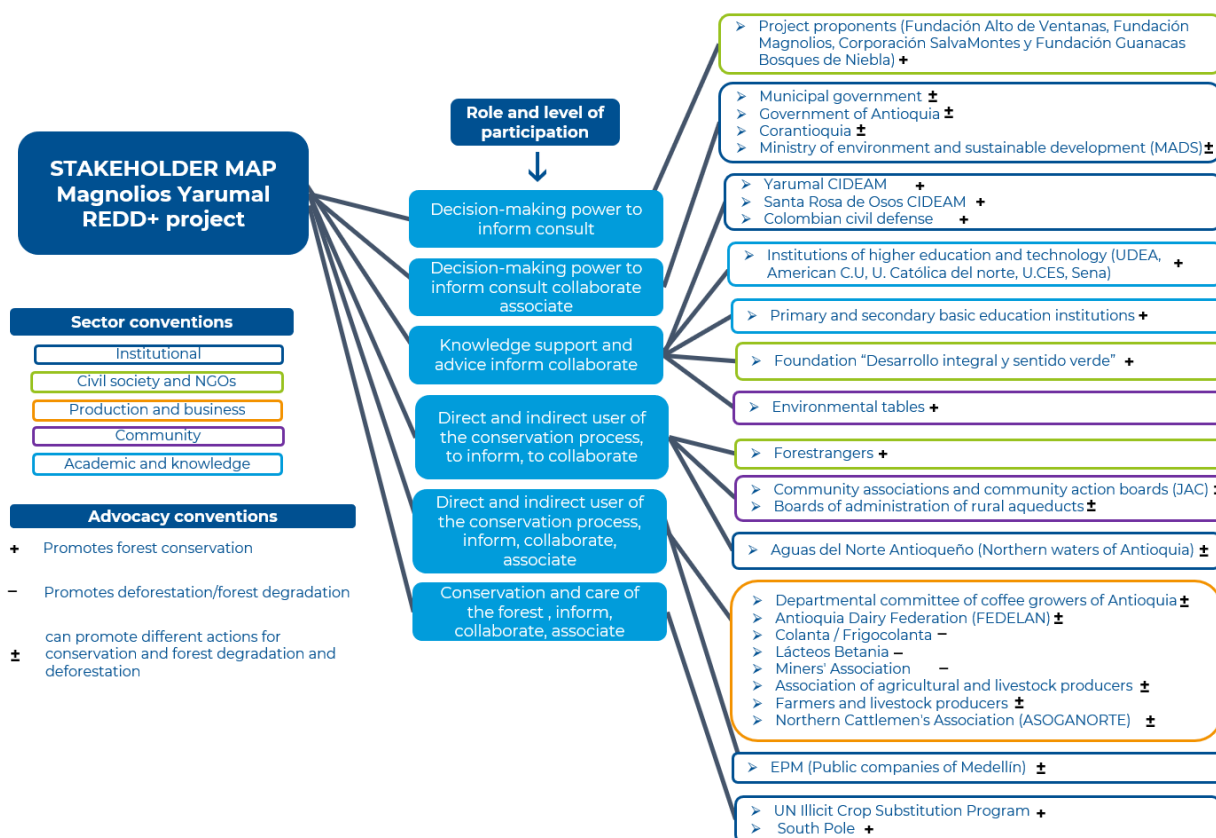


Figure 33. Stakeholder map diagram of the REDD+ Project Magnolios de Yarumal

Source: South Pole (2020).

2.5.2 Communication proposal for the implementation phase

Annex 9 presents the communication proposal to give continuity to the Participation, Communication and Knowledge Appropriation Strategy (EPCAC) in the implementation phase.

2.5.3 Complaint and grievance mechanism

Annex 10 presents the proposed grievance mechanism for the REDD+ Project Magnolios de Yarumal.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The methodology employed to develop the project is VM0015 Methodology for Avoided Unplanned Deforestation, version 1.1.

3.2 Applicability of Methodology

The VM0015 methodology has no geographical restrictions and can be used globally. Table 19 describes the conditions of applicability of the methodology and its compliance.

Table 19. Conditions of applicability of the VM0015 methodology.

Conditions of applicability	Compliance
The baseline activities may include planned or unplanned logging of wood, firewood collection, charcoal production, agricultural and grazing activities, provided that the category is unplanned deforestation as stated in the latest VCS AFOLU requirements.	The baseline activities include unplanned deforestation from activities such as dairy farming and agriculture (see Section 3.5).
Project activities may include one or a combination of the eligible categories defined in the description of the methodology scope.	The scope of the project activity is avoided deforestation without logging, (Scope A of the methodology)
The project area may include different types of forest, including, but not limiting to, growth forests, degraded forests, secondary forests, planted forests, and agroforestry systems that meet the definition of “forest”.	The project area includes six types of forest: • Lower-montane very humid forest (vhf-LM) • Tropical humid forest (hf-T) • Very humid tropical forest (vhf-T) • Pre-montane pluvial forest (pf-PM) • Lower-montane humid forest (hf-LM) • Montane pluvial forest (pf-M) Mapping of the project area and deforestation ensured compliance with the country's forest definition (see Section 1.3).
At the beginning of the project, the project area will only include land that qualifies as “forest”, being such for a minimum 10-year period before the project starting date.	For the quantification of carbon credits, the project area only includes the land classified as stable forest during the period 2005-2016 (see section 1.4).

Conditions of applicability	Compliance
The project area may include wooded wetlands (such as lowland forests, floodplain forests, mangrove forests) if they do not grow on peat. Peat will be defined as organic soils with at least 65% of organic matter and a minimum thickness of 50 cm. If the project area includes wooded wetlands growing on peat (for example, peat swamp forests), this methodology is not applicable.	The project does not include wetlands (See Section 1.13.1)

Source: South Pole (2020).

3.3 Project Boundary

According to VCS VM0015 methodology, the pools of above-ground and below-ground biomass must be included as a minimum; in the case of the REDD+ Project Magnolios de Yarumal, these pools were considered to get a more conservative approximation both of the baseline scenario and the project scenario. Table 20 describes the relevant carbon sinks for the baseline scenario and the project considered by VCS VM0015 methodology.

Table 20. Carbon pools included or excluded within the boundaries of the project area.

Carbon pool	Included?	Justification
Above-ground biomass	Trees: included	The change in carbon stocks in this carbon pool is always significant. Mandatory according to the methodology. Considered by the national NREF (see Annex 4).
	Non-tree: excluded	Optional according to the methodology.
Below-ground biomass	Included	Optional according to the methodology. Considered by the national NREF (see Annex 4). Represents 20% of aboveground biomass carbon stocks.
Litter	Excluded	Not significant for REDD projects according to the methodological requirements of the VCS v.4 ⁸⁵ and is not included in the national NREF since there is no current information available (MADS & IDEAM, 2019).
Dead wood	Excluded	
Soil organic carbon	Included	Considered by the national NREF, in which a gross emission is assumed where the soil carbon content is

⁸⁵ VCS Methodology Requirements. V4.0. September 2019

Carbon pool	Included?	Justification
		emitted in equal proportions for 20 years once the deforestation event happens (MADS & IDEAM, 2019).
Harvested wood products	Excluded	Carbon pool not included in the national NREF and is not significant since it represents less than 5% of emissions (See Annex 11) ⁸⁶ .

Source: South Pole (2020).

The GHG sources relevant to the baseline scenario and the project considered by the VM0015 methodology are presented below.

Table 21. Sources and GHGs included or excluded within the boundaries of the project area.

Source		Gas	Included?	Justification/explanation
Baseline	Biomass burning	CO ₂	Excluded	The project does not consider biomass burning under the baseline scenario. However, if emissions were considered, decreases in carbon stocks due to burning would be accounted for as a change in carbon stocks due to unplanned deforestation.
		CH ₄	Excluded	According to the methodology, omitting these gases is conservative.
		N ₂ O	Excluded	According to the methodology, omitting these gases is conservative.
	Livestock emissions	CO ₂	Excluded	According to the methodology, potential emissions are negligible
		CH ₄	Excluded	According to the methodology, GHG emissions from land-uses implemented on deforested lands are conservatively omitted.
		N ₂ O	Excluded	According to the methodology, GHG emissions from land-uses implemented on deforested lands are conservatively omitted.
Project	Biomass burning	CO ₂	Excluded	According to the methodology, this is counted as carbon stock change

⁸⁶ Significance was determined in accordance with *Tool for testing significance of GHG emissions in A/R CDM project activities*. Disponible en: <https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-04-v1.pdf>

Source		Gas	Included?	Justification/explanation
		CH ₄	Excluded	According to the methodology, omitting these gases is conservative.
		N ₂ O	Excluded	According to the methodology, omitting these gases is conservative.
	Livestock emissions	CO ₂	Excluded	According to the methodology, the potential emissions are negligible.
		CH ₄	Excluded	Project activities will not increase the amount of livestock in the project. On the contrary, the project seeks to avoid the conversion of forest to pasture and promotes alternative activities to livestock, thus reducing the amount of livestock emissions. Thus, the exclusion of livestock emissions is conservative.
		N ₂ O	Excluded	
Leakage belt	Biomass burning	CO ₂	Excluded	According to the methodology, this is counted as carbon stock change.
		CH ₄	Excluded	According to the methodology, if conservatively omitted in the baseline can be ignored in the leakage belt.
		N ₂ O	Excluded	According to the methodology, if conservatively omitted in the baseline can be ignored in the leakage belt.
	Livestock emissions	CO ₂	Excluded	According to the methodology, the potential emissions are negligible.
		CH ₄	Excluded	According to the methodology, if conservatively omitted in the baseline can be ignored in the leakage belt.
		N ₂ O	Excluded	According to the methodology, if conservatively omitted in the baseline can be ignored in the leakage belt.

Source: South Pole (2020) based on VM0015 methodology.

3.4 Baseline Scenario

The agricultural and livestock vocation, coupled with the expansion of the agricultural frontier where Magnolios REDD+ is being developed, represents a constant threat to forests, which is increased by the informality of land tenure and production systems, which cannot be improved because small and medium-sized producers do not have easy access to financing or technical assistance programs, which, moreover, are still insufficient in the country (FAO and Rural Development Agency, 2019).

On the other hand, the geostrategic location of the municipalities where Magnolios REDD+ is being developed, the favorable environmental characteristics for the development of dairy cattle ranching and the informal extraction of various minerals, poverty, displacement, lack of opportunities, weak governance and governance, and spaces conducive to the establishment of illicit crops, are the socioeconomic conditions that promote the use of natural resources and stimulate land cover change (see Annex 2 for more details).

The most likely baseline scenario was determined using the general methodological guidelines of the CDM Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities.⁸⁷ This tool was applied to the project to select the baseline scenario based on a stepwise approach consistent with the determination of additionality of project activities.

The methodological development for the selection of the project baseline was approached as follows:

- Identification of alternative land use scenarios to the AFOLU Project activity: alternative land use scenarios were identified with respect to the proposed project activities and which could be defined as a baseline scenario (see Section 3.5.1).
- Identification of barriers preventing the implementation of the proposed project activity, which in general terms included (i) financial barriers related to insufficient budget to address the implementation of the strategic lines and, (ii) institutional barriers derived from lack of budget; in addition to barriers associated with local tradition and social conditions of the project area (see Sub-Step 3a of Section 3.5.3).
- Show that the identified barriers do not prevent the implementation of at least one of the alternative land use scenarios (except the proposed project activity): within the alternative land use scenarios, cattle ranching is the only land use alternative that does not face any of the identified barriers (see Sub-Step 3b of Section 3.5.3). Table 24 shows the list of land use scenarios and the respective constraints or barriers identified.

In the absence of the project, the most likely future land use scenario would be continued deforestation and conversion of land to pasture by the development of traditional livestock and agricultural activities (see section 3.5 for more details). The project baseline scenario is a set of biophysical, social, economic and historical conditions that contribute to the identification of deforestation trends in the reference region. Indeed, the analysis of agents and drivers of deforestation concluded that the productive activities that have contributed to deforestation in the project expansion area are mainly cattle ranching and agriculture, and to a lesser extent mining and illicit crops.

Cattle ranching has traditionally been carried out in the territory for more than a century and is one of the main economic sources of income for the region; this activity is not only for productive purposes, but also as a way to secure land tenure. Agriculture is developed on a small and medium scale, initially due to the need to colonize new areas and later for the production of crops such as potatoes and tree tomatoes that supply national markets. Mining was an important economic activity during colonial times,

⁸⁷ Available at: <https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-02-v1.pdf>

but it lost relevance over time, although gold and coal mining persists in some areas. Finally, the establishment of illicit crops has been promoted by the armed conflict, mainly in the municipalities of Valdivia and Briceño (see Section 4.1.6 and Annex 6).

Considering the above, the foundations participating in the REDD+ project have worked to reduce deforestation not only inside their reserves but also in the surrounding rural communities. For example, Mauricio Mazo, the executive director of Corporación Salvamontes already had been taken some actions in the territory, before registering with the Chamber of Commerce in February 2016, mainly related to the conservation of the magnolia species.

Furthermore, although the Fundación Guanacas undertook conservation actions in the territory, initially, as an altruistic effort of its founder Rodrigo Castaño, as of 2007, they began to manage some activities of greater scope as legal entity. These activities included different initiatives of reforestation and propagation of native species, especially in the Santa Rosa de Osos municipality; however, it was not until February 2016 that the Fundación Guanacas decided to start activities to control deforestation and hired a team of four forest rangers to ensure the implementation of forest control and surveillance mechanisms, as well as some passive restoration areas in its jurisdiction area; besides participating in different activities of propagation of native species.

As of December 30, 2016, Fundación Magnolios complements the previous work of Corporación Salvamontes and Fundación Guanacas, and it is the one having taken the initiative of developing a REDD+ project pooling the efforts of non-profit entities and farmers in the Northern region of Antioquia.

Finally, the project includes actions related to the reduction of carbon emissions due to deforestation in high Andean forests in the Northern region of Antioquia, which are deforested at existing or historical rates as defined by a supervised classification analysis of satellite images. For the quantification of emissions reduction, the baseline scenario was developed considering the annual average deforestation in the reference region for the historical reference period (2005-2016). The annualized average deforestation in the reference region was 344.26 ha/year (historical rate of 0.83% per year) for the period 2005- 2016 (see Section 4.1.3).

3.5 Additionality

The “Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities - VT0001”, Version 3.0, was employed for the Additionality Analysis.

This tool is applicable because it meets the following conditions:

1. The AFOLU activities of the Project do not involve any violation of applicable laws.
2. The baseline was selected under a progressive approach that justifies the decision over the most plausible scenario for project development.

3.5.1 STEP 1. Identification of alternative land use scenarios to the proposed VCS AFOLU project activity

Sub-step 1a. Identification credible alternative land use scenarios to the proposed VCS AFOLU project activity

Livestock farming

Over the last 500 years, Colombia has undergone the transformation of its lands into livestock, agricultural, and mining use, as one of the main sources of income and ways of securing land tenure. For the year 2011, about 1.7 million holdings in Colombia were devoted to agro-livestock activities, and 49% of them were somehow related to livestock farming (González Arenas, et al., 2011)⁸⁸

Livestock farming is one of the main activities carried out in Antioquia, because the northern region of this Department is recognized as the country's dairy basin. In the project expansion area (Yarumal Briceño, Valdivia, and Santa Rosa de Osos municipalities), 77.9% of the land cover is related to agro-livestock production that involves permanent and temporary crops, and livestock farming. However, 60.8% corresponds to pastures, and 17.1% are mosaics of pastures, natural spaces and/or crops, showing the representativeness of this land use in the territory.

Livestock farming in the project expansion area is mostly extensive, with a productivity of 0.79 head/hectare. The ratio headage-number of holdings ranges from 42 to 43.8 headage per holding, values that did not change dramatically throughout the project's historical reference period (Figure 34). The highest number of specimens per hectare is in the Santa Rosa de Osos municipality, which traditionally have subsisted on livestock farming, especially for milk production.

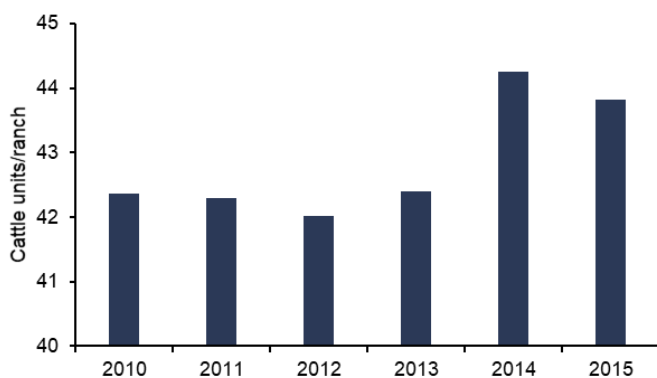


Figure 34. Headage per cattle farm for Antioquia.⁸⁹

Source: South Pole based on statistics from Fedegán (2017).

Since 2004, the number of cattle farms has been variable both at national and departmental level. Although the years 2015, 2010 and 2012 concentrated the largest amount of properties devoted to this

⁸⁸ J.J. Gonzalez and others, 'Análisis de Tendencias y Patrones Espaciales de Deforestación En Colombia' (Bogotá: Instituto de Hidrología y Meteorología y Estudios Ambientales - IDEAM).

⁸⁹ Fedegán, 2017. Statistics. Available at: <https://www.fedegan.org.co/estadisticas/inventario-ganadero>. Accessed on January 9, 2020.

purpose, the activity has always been present in the territory in at least 38.8%⁹⁰ of the farms at departmental level. This shows that despite the years when cattle farms decrease, they increase again in subsequent years (Figure 35), indicating that there is no certainty that the presence of livestock farming will reduce in the absence of the carbon project.

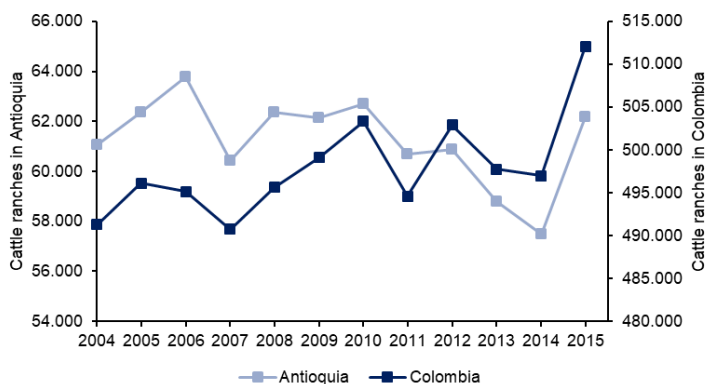


Figure 35. Cattle farms at departmental and regional level.⁹¹

Source: South Pole based on statistics from Fedegán (2017).

Agriculture

Agriculture is one of the most important economic activities of the country, over the last 25 years it has contributed on average with 15.4% of total Gross Domestic Product (GDP)⁹² (DPN, 2019)⁹³. For Antioquia it is one of the main economic activities in its rural territory (Gutiérrez, 1939)⁹⁴.

The project expansion area holds an agricultural potential of 24.2% of the Department along with other municipalities from the northern and northeastern regions (Corantioquia, 2006)⁹⁵. According to the information on land cover from the Map of Inland, Coastal, and Marine Ecosystems of Colombia (IDEAM, 2017)⁹⁶, about 10.4% of the project expansion area⁹⁷ has (permanent and temporary) crops; which

⁹⁰ Based on the approximate number of cattle farms in the Antioquia Department in 2013.

⁹¹ Fedegán, 2017. Statistics. Available at: <https://www.fedegan.org.co/estadisticas/inventario-ganadero>. Accessed on January 9, 2020.

⁹² GDP: Gross Domestic Product. Economic indicator that reflects the monetary value of all final goods and services produced by a country or region in a given period, usually a year. It is employed to measure the wealth of a country. For further information visit: <https://www.banrep.gov.co/es/estadisticas/producto-interno-bruto-pib>

⁹³ DNP, *Departamento Nacional de Planeación: Participantes En El Proyecto Visión Colombia II Centenario*, 2019.

⁹⁴ J Gutiérrez, 'Historia de La Agricultura En Antioquia', *Facultad Nacional de Agronomía*, 10.

⁹⁵ Corantioquia, 'PGAR, Plan de Gestión Ambiental Regional 2007-2019'.

⁹⁶ IDEAM, 'Updating of the Map of Inland, Coastal and Marine Ecosystems of Colombia (MEC), Scale 1:100.000',.

⁹⁷ IDEAM, 2017. Map of Inland, Coastal and Marine Ecosystems of Colombia.

implied that in 2017 this activity was among the main causes of environmental impact and advance of the cropping frontier in the northern region (Contraloría General de la Nación, 2018)⁹⁸.

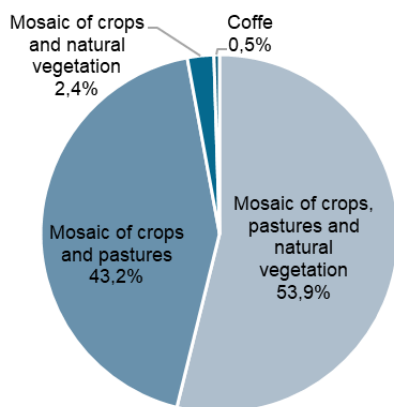


Figure 36. Share of land cover with crops in the project expansion area (Yarumal Briceño, Valdivia, Santa Rosa de Osos municipalities).

Source: South Pole based on the Map of Inland, Coastal, and Marine Ecosystems of Colombia, IDEAM (2017)⁹⁹.

During the entire period 2014-2019, in the Antioquia Department a total of 80,887 hectares of coffee, cassava, plantain, sugar cane, bean, maize, tomato, tree tomato, and potato were planted (Figure 37); coffee was the crop planted in greater quantity (59.2%), followed by plantain (18.9%). For their part, crops with smaller area were tomato (2.3%) and cassava (0.7%). In general, permanent crops presented the largest established area and the highest production, plantain accounting for 25.3%.

The evaluated crops do not have a defined behavior because they increased and decreased during the period. The largest planted area (129,080.49 ha) was established with coffee during 2015, and the smallest one was cassava in 2014, with 494.89 hectares. During 2015 and 2016 no sugar cane crops were established, and in 2019 tree tomato was not reported (Figure 38).

⁹⁸ Contraloría General Nación, *Informe Anual Sobre El Estado de Los Recursos Naturales y Del Ambiente En Antioquia 2016-2017* (s.l: s.n).

⁹⁹ IDEAM, 'Updating of the Map of Inland, Coastal and Marine Ecosystems of Colombia (MEC), Scale 1:100.000',.

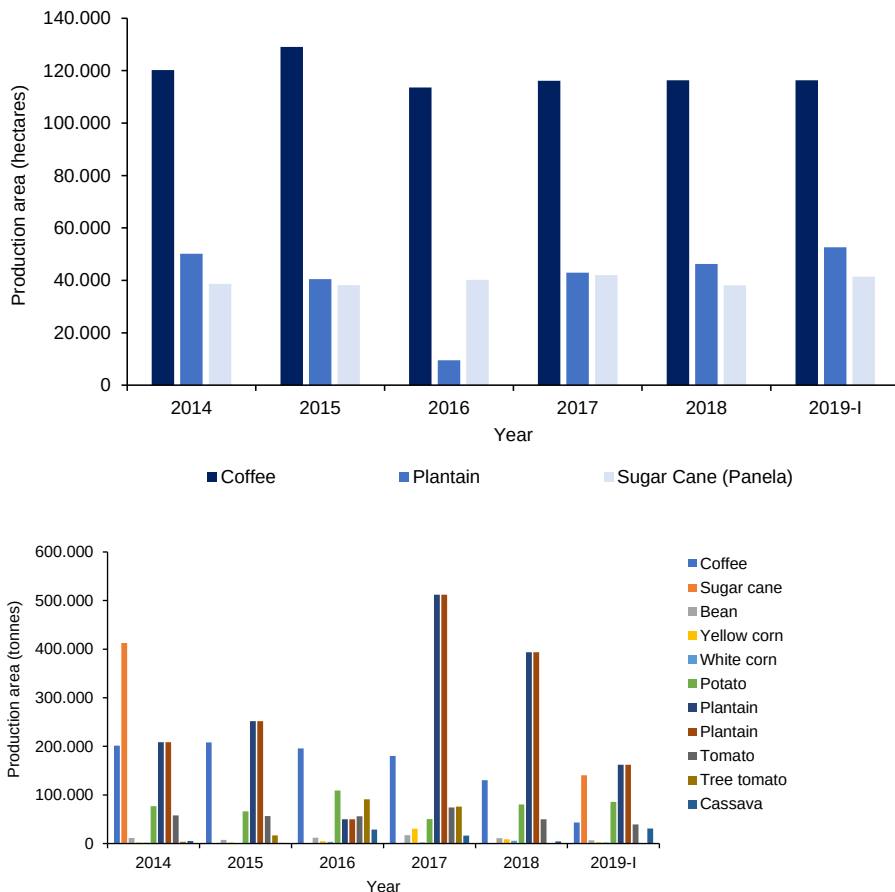


Figure 37. Departmental analysis of the main agricultural commodities in the expansion area of the REDD+ Project Magnolios de Yarumal (products with less extension area).¹⁰⁰

Source: South Pole based on historical records from the National Agro-livestock Survey (ENA).

¹⁰⁰ National Agro-livestock Survey (ENA) period 2014-2019. Available at: <https://www.dane.gov.co/index.php/estadisticas-por-tema/agropecuario/encuesta-nacional-agropecuaria-ena>. Accessed on March 6, 2020.

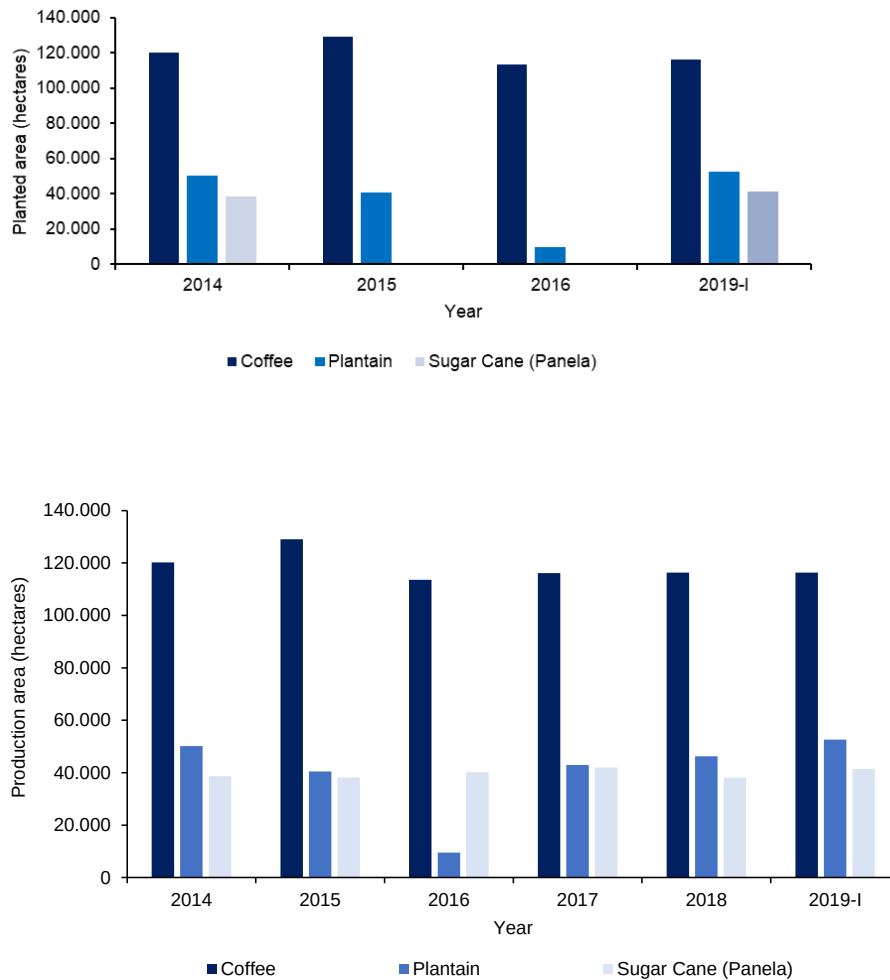


Figure 38. Departmental analysis of the main agricultural commodities in the expansion area of the REDD+ Project Magnolios de Yarumal (products with more extension area).¹⁰¹

Source: South Pole based on historical records from the National Agro-livestock Survey (ENA).

Mining

In Colombia, the historical average investment in the mining sector well above than that of other countries, given the high potential for the extraction of different mineral resources (charcoal, limestone, sands, gravels, silver, gold, among others) and their strategic location for transportation and marketing; in addition to the need of boosting and serving the international market (there is a created demand). The share of this activity in the GDP went from 1.3% in 1977 to 6.6% in 2004 (DPN, 2019), and between

¹⁰¹ National Agro-livestock Survey (ENA) period 2014-2019. Available at: <https://www.dane.gov.co/index.php/estadisticas-por-tema/agropecuario/encuesta-nacional-agropecuaria-ena>. Accessed on March 6, 2020.

2005 and 2019 it had an average of 5.7%. Colombia, like Chile and Peru, contributed with foreign investment in mining of 26% during 2016, ranking among the High-Importance¹⁰² countries, and holding the eighth position among the countries with the largest share of mining GDP, considering that 33 countries from Latin America and the Caribbean were analyzed. The project expansion region holds some of the areas with highest mining potential, such as the municipalities of Briceño and Valdivia (Corantioquia, 2006)¹⁰³.

For the period 2012-2019, the greatest production of minerals in the Antioquia Department was in limestone, gravels, clays, sands, because they are minerals of greater availability; but the extraction of gold and silver was also present. In the expansion region, the departmental production of graves and sands was 5.8% and 4.4%, respectively. In 2013, the largest amount of gravels was extracted, with a total volume of 350,416 m³.

As mentioned before, the extraction of minerals in Antioquia for the same period was also focused on the production of gold, silver, and talc; the latter being produced in Yarumal (this municipality accounts for about 51% of departmental production). In the period 2012-2019 Antioquia produced 45.6% of the country's gold (182 tons), and 60.3% of silver (61.7 tons), of which the project expansion area contributed 0.83% of gold and 1.25% of silver in the Department (production of 1.50 and 0.77 tons of gold and silver, respectively). In the period 2012-2019, the year with the highest mineral production was 2018 with 588,66 kilograms of gold and 527 kilograms of silver (Figure 39).

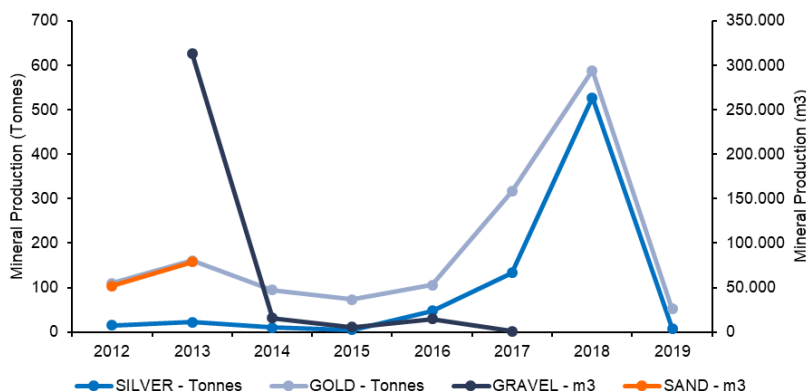


Figure 39. Production of minerals in the expansion area of the REDD+ Project Magnolios de Yarumal (Yarumal, Briceño Valdivia, and Santa Rosa de Osos municipalities).¹⁰⁴

Source: South Pole based on data from the Mining/Energy Planning Unit (UPME) (2020).

¹⁰² Highest category taking into account the mining share in the GDP. Those countries in which the mining share in the PIB is over 3.5%.

¹⁰³ Corantioquia, 'PGAR, Plan de Gestión Ambiental Regional 2007-2019'.

¹⁰⁴ UPME, 2020. Mining/Energy Planning Unit. Available at: <http://www1.upme.gov.co/simco/Cifras-Sectoriales/Paginas/mineriaconsolidadonacional.aspx>. Accessed on February 10, 2020.

The information of Figure 39 provides of legal mining and probably the substantial decline in gravel from 2013 to 2014 and, gold and silver in 2019 because of the closing of mining companies in the region. For example, the San Ramon mine operated by Red Eagle Mining stopped operations in 2019 in the municipality of Santa Rosa de Osos.

Until 2005, the expansion area of the REDD+ Project Magnolios de Yarumal had the mining-concession contract L685 with dossiers JI8-08071 and JI8-08461 for the exploitation of gold, aluminum, and concentrates, being in force from April 1, 2014, to March 31, 2044. The first dossier is in the jurisdiction of the municipalities of Gómez Plata (7.0%), Carolina del Príncipe (18.2%), and Santa Rosa de Osos (74.8%); the second one, in Carolina (1.9%), and Santa Rosa de Osos (98.1%).

Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project

The area where the activity of the REDD+ Project Magnolios de Yarumal will be developed corresponds to eight life zones where lower montane very humid forest (vhf-LM), pre-montane pluvial forest (pf-PM), and lower-montane pluvial forest (pf-LM) stand out. They are part of the Regional Integrated Management District (DRMI) of Alto de Ventanas (located in the vicinity of the municipalities of Yarumal, Valdivia, and a small part of Briceño) where their main activities focus, in general, on the protection, conservation, and sustainable use of their natural resources (Ecosistemas ESP S.A.S, 2016). Thanks to the initiative of private owners, three natural reserves were created (Salvamontes, Magnolios and Guanacas), that do not have been registered in the National System of Protected Areas (SINAP), but whose mission is the sustainable use of natural resources and the protection of plant species threatened, such as *Magnolia* spp and *Ceroxylon* spp.

The Alto de Ventanas DRMI was registered via Agreement 528 of April 26, 2018 and is located between the municipalities of Yarumal (71.8%), Valdivia (25.1%), and Briceño (3.1%). The declaration of this instrument promotes in the territory to combine strategies of preservation, conservation, and sustainable use at regional level to (i) preserve forest relicts in the Alto de Ventanas area because they have a high amount of endemisms, and (ii) to guarantee the survival of flora and fauna species threatened in some degree, according to the Red List of Threatened Species of the International Union for Conservation of Nature (IUCN)¹⁰⁵.

This protection instrument is delimited looking for ecosystem that represent unaltered natural features or altered ecosystems of special singularity, that have an environmental offer or resources allowed to be used to guarantee their conservation, that present natural or seminatural ecosystems that are not altered in more than 50% of their total surface, among others. Under these premises, it is possible to resort to a declaration that involves preparing a Preliminary Study that will present the fulfilment of the requirements provided for, a delimitation proposal, land management and zoning, the analysis and characterization of land uses, plan of activities, the Environmental Management Plan (EMP) with its

¹⁰⁵ Corantioquia, 2018. Legal technical study for the declaration of protected area in the Alto de Ventanas region.

related budget, among others, that will make possible to implement the conservation, preservation, and sustainable use strategies.

The EMP requires an approach of the programs and projects to be implemented, the budget and investment plan are limited because the Regional Autonomous Corporations –whose obligations include supervising, monitoring and evaluating the programs that are implemented in the DRMI– do not have enough money to deliver them. In many cases, the activities focused on conservation are proposed as initiatives from the owners that decide to establish reserves (Magnolios, Salvamontes, Guanacas) and through them, certain resources are managed that, in addition to being variable, they depend on the will of donors. Given the uncertainty for the lack of financial resources and formalization of the activities to be implemented, the deforestation risk remains latent, since land-use scenarios such as agriculture, mining, and livestock farming predominate; the latter being the most likely because tradition and the need to satisfy the market prevail.

The proposed EMP for the Alto de Ventanas DRMI includes seven strategic lines grouped into 14 programs and 36 projects, which seek to respond to the territory's conservation needs. The total value of the plan is COP 16,619,969,000 and more than 80% of the resources are prioritized for agro-ecological activities, ecological connectivity of the landscape and environmental management (Corantioquia, 2020)¹⁰⁶ (Table 22).

Table 22. Projected budget in the Alto de Ventanas DRMI by EMP

# Line	Name	Number of programs	Number of projects	Estimated value (COP)
1	Reconversion to sustainable systems (agroecology)	4	7	COP 5,558,131,000
2	Environmental control and procedures	1	2	COP 705,502,000
3	Landscape ecological connectivity	3	4	COP 4,763,094,000
4	Environmental management	1	4	COP 4,316,290,000
5	Primary information monitoring network	3	3	COP 851,494,000
6	Territorial governance	1	1	COP 98,620,000

¹⁰⁶ Corantioquia, *Plan de Manejo 2020 - 2025 Distrito Regional de Manejo Integrado DRMI Alto de Ventanas*.

# Line	Name	Number of programs	Number of projects	Estimated value (COP)
7	Education, environmental and outreach	1	2	COP 301,659,000
Total		14	23	COP 16,594,790,000

Source: (Corantioquia, 2020)¹⁰⁷.

Compliance with the proposed lines of the Alto de Ventanas DRMI EMP faces the following risks for its implementation (Corantioquia, 2020)¹⁰⁸:

Armed conflict and violence risks: presence in the region of criminal organizations dedicated to illicit economies in the territory.

Financial risks: the state does not have sufficient economic resources for the management of public institutions directly related to environmental policy and biodiversity. The financial resources allocated by the State are mainly concentrated on promoting and developing sectoral economic policies that promote activities such as mining, energy development, agriculture, creating infrastructure, etc., allowing these sectors to flourish, often to the detriment of the environmental protection of the territories. In order for the LDC to be economically viable, it is necessary to establish a financial sustainability strategy for protected area management.

Risks due to delegitimization: non-compliance with conservation goals due to lack of political will on the part of public entities.

Result from Sub-step 1a. Identification credible alternative land use scenarios to the proposed VCS AFOLU project activity

The alternative land-use scenarios are:

- Livestock farming
- Agriculture (subsistence and commercial)
- Mining
- Project activity on the land within the project boundary performed without being registered as the VCS AFOLU project

¹⁰⁷ Corantioquia, Plan de Manejo 2020 - 2025 Distrito Regional de Manejo Integrado DRMI Alto de Ventanas.

¹⁰⁸ Corantioquia, Plan de Manejo 2020 - 2025 Distrito Regional de Manejo Integrado DRMI Alto de Ventanas.

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

All the land-use scenarios resulting from Sub-step 1a apply to the project area, they are ruled by Colombian mandatory laws and regulations at national, regional, and local level. The evidence of this assertion is based on the promotion of these land uses in the country. Colombia has a Ministry of Agriculture and Rural Development (MADS) whose powers include making policies to develop the Agro-livestock, Fisheries, and Rural Development Sector, to guide and direct the approach of plans, programs, and projects within the areas themselves.¹⁰⁹

For its part, mining is regulated by the Ministry of Mining and Energy which is responsible for making and adopting —on a timely basis— policies, plans, programs, projects, rules and regulations for the mining and energy sector, according to the directives of the national government. In addition, it is regulated by Law 685 of 2001, and for ore reduction and marketing of minerals it is required the Single Registry of Mineral Marketers (RUCOM). The development of works and activities related to mining-exploitation projects requires an Environmental Impact Assessment (EIA) that must be submitted before the Ministry of Environment and Rural Development or the Regional Autonomous Corporations.

Although the mining activity is more regulated than the agro-livestock one, and despite all the measures and even the effort of the Department to formalize it, during 2017, 57% of the activity was carried out informally. In the northern region of the Antioquia Department, 38.6% of the exploitations are engaged in informal mining (Contraloría General de la Nación, 2018)¹¹⁰.

As to the Regional Integrated Management Districts (DMI), among which is the Alto de Ventanas, according to subparagraph d. of Article 2.2.2.1.2.1 from Decree 1076 of 2015, the DMI are part of the categories of protected areas of the SINAP. In this geographical spaces, although their structure has been modified, they are made available to human population to be used for sustainable use, preservation, restoration, knowledge, and enjoyment;¹¹¹ and they are endorsed, among others, by Decree Law 2811 of 1974, Law 99 of 1993, and Decree Law 216 of 2003 (Table 23).

The list of instruments demonstrating the legality of the credible land-use scenarios is below.

¹⁰⁹ MADR, 2020. Ministry of Agriculture and Rural Development. Available at: <https://www.minagricultura.gov.co/ministerio/quienes-somos/Paginas/Funciones.aspx>. Accessed on February 7, 2020.

¹¹⁰ Contraloría General de la Nación, *Informe Anual Sobre El Estado de Los Recursos Naturales y Del Ambiental En Antioquia*, 2018.

¹¹¹ Presidency of the Republic, 2015. Decree 1076 of 2015. Available at: <http://www.suin-juriscol.gov.co/viewDocument.asp?ruta=Decretos/30019960>. Accessed on February 7, 2020.

Table 23. Laws, decrees, and resolutions proving the legality of land use.

Activity	Regulation	Note	Specific articles
Livestock farming	Law No. 0089 of December 10, 1993, and Decree No. 696 of March 30, 1994	“By which the Quota of Livestock and Dairy Development is created, and the National Livestock Fund is created.”	Article 1. The parafiscal contribution to promote the livestock and dairy sector will abide by the conditions provided for in this Law, paragraph 12 of Article 150 of the National Constitution.
Agriculture	Law 160 of 1994	“By which the National System of Agrarian Reform and Peasant Rural Development is created, a subsidy for the acquisition of lands is established, the Colombian Institute of Agrarian Reform is reformed, and other provisions are issued.”	
	Resolution No. 3814 of September 27, 1995	“By which approval is granted to perform inspection visits to accounting books and other accounting supports of those who have the legal obligation of collecting and paying the Quota of Livestock and Dairy Development.”	
	Law No. 395 of August 2, 1997, and Decree No. 3044 of 1997	“By which the eradication of foot-mouth disease throughout the Colombian territory is declared of national social interest and as a health priority, and other measures aimed to this end are issued.”	
	Decree No. 1187 of June 30, 1999	“By which the Stabilization Fund to Develop the Export of Meat, Milk and Dairy Products is organized.”	
	Law 607 of 2000	By which the creation, functioning and operation of the Municipal Units of Agro-livestock Technical Assistance (UMATA) are modified; direct rural technical assistance is regulated.	
	Law 811 of 2003	By which Law 101 of 1993 is modified, the organizations of chains in the agro-livestock, fisheries, forestry, and fish-farming sectors are created, as well as the Agricultural Processing Companies (SAT), and other provisions are issued.	
	Decree No. 2255 of 2007	“By which Decree 696 of 1994 that regulates Law 89 of 1993 is modified.” Related to livestock development and the National Livestock Fund.	
	Law 1731 of 2014	“By which financing measures are adopted to reactivate the agro-livestock, fisheries, fish-farming, forestry, and agro-industrial sectors.”	

Activity	Regulation	Note	Specific articles
	Law 1776, of January 29, 2016	By which the Areas of Interest for Economic and Social Rural Development (ZIDRES) are created and developed.”	
	Law 1876 of 2017	“Through which the National System of Agro-livestock Innovation is created, and other provisions are issued.”	Article 1. The Areas of Interest for Social and Economic Rural Development (ZIDRES) are created as territories suitable for agriculture, livestock, forestry, and fish farming activities identified by the Unit of Rural Agro-livestock Planning (UPRA).
	Resolution No. 000051 of 2020	“By which the cover and crops included in the Agri-livestock Risk Management Plan for the 2020 term are established, and other provisions are issued.”	
	Resolution No. 000006 of 2020	“By which the National Plan to Promote the Marketing of Production from the Peasant, Family, and Community Economy is adopted, drafted as provided for in Point 1.3.3.4 of the Final Agreement.”	
Agriculture and livestock farming	Law No. 101 of December 23, 2020	“General law of Agro-livestock and Fisheries Development”.	
	Decree 1071 of 2015	“By which the Single Regulatory Decree of the Administrative, Agro-livestock, Fisheries, and Rural Development Sector is issued.”	Article 1.1.1.1. The Ministry of Agriculture and Rural Development is in charge of guiding, controlling, and evaluating the performance of duties of their attached and associated entities, without prejudice to the decision-making powers granted to them, such as their participation in policy-making, in preparing sectoral programs, and in delivering them.
			Article 1.1.1.2. The Agro-livestock, Fisheries, and Rural Development Sector, in line with current regulations, is integrated by the Ministry of Agriculture and Rural Development and its attached and associated entities.
			Article 1.2.1.2. Entities attached to the Ministry of Agriculture and Rural Development without legal status:

Activity	Regulation	Note	Specific articles
			1. Unit of Rural Agro-livestock Planning – UPRA.
			Article 1.2.2.1. Entities attached to the Ministry of Agriculture and Rural Development without legal status:
			2. Financing Fund for the Agro-livestock Sector – FINAGRO.
			5. The Livestock Funds.
Mining	Law 685 of 2001 and Law 1382 of 2010	"By which the Mining Code is issued, and other provisions are issued."	6. Supply Corporations in which the Nation or decentralized entities of the sector, national ones, own shares or have paid-in capital.
	Decree 1666 of 2016	"By which the Single Regulatory Decree for the Administrative Sector of Mines and Energy, 1073 of 2015, is added, related to mining classification."	Article 1.To promote technical exploration and exploitation of state and private property mining resources, encouraging these activities to satisfy the requirements of their internal and external demand, and that they be harnessed in line with the principles and rules of rational exploitation of non-renewable natural and environmental resources, according to a comprehensive concept of sustainable development and economic and social strengthening of the country.
	Decree 2253 of 2017	"By which Article 365 from Law 1819 of 2016 is regulated and the Single Decree for the Administrative Sector of Mines and Energy 1073 of 2015, is added, in relation to the incentive for investments in hydrocarbons and mining."	
	Resolution 40076 of 2020	"By which the methodology of distribution and partial allocation of operating resources is defined, to encourage the comprehensive use and exploitation of non-renewable natural resources in territorial	

Activity	Regulation	Note	Specific articles
		entities for the 2019-2020 biennium, and the related allocation is made."	
DMI (Integrated Management District)	Decree Law 2811 of 1974	"It issues the National Code of Renewable Natural Resources and Protection of the Environment, which includes in Article 310 the creation of the figure Regional Districts of Integrated Management of Renewable Natural Resources to promote and legislate the national use".	
	Law 99 of 1993	"By which the Ministry of Environment is created, the Public Sector responsible for the management and conservation of the environment and renewable natural resources is rearranged, the National Environmental System (SINA) is organized, and other provisions are issued."	Article 4. It establishes the National Environmental System (SINA), comprising the Ministry of the Environment, the Regional Autonomous Corporations, departments, districts, municipalities, research institutes, and civil society.
			Article 31. It determines that the Regional Autonomous Corporations should abide by the policies and guidelines established by the Ministry of Environment and Sustainable Development.
	Decree Law 216 of 2003, related to the SINAP	"By which the goals, organizational structure of the Ministry of Environment, Housing and Territorial Development is determined, and other provisions are issued."	Article 4. The conservation and management of protected areas is a joint responsibility of the National Government, the Regional Autonomous Corporations, the territorial entities, and other actors involved in the management of protected areas. Article 14. The categories of protected areas include the Regional Integrated Management Districts, that oversee the Regional Autonomous Corporations. Articles 34 and 35. They specify the different management categories that can be assigned to the areas, and they determine the activities allowed in each one of them.

Activity	Regulation	Note	Specific articles
All	Decree 1076 of 2015	It is a compilation of the norms issued by the National Government headed by the President of the Republic. This initiative attempts to collect in a single piece of legislation all the current regulatory decrees issued as of today, which develop environmental laws.	

Source: South Pole (2020) based on the laws, decrees, and resolutions set forth.

Resultado de Sub-paso 1b. Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

The scenarios previously presented abide by the current legislation.

Sub-step 1c. Selection of the baseline scenario

The traditional livestock farming, and agricultural activities is the baseline scenario selected; they are described in Section 3.4.

According to the analysis previously conducted (sub-step 1a and 1b) and the analysis of agents and drivers of deforestation (see Section 4.1.6 and Annex 5), the activities most likely to occur in the REDD+ Project Magnolios de Yarumal expansion area if the project does not take place would be cattle ranching and agriculture (subsistence and commercial). These activities have been carried out in this area for the last 80 years¹¹².

By tradition, and despite the barrier this land uses may represent to implement the project (lack of access to credits, technological barriers, difficulties in transportation and high production costs, ecological restrictions, armed conflict, lack of association capacity, etc.), the inhabitants of rural areas prefer to continue with these practices instead of implementing different ones. On one side, livestock farming involves securing land tenure, less investment in resources and workforce, besides of a market with an attractive national consumption of milk and meat that has an annual average of 136.6 liters and 18.8 kg/year per inhabitant, respectively. On the other, agriculture is based on ancestral techniques that create stronger roots and predisposition to change from traditional systems.

In this way, thinking of modifying traditional systems for the sake of conservation practices is a difficult decision for rural inhabitants to be made and even considered. Coupled with this, because of the low fertility of soils, they prefer to deforest new areas to offset production costs and increase their profits;

¹¹² Date of official formation of Fondo Ganadero de Antioquia S.A. However, a cattle inventory of more than 30,000 head was estimated for 1976 in the Aburrá Valley (Antioquia). Source: Sourdis Nájera, Adelaida. Cattle raising: The industry that built the country. Available at: <https://www.banrepcultural.org/biblioteca-virtual/credencial-historia/numero-266/ganaderia-la-industria-que-construyo-al-pais>. Consultado el 06 de marzo de 2020.

and example of this is that, in the project expansion area, there are only 1.4% of areas as plantations versus 60.8% of pastures.

At regional level and in line with what is mentioned by Toro (2011), it is necessary to increase the production of milk and meat to satisfy the market, hoping to generate a positive impact on Antioquian livestock farming—a goal embodied in the Development Plan “Antioquia para todos, manos a la obra” [Antioquia for all, all hands on deck]— which will promote an increase in livestock production areas if production processes are not improved.

In addition to this, Visión Colombia’s fundamental principles considered that by 2019 (DPN, 2019)¹¹³ Colombian agriculture would have increased its production competitively and its ability to access international markets, offering better quality of life to rural population and the country. The proposed goals included to develop the productive potential and diversify exports, promoting the effective development of Colombian agriculture. As a result, the activities in the rural area will focus on strengthening agro-livestock activities rather than on protecting and preserving the forests.

3.5.2 STEP 2: Investment analysis

Not applicable. Barriers analysis was applied.

3.5.3 STEP 3: Barrier analysis

Sub-step 3a. Identification of barriers that would prevent the implementation of the type of proposed project activity

The barriers that prevent the implementation of the proposed project activity are listed below, considering that the AFOLU project is not registered with the VCS.

Investment barriers

The Guanacas, Salvamontes, and Magnolios nature reserves were established mainly by nature-loving supporters interested in preserving the forests of the region rather than in generating financial resources, because the protection and conservations activities yield environmental benefits and rarely economic gains. For example, to register a nature reserve as a civil-society nature reserve (RNSC) before the National System of Protected Areas (SINAP) financial resources are required and a long-term investment, and that is why people often give up. In addition to this, getting the registry does not guarantee access to financial support from the SINAP, which is not an attractive perspective for private owners, as it is the case of the Fundación Guanacas that after a two-year process decided to waive the registration process as SCNR in order to prioritize other type of activities that offer long-term economic stability.

Because of this, the foundations depend on donations or on the management of resources from the activities they can perform according to their legal status. That is why, in most cases, the conservation activities are subject to the management of financial and operational resources that can be processed

¹¹³ DNP. Departamento Nacional de Planeación: Participantes en el proyecto Visión Colombia II Centenario (2019)

through the environmental authority, which in this case would be the Regional Autonomous Corporation (CAR), Corantioquia.¹¹⁴ However, such access is difficult, for example, only Guanacas —of the three foundations— has been able to get this type of resources through a contract executed with Corantioquia in 2013 to develop and legalize the activities allowed in paramo zone of the Belmira DMI.

In 2019, Corantioquia allocated 3.1% of the general total budget for the Comprehensive Management of Protected Areas for the conservation of biodiversity, 58% of which was allocated to obligations, it implies that little budget¹¹⁵ can be invested to manage protected areas. Corantioquia has jurisdiction over 80 municipalities grouped into 7 territories where it performs formal accompaniment. On account of its legal capacity, it is responsible —within its jurisdiction— for administering the environment and the renewable natural resources and promoting their sustainable development, according to the legal provisions and policies of the Ministry of Environment, Housing and Territorial Development,¹¹⁶ which makes that the allocation of financial resources depend on the obligations and the immediate needs.

Due to the above, more than 30% of the final budget between 2014 and 2019 was mainly allocated to regulate the use of Renewable Natural Resources (RNR), the improvement of urban and rural water sanitation, and to strengthen the operating capacity for a comprehensive administration of the natural endowment, leaving a small percentage for the comprehensive management of protected areas (4.4%). Considering the period 2014-2019, the highest budget was obtained in 2015 whereas the lowest one in 2018 (Figure 40).

¹¹⁴ Corantioquia. Regional Autonomous Corporation of the Center of Antioquia.

¹¹⁵ On average between 2014-2019, less than 42% (1.345.619.199 COP) of the final budget for the comprehensive management of protected areas could be allocated for this purpose, because the obligations of Corantioquia totaled more than 58%.

¹¹⁶ Corantioquia. Regional Autonomous Corporation of the Center of Antioquia. Compilation of statutes. Available at: [http://www.corantioquia.gov.co/SiteAssets/Lists/Administrar%20Contenidos/AllItems/Estatutos%20\(Compilacion\).pdf](http://www.corantioquia.gov.co/SiteAssets/Lists/Administrar%20Contenidos/AllItems/Estatutos%20(Compilacion).pdf). Accessed on March 4, 2020.

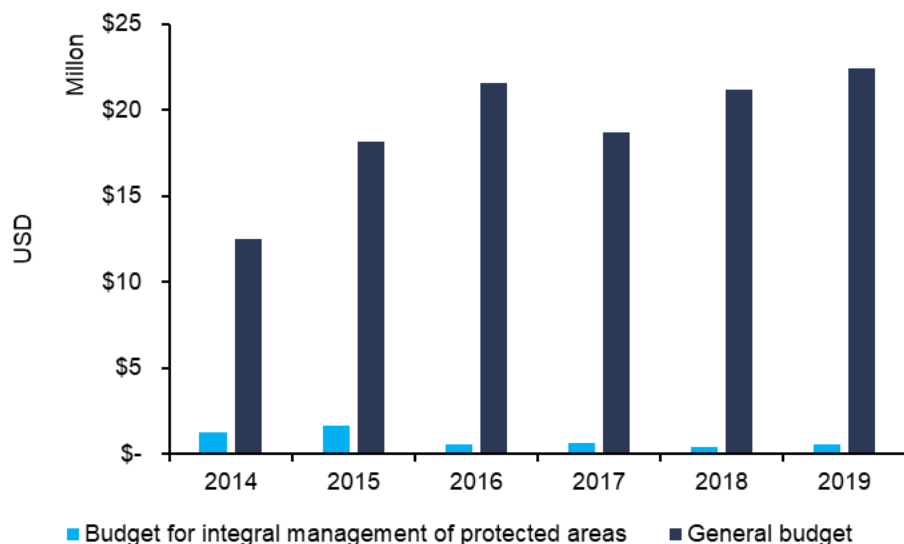


Figure 40. Execution of investment expenses of Corantioquia.¹¹⁷

Source: South Pole (2020) based on information about the budget execution of Corantioquia 2014-2019.

As to Foundations, obtaining resources for the maintenance of nature reserves is limited to the donations and revenues from the execution of projects, being always below optimal operating costs (Figure 41). To prevent generating greater losses, they must resort to hiring less staff than the really needed and reduce the budget for the implementation of conservation activities. For example, they hire less forest rangers¹¹⁸ because resources are not sufficient, generating that a large part of the land cannot be permanently supervised, as a result people not related to the project intrude because they see the benefit of extracting flora and/or fauna, leading to a loss of biodiversity and a reduction of protected forests. In addition to this, in many cases, ecological restoration measures cannot be implemented because of the costs involved in hiring and handling staff.

It can be inferred, from Figure 41, that the revenues from the private reserves proposing the REDD+ Project Magnolios de Yarumal (from donations and management of resources through projects) are less than the expenses for staff, debts, maintenance of facilities, among others costs. There is no money available for unforeseen expenses, and little budget is allocated for new activities. Furthermore, earmarked costs amount 80.2%, below the optimum for operation. During 2019 and 2020, only the Fundación Guanacas –thanks to a donation from an international conservation charity– managed to

¹¹⁷ Corantioquia 2014-2019. Budget execution. Available at: <http://www.corantioquia.gov.co/Paginas/VerContenido.aspx?List=MenuInferior&item=210>. Accessed on February 10, 2020.

¹¹⁸ Fundación Magnolios requires at least four forest rangers for the reserve; however, they have only one person who is also shared with Salvamontes Corporation, and he performs various tasks because they do not have budget to hire more labor. On the other hand, Fundación Guanacas had to reduce its team of forest rangers, from four persons in 2016, to three since 2019.

acquire a new property of 131.7 ha highly threatened to be deforested for livestock activities and that additionally has a strategic location to establish ecological connectivity in the region. Moreover, the three foundations have a current deficit over USD 62 000 for debts with banks and land taxes of several years that they owe on the properties. The foregoing proves that the lack of financial resources for the proper operation of the reserves is a barrier for the success of the conservation projects in areas where livestock and agriculture economy predominates, as well as extraction activities such as mining.

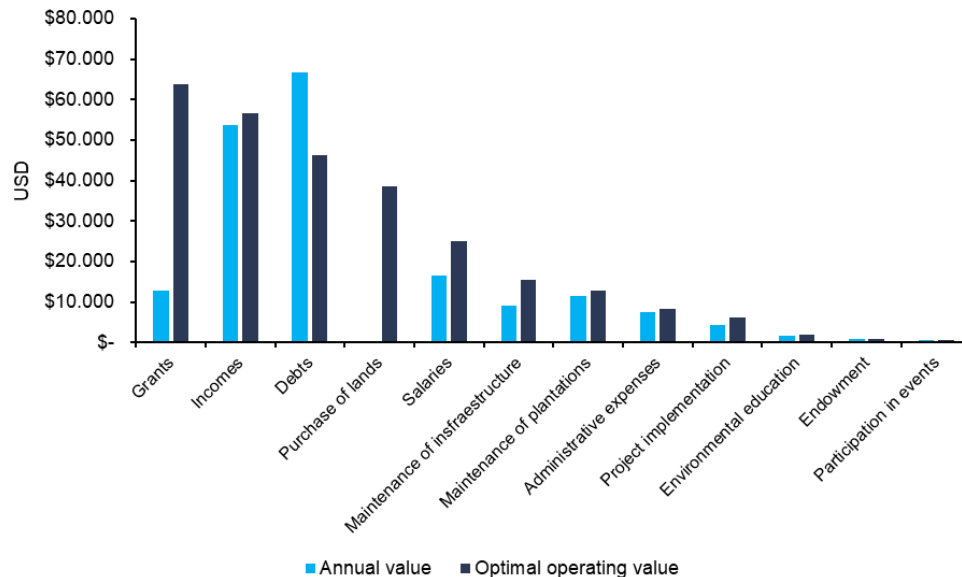


Figure 41. Operating costs of the reserves in the project expansion area of the REDD+ Project Magnolios de Yarumal for the year 2019.

Source: South Pole (2020) based on information supplied by the Magnolios and Guanacas reserves.

Institutional barriers

As previously mentioned, private nature reserves have difficulty becoming part of the SINAP, due to the time it takes to register and the fact that this does not guarantee resources for their maintenance.

To date, there are 796 Civil Society Nature Reserves (RNSC) in the country, totaling 160,399 hectares. Nevertheless, accessing the registry implies allocating budget to prepare the relevant reports and the approach of an Environmental Management Plan (EMP), which requires financial resources to collect information on the physical-biotic, sociocultural, legal, economic characteristics of the properties which, certainly, most of the owners do not have. After proposing and starting to execute the EMP, despite the fact that Decree 1076 of 2015 states that it is possible to access public incentives, the red tape and lack of clarity of the owners of the reserves versus the procedures make the registration an impossible task.

The investment operation plan of Corantioquia does not have a defined budget for the support or management of resources for regional nature reserves such as Guanacas, Salvamontes and Magnolios but rather for the management and administration of protected areas. The largest amount of capital is allocated for the control and monitoring of activities that require environmental license, protection of natural resources, education programs and risk management, but not for the promotion of private conservation sites. This situation entails that many times it is necessary to resort to the community pursuing to propose socio-economic alternatives related to the protection of biodiversity to guarantee the preservation of forests and, with them, the species threatened.

Because of their legal status, foundations and corporations have restrictions to participate in tenders or execute contracts. For example, the Fundación Magnolios can only carry out activities related to the research, study, and implementation of various aspects relevant to biodiversity and climatic change, REDD+, payments for environmental services, and the like. Corporación Salvamontes cannot perform or execute accts and contracts exceeding current one hundred monthly legal minimum wages or donations amounting the same. Although the Fundación Guanacas has a broader scope of action, it can carry out activities related to biodiversity either for protection and/or implementation. Due to these limitations, the possibility of managing resources is restricted by the time and the access to contracts. Besides, in some cases, there is a lack of administrative and operational personnel (professionals in specific fields, administrators, accountants, etc.) to increase the management capacity. Despite the responsibility of the Regional Autonomous Corporations to support this type of initiatives that enable the protection of forests and other natural resources, additional support is needed to train personnel on conservation issues.

Barriers related to local tradition

As mentioned in Sub-step 1b., livestock farming and agriculture in the region have a fairly noticeable cultural component, as a result, rural people who have forests in their properties would rather continue with the activity they have practiced ancestrally because it would be better to expand the agro-livestock frontier (greater purchasing power) than using alternative techniques, such as conservation or implement strategies that improve the productivity of their land. The profitability of conservation activities is basically nil even if it is compared to the low income provided by small-scale livestock or subsistence agriculture activities.

Given the education level of rural people (in 2017, only 49.1% enrolled in upper secondary) it is evident that most adults do not get access to higher education and, consequently, they do not have professional or technological level jobs; as a subsistence alternative, they resort to the use of land because they are knowledgeable about this activity that has been practiced since the time of their ancestors.

Besides, the strengthening of the agro-livestock productivity at regional and local levels to satisfy the market makes that the expansion region continues to be an important source of revenues for the Department. Having more than 60% of the territory covered with pastures, the population in the expansion area would prefer their traditional activities because they have greater prospects in the local market (DPN, 2019) than implementing a conservation project.

Barriers posed by social conditions and land-use practices

Up to now, there has been evidence of illicit crops for several years towards the area of Briceño, Valdivia, and even Yarumal (Figure 42). The expansion area went from 122 hectares in 2012 to 2,987 in 2018, implying that social and economic conditions of the region may have a different behavior than other regions without this problem.

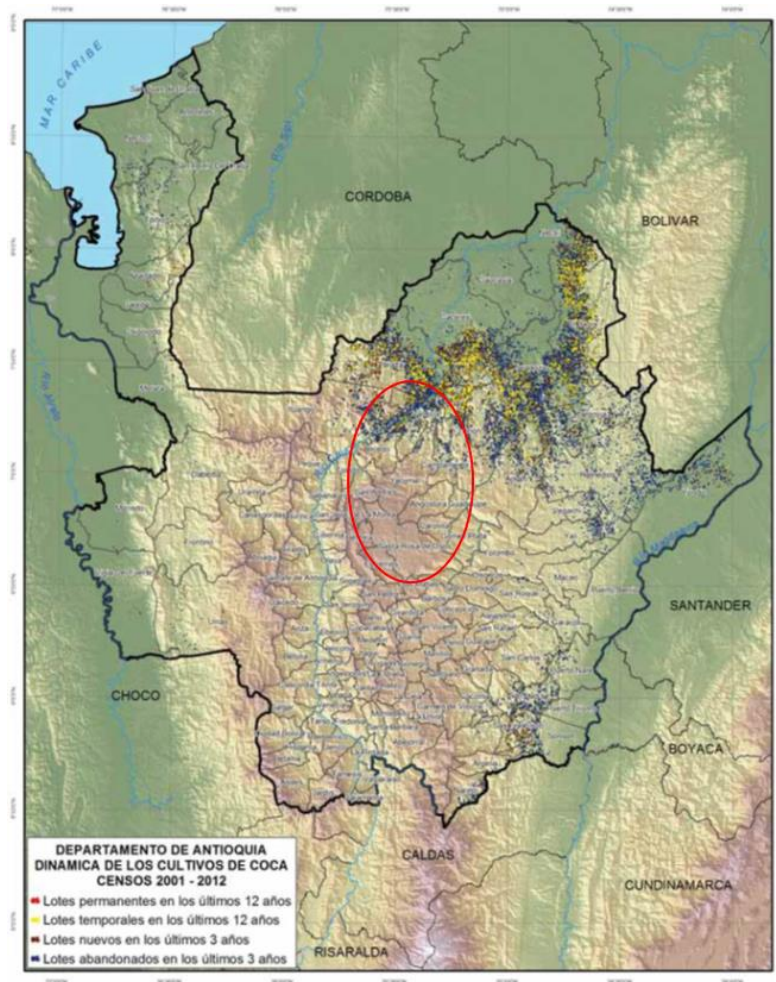


Figure 42. Dynamics of coca crops in the expansion area of the REDD+ Project Magnolios de Yarumal for the period 2001-2012.

Source: (UNODC, 2014)¹¹⁹.

¹¹⁹ UNODC, *Colombia: Monitoreo de Cultivos de Coca 2013, 2014*.

Figure 42 shows the dynamics of temporary and abandoned lots in the last three years (until 2012), mainly towards the Valdivia and Briceño area. However, from 2012 on, crops have considerably increased in the project expansion area.

It is known that in places with coca production the economic offer to work in illicit crops is better compared to legal activities like agriculture, because labor rate is higher as it is a risky activity. In addition to this, illicit crops entail other types of problems such as violence and clashes between armed groups fighting over the territory. Although in 2016, a Peace Agreement was signed in La Habana with the intention of discouraging production of illicit crops¹²⁰ and promoting the eradication of existing ones, in municipalities such as Valdivia, a significant increase in these crops has been observed.

Barriers related to land tenure

The informality of land tenure (45% in Antioquia) and its subdivision makes that owners consider the need of establishing production initiatives focused on self-consumption or the over-exploitation of resources to guarantee their income. All the owners integrating the REDD+ initiative have a legal document proving land tenure. However, owners and occupants were ruled out from the start. Subsequently, of the 216 properties that wanted to participate in the initiative, 38.9% were rejected due to additional land-tenure problems or because the owners desisted. In the first case, incomplete hereditary succession procedures, disposal of property, restitution of lands and fractional ownership (multiple owners), that is why not all could participate in the process. In the second, owners did not want to continue. Finally, the project area registers 132 properties, 0.8% have an area of less than 2.5 hectares; 14.4% between 2.5 and 10 hectares; 46.2% between 10 and 50 hectares; 20.5% between 50 and 100 hectares, and 18.2% over 100 hectares; it shows that more than 61% of the owners do not have more than 50 hectares of land.

Sub-step 3b. Showing that the identified barriers would not prevent the implementation of at least one of the alternative land-use scenarios (except the proposed project activity)

Among the alternative land-use scenarios, livestock and agriculture are activities that by tradition and despite the barriers they may pose for their implementation (lack of access to credits, technological barriers, difficulties in transportation and high production costs, ecological restrictions, armed conflict, lack of association capacity, etc.), the inhabitants of rural areas prefer to continue with these practices instead of implementing a new one. In this way, they are selected as the determined baseline scenario.

Only livestock¹²¹ will be used to quantify the reduction in emissions, because this scenario is associated with a higher content of carbon in the above-ground biomass than agriculture.¹²² Thus, it is guaranteed

¹²⁰ National Government and FARC-EP. Agreement for the termination of conflict and the construction of a stable and lasting peace. Available at: <http://www.altocomisionadoparalapaz.gov.co/procesos-y-conversaciones/Documentos%20compartidos/24-11-2016NuevoAcuerdoFinal.pdf>. Accessed on February 7, 2020.

¹²¹ Over the last years, Antioquia has featured as the Department with the largest headage number in the country.

¹²² The agriculture that takes place in the project expansion area is for subsistence and commercial purposes. There are permanent crops such as coffee, plantain, sugar cane, tree tomato; and temporary crops such as cassava, tomato, maize,

that *ex ante* estimates are conservative according to the guidelines of the VM0015 methodology. Table 24 shows the list of land-use scenarios and their respective limitations or barriers that were identified.

Table 24. Alternative land uses and identified barriers.

Alternative land use	Type of barrier
Livestock farming	It is the main land use in the territory, firstly in the rural area under environmental conditions that generate poor productivity; and the lack of economic incentives facilitating that the activity expands to other lands to increase profitability. It is mainly practiced towards the Santa Rosa de Osos and Yarumal municipalities.
Agriculture Permanent crops: Coffee, plantain, sugar cane, and tree tomato Temporary crops: cassava, tomato, maize, bean	As the second economic activity in the area, agriculture is established by the climatic conditions of the expansion area, by the variety of its life zones that allow to plant different crops (legal al illicit ones).
Mining	Barriers posed by local tradition Mining is not a main economic activity in the project expansion area. And, by tradition, people in the project expansion area have a greater vocation towards livestock and agriculture activities. For example, when the mining company Red Eagle began exploration work in the Santa Rosa de Osos municipality, there was a great rejection of the community and local authorities, after a long consensus process, they were able to start working, but they had to waive to one of the two mining titles where they intended to work, and do it in a smaller area than the planned one.

Source: South Pole (2020).

3.5.4 STEP 4: Common practice analysis

Although various initiatives have been undertaken to curb deforestation in several departments and regions of Colombia, the activities of the REDD+ Project Magnolios de Yarumal stand out from the others because they encourage the protection of forest species threatened, as the *Magnolia* spp and *Ceroxylon* spp and the propagation of native species to high-Andean ecosystems. In addition, to environmental education activities in rural communities and the reinforcement of a technical work team that carries out control, surveillance and resource management activities for the implementation of projects associated with conservation (see Section 1.11 for more details). Also, the conservation activities are proposed by

and bean. However, in 2019, Antioquia contributed 12.7% of permanent crops and 5.4% in temporary crops in the established area.

the union of Private Owners and Nature Reserves to promote the protection of those resources and increase the workforce in the region, that has mainly been dedicated to agro-livestock production and, in some cases, to illicit crops.

In the Northern and central regions of Antioquia there are 11 Regional Integrated Management Districts (DRMI), among which is Alto de Ventanas and where the REDD+ initiative is located (Table 25). This category of protection includes the sustainable use and conservation of forests, allowing the versatility of activities in the territory, tending towards, above all, to protect natural resources. Although the initiative proposes several conservation alternatives, it pursues to secure the permanence of endemic species and protect the *Magnolia* spp in closure conditions.

The Corantioquia jurisdiction has 236,856 protected hectares, 11 of them are DRMI, 3 are Regional Protective Forest Reserves (RFPR), and 1 is a Regional Natural Park (PNR). In 2019, just over 3% of the Corporation's budget was allocated to these 15 protected areas, but about 60% of it was allocated to commitments, implying that access to resources is really limited for the areas.

Table 25. Regional Integrated Management Districts in the Corantioquia jurisdiction.

Name	Year of creation	Administrative act
Ciénaga de Chiqueros	2018	Agreement 543 of August 22, 2018
Alto de Ventanas	2018	Agreement 528 of April 26, 2018.
Ciénaga de Barbacoas	2017	Agreement 493 of May 5, 2017
Ciénagas El Sapo y Hoyo Grande	2017	Agreement 508 of October 26, 2017
Cacica Noría	2016	Agreement 480 of November 29, 2016
Corredor de las Alegrías	2015	Agreement 459 of July 2, 2015
Nubes Trocha Capota	2010	Agreement of May 20, 2010
Cuchilla Jardín Támesis	2009	Agreement 316 of April 22, 2009
Divisoria Valle de Aburrá río Cauca	2007	Agreement 267 of September 10, 2007
Cañón del río Alicante	2006	Agreement 233 of October 12, 2006
Cuchilla Cerro Plateado Alto San José	2006	Agreement 244 of December 21, 2006
Ríos Barroso y San Juan	2006	Agreement 245 of December 21, 2006

Source: adapted from the Single National Registry of Protected Areas (RUNAP)¹²³

¹²³ Single National Registry of Protected Areas (RUNAP) Available at: <http://runap.parquesnacionales.gov.co/> Accessed on February 10, 2020.

As shown in Table 25, the Alto de Ventanas DRMI is the second one registered in Antioquia in 2018, presenting itself as one of the latest protection initiatives at regional level. To date, there is no registry of the Environmental Management Plan of Alto de Ventanas DRMI, so, the economic proposal for its execution is unknown due to its recent declaration. However, considering the investment plan of Corantioquia, it is fact that for the management of protected areas there are not enough resources for their maintenance since there is evidence of variability in the investment in the period 2014-2019. In 2015, 8.2% of the final budget of the corporation for the Comprehensive Management of Protected Areas for the Conservation of Biodiversity¹²⁴ was invested; however, in 2018, it was only 1.9%, which implies that there is no guarantee of the availability of resources for this activity.

In the 80 municipalities of the Corantioquia jurisdiction there are only 8 private areas registered as Civil Society Nature Reserve, 2 of them are in the project expansion area: Patio Bonito-Los Erizos¹²⁵ and El Gramero¹²⁶ located in the Santa Rosa de Osos municipality. These reserves cover an area of 14.78 ha and 10 ha respectively, accounting for less than 1% of the 251,908 ha of the project expansion area and showing the scarce incentives from the institutions to promote private conservation initiatives.

The REDD+ Project Magnolios de Yarumal is the first in the Northern region of Antioquia that works grouping areas of small farmers in a landscape-level initiative, along with private reserves. Small properties are part of this initiative that, if the proponents were not united under the grouped approach, they would not have the opportunity to implement or promote impact activities to reduce deforestation in their territory. To make this possible, a great logistic effort was required to convene peasants, to delimit the properties, and to gather the legal documents on land tenure. Besides, it is highlighted that peasants and the reserves of the project that devote their properties for conservation, they renounce on the high opportunity cost that these lands may offer if they were assigned to livestock farming and agriculture.

Despite the financial, institutional, and social barriers that non-profit entities and the owners of the project area face for the sake of conservation, they have worked together to maintain environmental education, conservation activities, biodiversity, and crops, since the project starting date. Furthermore, work has been done with government entities, through agreements, to enforce the obligations for generating environmental impacts by the Public Companies of Medellín (EPM),¹²⁷ and between the period

¹²⁴ Corantioquia. Regional Autonomous Corporation of the Center of Antioquia. Budget execution, investment expenses. Available at: <http://www.corantioquia.gov.co/Paginas/VerContenido.aspx?List=MenuInferior&item=210>. Accessed on February 07, 2020.

¹²⁵ Auto 077 de 2017. Available at: https://storage.googleapis.com/pnn-web/uploads/2017/05/Auto_077_050517_sgm.pdf. Accessed on April 20, 2020.

¹²⁶ Auto 079 de 2019. Available at: https://storage.googleapis.com/pnn-web/uploads/2017/05/Auto_079_050517_sgm.pdf. Accessed on April 20, 2020.

¹²⁷ An agreement was signed between EPM and Fundación Guanacas, within the framework of EPM's environmental obligations to compensate for its environmental impact, where Guanacas contributed with the land and EPM with the project implementation costs. Twenty-one hectares were established to compensate for closure conditions, and four hectares to compensate for the loss of biodiversity. The Fundación Guanacas had to formulate and implement the project, in addition to perform the corresponding maintenance.

2010-2015, by the Santa Rosa de Osos municipality, for reforestation, sowing, and maintenance of native species in the Guanacas village.

Finally, it is evident that the project activities focused on conservation and sustainable use of forests are not a common practice, considering that they arose from the initiatives of the owners from the area and some foundations and corporations, and not from the SINAP or from the work of the Regional Autonomous Corporation.

The proposed activities of the project aim at changing the land use from livestock and agriculture to activities with a less negative impact that allow the natural environment to recover and the connectivity among the forest covers in the area, historically very affected by the processes of social and economic development stimulated by the country's agro-livestock demand and the local tradition.

3.6 Methodology Deviations

Table 26 presents the deviations to the VM0015 methodology applied for the quantification of the net GHG emission reductions of the REDD+ Project Magnolios de Yarumal. These deviations were applied to comply with the methodological and regulatory guidelines of Resolution 1447 of 2018 and the proposed reference level of forest emissions from deforestation in Colombia for payment for REDD+ results under UNFCCC (MADS & IDEAM, 2019)¹²⁸.

Table 26. Methodology deviations.

Deviations	Justification
Definition of the land cover and land use change component and land use transition matrix.	The VM0015 methodology considers the calculation of the activity data of the initial forest classes that will be deforested and the activity data of the post-deforestation classes that will replace them in the baseline and project scenarios. The national NREF for the baseline scenario considers as activity data only the change in the area covered by forest; that is, areas for which forest is detected on the first date and no forest on the second date, so that there is certainty that the deforestation event occurred in the time period analyzed, so that the REDD+ Project Magnolios de Yarumal does not consider the definition of post-deforestation scenarios associated with specific land cover or land use or activity data associated with these changes. Thus, for the estimation of carbon stock changes the project considered only the gross change from forest to non-forest and the emission factor of the Andean biome proposed by the national NREF (see Section O), so a matrix of land use changes proposed by the methodology was not applied.

¹²⁸ MADS and IDEAM. 2019. Propuesta de nivel de referencia de las emisiones forestales por deforestación en el Bioma Amazónico de Colombia para pago por resultados de REDD+ bajo la CMNUCC

Deviations	Justification
	The selection of activity data and emission factors in the baseline scenarios is done to give compliance with the provisions of MADS Resolution 1447 of 2018 on mitigation actions at the national level.
Below ground biomass emission factors	According to the methodology, for the calculation of the factors of change in carbon values, predetermined linear functions are applied to take into account the decrease in carbon value in the initial forest classes and the increase in carbon value in the class after deforestation. Specifically for belowground biomass, the annual release of one-tenth (1/10) of the carbon value of the initial forest class at the end of the year in which deforestation occurs and the accumulation of one-tenth (1/10) of the final carbon value of the post-deforestation class are assumed. However, the national NREF assumes that all carbon contained in the aboveground and belowground biomass pool is emitted in the same year that the deforestation event occurs. The selection of activity data and emission factors in the baseline scenarios is done to give compliance with the provisions of MADS Resolution 1447 of 2018 on mitigation actions at the national level

Source: South Pole (2020).

4 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

4.1.1 Geographical boundaries

The following spatial limits were defined, considering the guidelines of VM0015 methodology.

Reference region (RR)

According to the VM0015 methodology, the reference region (RR) corresponds to the spatial delimitation of the analytic domain from which rates, agents, drivers, and usage patterns, change in land cover and use will be obtained, that will be prospected and monitored.

For the REDD+ Project Magnolios de Yarumal, the baseline was defined in accordance with the requirements of the VCS VM0015 methodology. The delimited reference region covers an area of 90,368.07 ha which is equivalent to 20.92 times the Project Area (PA) (4,319 ha¹²⁹) and is in the northern region of Antioquia in the municipalities of Yarumal, Valdivia, Briceño, Santa Rosa de Osos and Belmira (Figure 43).

¹²⁹ According to VM0015 methodology, for projects of less than 100,000 ha, the reference region should be between 20 and 40 times the size of the PA.

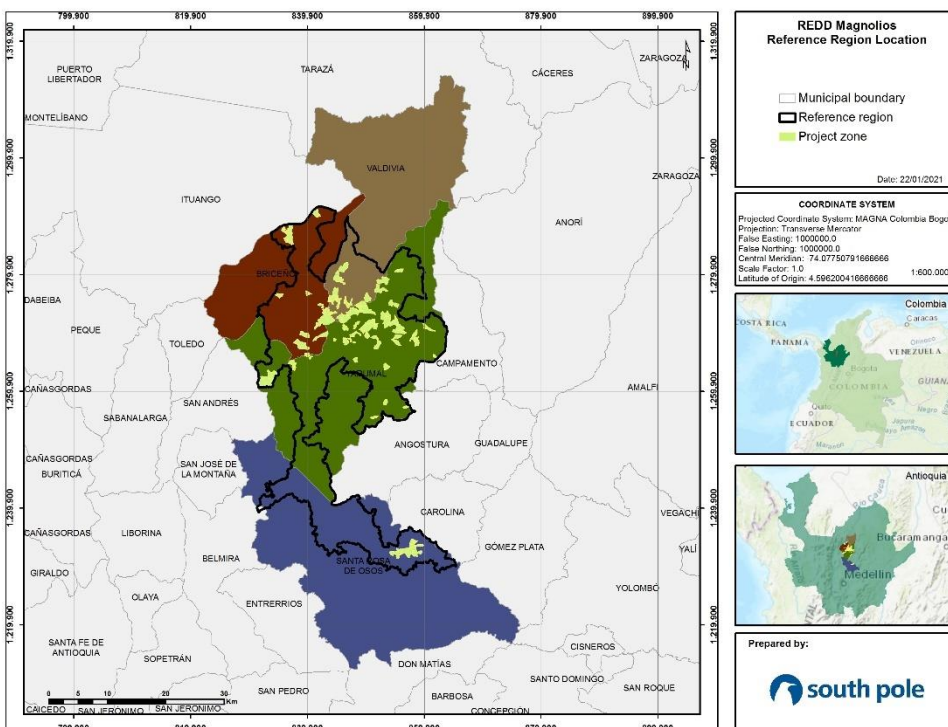


Figure 43. Map location of reference region.

Source: South Pole (2020).

The reference region was defined taking into account that the biotic, physical and social aspects were similar to the project area, according to the following criteria of the VM0015 methodology:

Agents and drivers of deforestation.

The agents and drivers of deforestation within the project area are also present in the reference region as described in Table 27.

Table 27. Agent and driver criteria for the delimitation of the reference region according to VM0015 methodology.

Conditions	Compliance
Agent groups: The deforestation agent groups expected to be found in the PA must exist or have existed and caused	The agents of deforestation in the Project Expansion Area (PEA) and Reference Region (RR) during the historical reference period are cattle ranchers and agricultural producers. These same

Conditions	Compliance
deforestation elsewhere in the reference region during the historical reference period.	agents could affect the Project Area (PA) (see Section 4.1.6).
Infrastructure drivers: If new or upgraded infrastructure (such as roads, railroads, bridges, hydroelectric reservoirs, etc.) is expected to be developed near or within the project area, the reference region should include a stratum where such infrastructure has been built in the past and where the forest cover impact has been similar to that expected from new or upgraded infrastructure in the project area.	No infrastructure will be developed or improved in the project area.
Other spatial drivers expected to influence the project area: Any spatial drivers of deforestation considered relevant (e.g., resettlement programs, mining and oil concessions, etc.) must exist or have existed elsewhere in the reference region. The historical impact of such drivers must have been similar to that expected in the project area.	Deforestation drivers do not include spatial drivers (see Section 4.1.6 and Annex 6).

Source: South Pole (2020) based on the requirements of the VM0015 methodology.

Landscape configuration and ecological conditions

Criteria for baseline use must meet at least 3 of the 4 criteria defined by VM0015 methodology. The evaluation of each condition is detailed below:

- **Forest/vegetation classes:** at least 90% of the project area must have forest classes or vegetation types that exist in at least 90% of the rest of the reference region.

For the Magnolios REDD project, 100% of the ecosystem type classes in the project area exist in the reference region and only Low Montane Rainforest, which represents 0.3% of the reference region, is not present in the project area (Table 28 and Figure 44)

Table 28. Vegetation classes in the project area and reference region.

Type of ecosystem	Project area (%)	Reference region (%)
Low Montane Rainforest	0.0	0.3
Tropical Humid Forest	0.3	0.2
Very Humid Low Montane Forest	21.3	38.7
Very Humid Tropical Forest	2.4	3.8

Type of ecosystem	Project area (%)	Reference region (%)
Montane Rainforest	0.8	0.8
Low Montane Rainforest	47.6	26.1
Premontane Rainforest	27.6	30.1

Source: South Pole (2020).

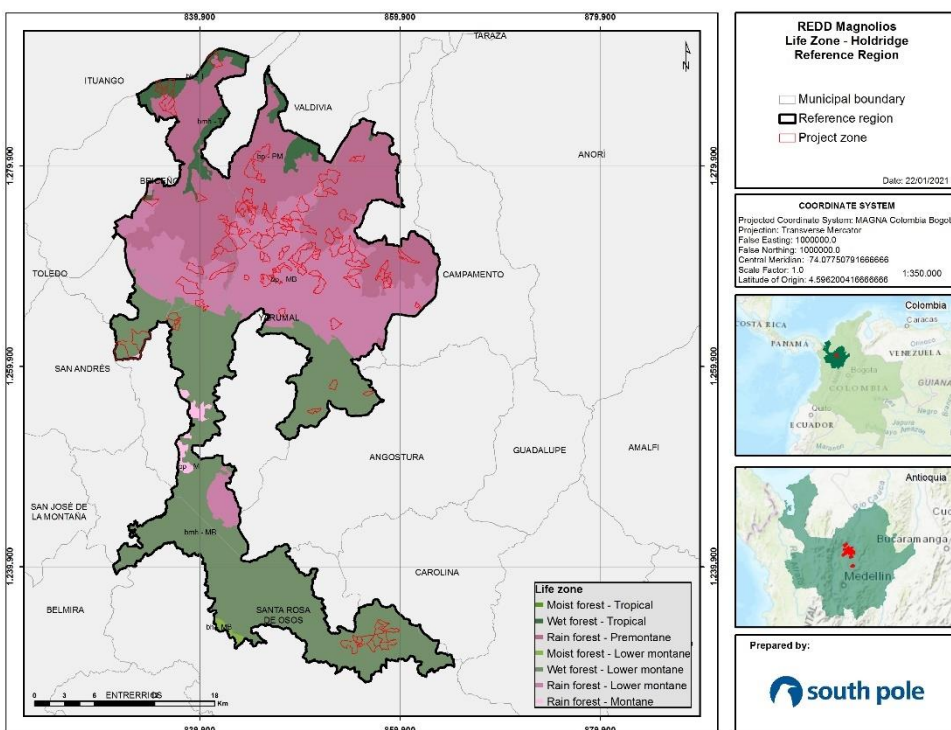


Figure 44. Map of life zones in the reference region.

Source: South Pole (2020).

- **Elevation:** at least 90% of the AP must be within the range of at least 90% of the RR.
All AP elevation ranges are within the RR (Table 29).

Table 29. Elevation classes in the project area and reference region.

Elevation range (masl)	Project area (%)	Reference region (%)
150 – 200	0.1	0.1
200 – 500	1.7	0.8
500 – 1000	2.4	7.2
1000 – 1500	9.1	14.6
1500 – 2000	34.8	20.3
2000 – 2500	35.9	28.8
2500 – 3000	16.0	28.1

Source: South Pole (2020).

- **Slope:** the average slope of at least 90% of the PA must be within $\pm 10\%$ of the average slope of 90% of the rest of the RR.

This criterion was not evaluated because it meets the other three landscape requirements.

- **Precipitation:** the average annual precipitation in at least 90% of the PA should be within $\pm 10\%$ of the average annual precipitation of at least 90% of the rest of the RR.

The average annual precipitation is 2,720 mm and 2,715 mm, for the project area and reference region, respectively. 100% of the precipitation classes in the project area exist in the reference region (Table 30).

Table 30. Precipitation classes in the project area and reference region.

Average annual precipitation (mm)	Project area (%)	Reference region (%)
2000 – 2500	24.4	21.1
2500 – 3000	62.5	62.5
3000 – 3700	13.1	16.5

Source: South Pole (2020).

Socioeconomic and cultural conditions

Economic and cultural conditions are widespread within the project area and the reference region (Table 31).

Table 31. Socioeconomic and cultural conditions criteria for the delimitation of the reference region according to VM0015 methodology.

Criteria	Description	Compliance
Socioeconomic and cultural conditions	Legal status of the land: the legal status of the land (private, forest concession, conservation concession, etc.) in the baseline within the PA must exist elsewhere in the RR. If the legal status of the PA is a unique case, it must be demonstrated that the legal status is not biasing the PA baseline (e.g., by demonstrating that access to land by deforestation agents is similar to other areas with a different legal status).	The legal status of the land in the project area is private and this condition is also generalized in PEA and RR (see Section 1.7).
	Land tenure: the land tenure system prevailing in the project area in the reference case is located elsewhere in the reference region.	Land tenure in the PA corresponds to private landowners, which is a generalized land tenure condition in PEA and RR (see Section 1.7).
	Land use: current and projected land use classes in the PA are found elsewhere in the RR.	The PA and RR have the same land use classes.
	Mandatory policies and regulations: The PA will be governed by the same policies, laws, and regulations that apply elsewhere in the RR.	Mandatory policies and regulations apply to both PA and PEA and RR (see Section 1.14).

Source: South Pole (2020).

Project area (PA)

According to VM0015 methodology, the project area (PA) corresponds to the area or areas under the control of the project proponent, where activities will be developed. On the project start date, the area should include only the forest area.

For the REDD+ project, the PA corresponds to the stable forest during the period 2005-2016, which encompasses an area of 4,319 ha and is located between the coordinates 7° 13'44.05" N - 6° 41'06.50" N and 75° 23'13.23" W - 75° 19'44.51" W (WGS84 coordinates system).

The PA does not include forests in which REDD+ project activities will not be carried out or that have not been included in the baseline assessment; and 100% of the area is under control of the project proponents at the time of validation.

Current land tenure and property are described in Section 1.7.1.

Appendix I enumerates the owners of the holdings that are part of the initiative.

Section 1.5 explains the roles of the proponents.

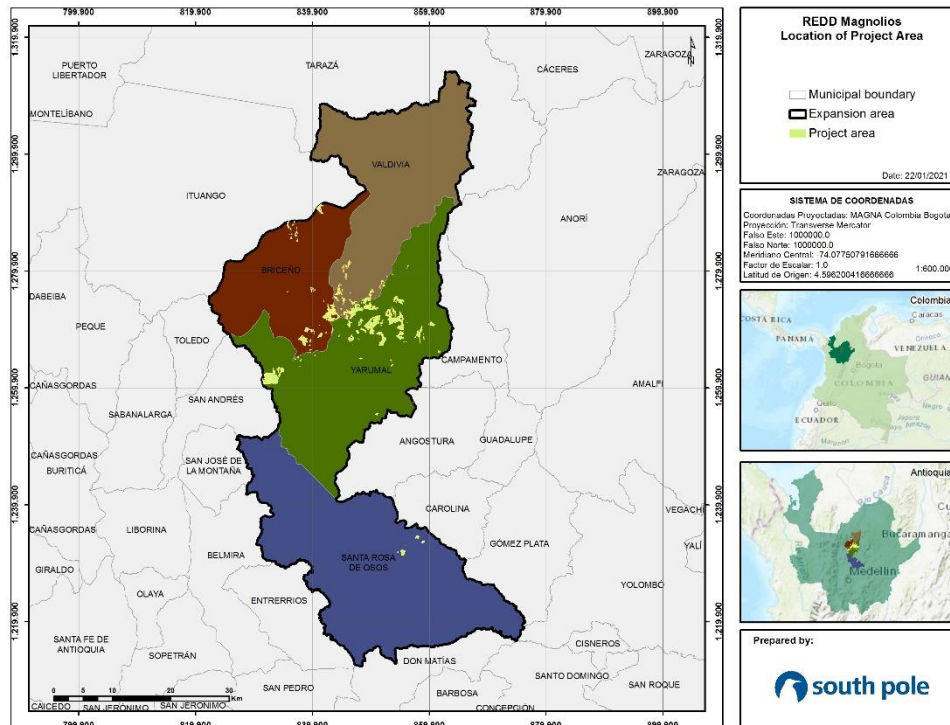


Figure 45. Location map and geographical limits of the project area.

Source: South Pole (2020).

Leakage belt (LB)

For the ex-ante estimates the leakage belt was not defined and the associated baseline emissions were not quantified. The project used an optional default leakage deduction proposed by section 3.14.13 of VCS-Standard-v4.1, in which, to account for activity displacement leakage, the project uses a 15% deduction to gross GHG emission reductions and/or removals.

Leakage management areas

To reduce the risk of leakage due to displacement of activity, the baseline deforestation agents have the option to engage in activities within the project area and in specially designated leakage management areas (outside the project area), which together will substitute for baseline revenues and outputs. However, considering the financial and institutional barriers faced by proponents for the implementation of conservation activities in the project area and that the decision to conserve forests stems from an altruistic decision, the project will not implement activities to replace the income or livelihoods of deforestation agents in the project scenario and will therefore assume within its carbon accounting all emissions displacements generated under that scenario.

However, as a preventive measure and in order to maintain a negative emissions balance, the project proponents have delimited some non-forest areas outside the project area to compensate for the displacement of emissions that may be generated; specifically 607 hectares between the coordinates 7°06'20.55"N - 6°41'11.82"N and 75°20'53.56"W - 75°29'15.17"W, which correspond to non-eligible areas in the reserves of Corporación Salvamontes and Fundación Guanacas and Magnolios, where the foundations are allowing ecosystem recovery through passive restoration and enrichment with native species (Figure 46).

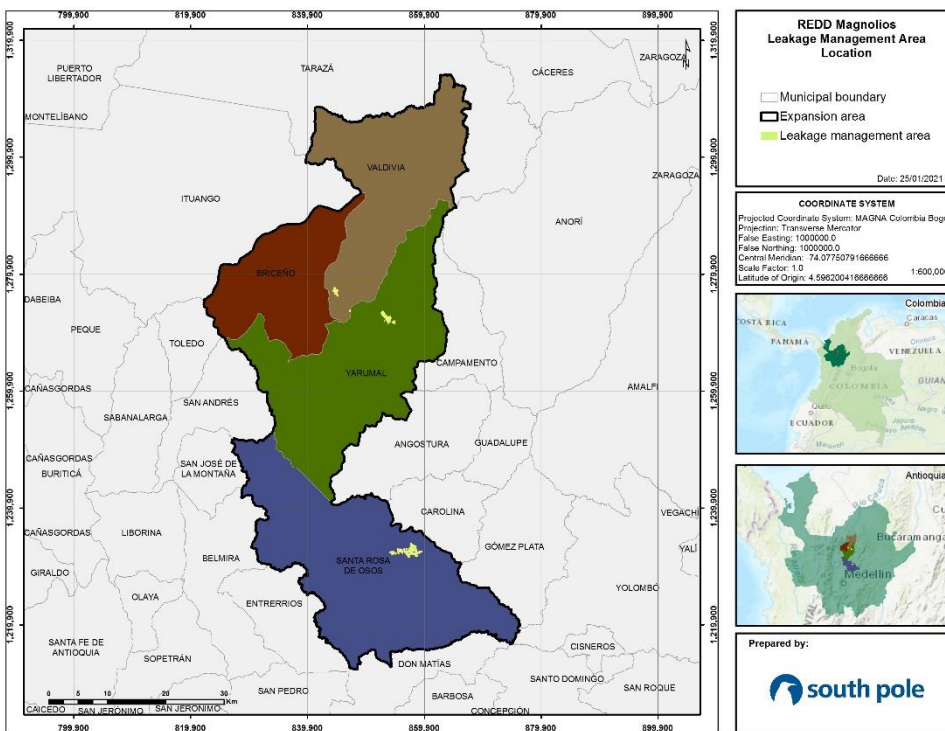


Figure 46. Leakage management area map.

Source: South Pole (2020).

The definition of forest for Colombia was used defined as any portion of land where tree-covered areas predominate with a minimum canopy density of 30%, a minimum canopy height (*in situ*) of 5 m at the time of its identification, and a minimum area of 1.0 ha; excluding tree covered areas from commercial forest plantations, palm crops, and trees planted for agro-livestock production. This definition is consistent with the criteria defined by the United Nations Framework Convention on Climate Change (UNFCCC) in its Decision 11/COP.7, with the definition adopted by Colombia before the Kyoto Protocol (MAVDT, 2002), as well as with the definition of natural forest cover included in the adaptation for Colombia of the legend from the CORINE Land Cover methodology (CLC Colombia).

4.1.2 Temporal limits

According to the selected methodology, the following temporal limits were considered:

- **Historical reference period:** for deforestation projection under the historical approach, the reference period corresponds to the years elapsed between at least three spatial data points. Considering the availability of satellite images for the classification and delimitation of forest areas, the historical reference period selected was 2005-2010-2013 and 2016 (10 years into the past with respect to the project start date).
- **REDD project crediting period:** the crediting period selected was 2016-2036, 20 years from the project start date. Project renewal will be considered for an additional 10 years, for a total accreditation period of 30 years.
- **Date for revalidation of the baseline:** considering that the baseline must be renewed every 10 years after the project start date, the date for this revalidation is 2026.
- **Monitoring period:** the monitoring period will be a minimum of one year and a maximum of five years.

4.1.3 Carbon pools

In Section 3.3 the carbon pools are described.

4.1.4 Sources of GHG emissions

In Section 3.3 the sources of GHG emissions are described.

4.1.5 Historical analysis of land use change

To obtain the forest and non-forest areas for the years 2005, 2010, 2013, and 2016 in the project area and the reference region, a supervised classification analysis was developed, using the polygon digitizing technique. Satellite images of medium spectral resolution (30 m) from sensors Landsat 7 (years 2005 and 2010) and Landsat 8 (years 2013 and 2016), in level 2 processing, were employed. Level 2 processing guarantees products with atmospheric correction in relation to the surface reflectance, radiometric correction and geometric correction, pixel by pixel, without displacement, and quality band to process clean pixels. The non-data pixels were masked out using other satellite imagery from years 2006, 2014 and 2015, from the same sensors. The images were downloaded from the Earth Resources

Observation and Science Center (EROS) server of the United States Geological Survey¹³⁰ (USGS) (Table 32).

Table 32. Cartographic information used for the analysis of historical land and land use change in the baseline scenario.

Mission	Level	Year	Data acquisition (YYYY-MM-DD)	Path	Row
Landsat 7	L2	2005	2005-01-23	09	55
Landsat 7	L2	2005	2005-08-19	09	55
Landsat 7	L2	2006	2006-06-19	09	55
Landsat 7	L2	2006	2006-08-22	09	55
Landsat 7	L2	2006	2006-09-23	09	55
Landsat 7	L2	2010	2010-01-21	09	55
Landsat 7	L2	2010	2010-05-13	09	55
Landsat 7	L2	2010	2010-05-29	09	55
Landsat 8	L2	2013	2013-07-19	09	55
Landsat 8	L2	2014	2014-07-19	09	55
Landsat 8	L2	2014	2014-12-26	09	55
Landsat 8	L2	2015	2015-12-29	09	55
Landsat 8	L2	2016	2016-05-21	09	55

A thorough and detailed classification was carried out through on-screen digitization at a scale of 1:10,000 for both forest and non-forest covers for the years 2005, 2010, 2013, and 2016, considering the definition of forest for Colombia and areas greater than 1 ha.

Overall classification accuracy

The classification accuracy for 2016 was validated through a confusion matrix with errors of commission (pixels classified as a land cover to which it does not belong) and omission (pixels that correspond to a land cover class but were not classified as such), which resulted in a percentage of the overall accuracy, comparing randomly distributed control points within the study area. The total number of points for the evaluation (327) was calculated from the total number of polygons in the 2016 cover layer (2,148),

¹³⁰ <https://earthexplorer.usgs.gov/>

considering the finite population methodology proposed by Morillas (2007)¹³¹. The GIS and RS expert evaluated this information point by point, at a scale of 1:10,000, assigning the forest cover class to each point, by observing imagery from different sources than the sensors used for the classification, such as Google Earth image repository, Microsoft Bing, and the ESRI map, for the year previously mentioned.

Table 33 shows the other parameters used.

Table 33. Parameters for calculating the number of points in the accuracy evaluation.

Variable	Description	Value
N	Number of polygons	2,148
Z α	Z value	1.96 (95%)
p	Probability	0.5 (50%)
q	1-p	0.5 (50%)
d	Maximum acceptance error accepted	0.05 (5%)
n	Number of points	327

A visual review was performed for each point, assigning the observed coverage. The confusion matrix was then calculated to evaluate the accuracy to the 2016 classification. Table 34 shows the classification accuracy by cover type and an overall accuracy, which was greater than 90%, as required by the methodology.

Table 34. 2016 classification accuracy values.

Year	Land cover	Forest	Non-forest	Total	User accuracy
2016	Forest	144	5	149	96.64%
	Non-forest	16	62	178	91.01%
	Total	160	167	327	-
	Producer accuracy	90.00%	97.00%	-	93.58%

Based on the classification layers created for the years 2005, 2010, 2013, and 2016, forest and non-forest categories were defined for each year. Then, a cartographic intersection was performed for the

¹³¹ Morillas, A. (2007). Muestreo en poblaciones finitas. Obtenido de Muestreo en Poblaciones Finitas.

years 2005, 2010, 2013, and 2016 to generate a forest change layer and the eligibility for the baseline period 2005 to 2016.

The gross deforestation rates between the years 2005 - 2010, 2010 - 2013, 2013 - 2016, and the gross deforestation rate in the baseline period 2005 - 2016 were calculated using the equation proposed by Puyravaud (2003)¹³². Gross deforestation is the loss of forest cover in a given period of time, without considering the regeneration or the forest gains (Weber et al., 2016)¹³³.

$$r = \left(\frac{A_2}{A_1} \right)^{\frac{1}{T}} - 1$$

r: Deforestation rate (%/year)

A1: Area in hectares of the forest in year 1

A2: Area in hectares of forest in year 2

T: Number of elapsed years between year 1 and year 2.

For the quantification of the emission reduction results, the baseline scenario was taken as the annual average deforestation scenario in the reference region for the period 2005 - 2016. Figure 47 presents the deforestation map for the historical period from 2005 to 2016 in the reference region and

Table 35 presents the deforestation data for each sub-period analyzed. The average historical deforestation corresponds to -0.83%.

Table 35. Deforestation data for the period 2005 - 2015 in the reference region.

Period under analysis	Annual deforestation (ha)	Average annual historical deforestation (ha)	Deforestation rate (%)	Historical deforestation rate (%)
2005 - 2010	1,047.7	344.26	-0.5%	-0.83%
2010 - 2013	900,5		-0.7%	
2013 - 2016	1,569.2		-1.3%	

Source: South Pole (2020).

¹³² Puyravaud, J.-P. (2003). Standardizing the calculation of the annual rate of deforestation. *Forest Ecology and Management*, 593-596.

¹³³ Weber, K., Walther-Thoß, J., Fleckenstein, M., & WWF, D. (2016). Deforestation-free supply chains. Concepts and implication. Obtenido de https://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/WWF-Study_Deforestation-Free_Supply_Chains.pdf

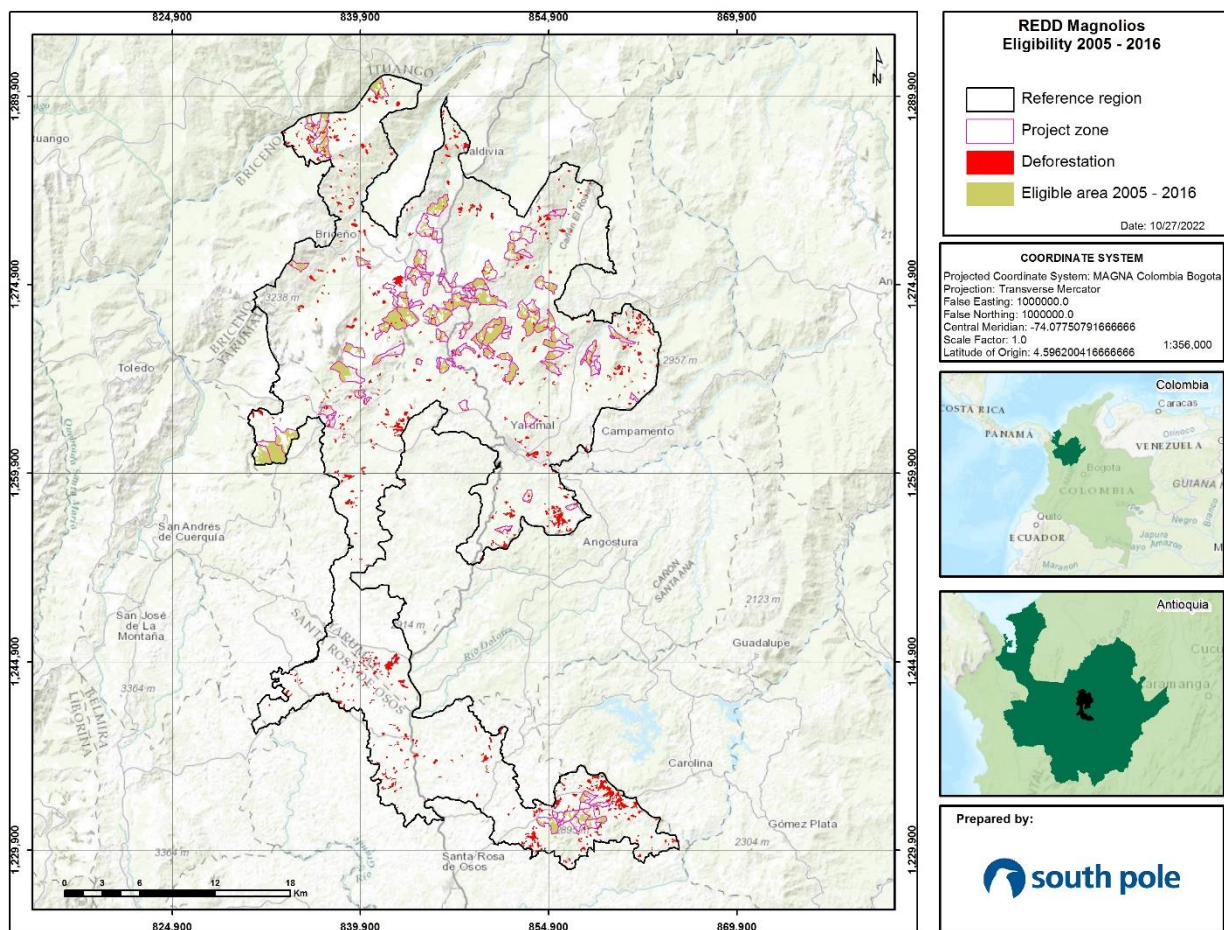


Figure 47. Deforestation map for the period from 2005 to 2016 in the reference region.

Source: South Pole (2020).

4.1.6 Analysis of agents, drivers and underlying causes of deforestation

The transformation of Colombia's forests dates back to the years 1500 to 1900, with the expansion of the Spanish colony driven by the introduction of cattle ranching (in many cases to secure land tenure), the decline of indigenous communities, the increase in the extraction of emeralds and gold, and the expansion into uncultivated areas to later introduce monocultures of coffee, tobacco, quinoa and exotic grasses, the latter because of their resistance and durability, which allowed the number of head of cattle to double.

This was also the beginning of the decline of the forests to make way for agricultural activity, characterized by small farms dedicated to the cultivation of mixed crops or large estates. The loss of large tracts of forest continued throughout history and later, with population growth, the increase in roads and monocultures, episodes of violence and migration to large cities triggered by industrialization, generated 56.9% of forest and 40.9% of non-forest in 1990. In the 1990s, illicit marijuana cultivation increased in the Caribbean and the Andes and coca cultivation in the Amazon region. After 2000, the National

Government tries to eradicate these crops, however, there was an increase of 1% between 2012 to 2013, 23% between 2013 to 2014 and 44% between 2014 to 2015, since some actors perceived that having a greater amount of areas with coca crops would allow them to access better benefits with the signing of the Peace Accords and allocated areas that were in forest for this use (González, et al., 2018). In this decade, forests are converted into small-scale agricultural production through oil palm and soybean production, which together with the expansion of illicit crops, concentrate ownership in a few actors and increase the loss of forest cover.

In 2012, the Revolutionary Armed Forces of Colombia (FARC-EP) decided to initiate the peace process with the National Government. This armed group, founded in 1964, based on disputes in the 1980s with drug traffickers over territory and the cocaine market, bases its economic income on this activity (Losada Salgado, 2010) and causes the loss of forest in Colombian territory in order to establish new crops and increase its profits. On the other hand, during the Peace Process, the expectation of liberation of lands under forest cover that were occupied by the FARC-EP increased, generated the arrival of other armed groups and livestock and agricultural producers that produced an expansion of the area dedicated to agricultural activities and therefore triggered deforestation processes (González, et al., 2018).

Historically, cattle ranching and agriculture have been the main drivers of deforestation in Colombia. In Latin America, most of the deforested land is devoted to agriculture to supply, in many cases, cattle ranching. An example of this is the production of soybean that doubled its cultivation between 1994 and 2004 and the world production of cattle tripled between 1980 and 2002, due to this, many countries were forced to import food to sustain livestock (FAO, 2007)¹³⁴. In Colombia between 2005 and 2015, the forest was reduced by approximately 1.4% due to land use change for pastures (50%), shrublands (28%), crops (7%) and grasslands (5%), which are mainly associated with extensive cattle ranching and small and medium-scale agriculture (González, et al., 2018)¹³⁵. In most cases, deforestation continues to increase on the borders with agricultural and livestock areas and forests are fragmented.

In Antioquia, one of the main causes of deforestation is the expansion of the agricultural frontier, with livestock and agricultural producers being the agents that have traditionally developed their activities and are present in all regions of the department. In 1676, more than 30,000 head of cattle were estimated in the department and by 1940 there was already the Fondo Ganadero de Antioquia S.A. (Antioquia Livestock Fund)¹³⁶. In the northern region, for example, for milk production has been recognized as one of the most important in the country (Corantioquia & CNPL, 2016)¹³⁷, this growth has resulted in the loss of forests to open new areas to satisfy the dairy market.

¹³⁴ FAO, 'Cattle Ranching and Deforestation', 2007, p. 8.

¹³⁵ J González and otros, 'Caracterización de Las Principales Causas y Agentes de La Deforestación a Nivel Nacional Período 2005-2015', in *Instituto de Hidrología, Meteorología y Estudios Ambientales – IDEAM- Ministerio de Ambiente y Desarrollo Sostenible* (Bogotá: Programa ONU-REDD Colombia).

¹³⁶ Sourdis, Adelaide, 2008. Livestock: The industry that built the country. Available at: <https://www.banrepcultural.org/biblioteca-virtual/credencial-historia/numero-266/ganaderia-la-industria-que-construyo-al-pais>. Accessed on 19 February 2020

¹³⁷ Corantioquia and CNPL, 'Fincas Lecheras', 2016.

The causes and agents of deforestation for the REDD+ Project Magnolios de Yarumal, located in the northern region of the department of Antioquia, are presented below. A detailed description of this analysis is provided in Annex 6.

Identification of deforestation agents

In order to identify the deforestation agents acting in the REDD+ Project Magnolios de Yarumal expansion area, a literature review, field surveys and project socialization workshops were conducted, where it was found that they were divided into four main groups (see more details in Annex 6):

- Livestock producer
- Agricultural producer with traditional crops for sale and self-consumption
- Agricultural coca producer
- Mineral extractors

Identification of deforestation drivers

The drivers of deforestation in the project expansion area are (see more details in Annex 6):

- Expansion of the livestock frontier
- Expansion of the agricultural frontier without coca cultivation
- Expansion of the agricultural frontier with coca cultivation
- Mining

Decision parameters

The decision parameters for the agents to make the change of use from forest to other land cover in the project expansion area are (see more details in Annex 6):

- Input costs
- Rural wages
- Market demand
- Distance to population centers
- Distance to roads
- Industrial development
- Environmental conditions
- Incentives

Identification of underlying causes of deforestation

Despite the efforts made by the National Government to monitor deforestation and subsequently curb it, it has been estimated that deforestation rates continue to increase and in a more alarming manner. However, efforts have focused on determining the direct causes of deforestation leaving aside the underlying causes that may be involved with social, political, economic, technological and cultural variables that explain the drivers of deforestation and explain how it is working.

Accordingly, the following is an explanation of the underlying causes of deforestation for the project expansion region (see more details in Annex 6):

- Low land productivity
- Land tenure
- Local tradition
- Armed conflict
- Population density
- Demographic parameters
- High levels of poverty
- State support for agricultural production
- Low state presence

Analysis of the chain of events leading to deforestation

Antioquia has a great ethnic and multicultural richness, for example, the indigenous population is distributed in 193 communities and 62 resguardos in 31 municipalities in the subregions of Bajo Cauca, Occidente, Nordeste, Norte, Magdalena Medio, Suroeste and Urabá (FAO & ADR, 2019)¹³⁸. Additionally, due to its strategic location and different climatic and ecological conditions, it is one of the departments with the largest population in the country.

Related to population, agents as the most important factor driving deforestation drivers, are mainly influenced by economic variables that are determined by access to markets, climatic and ecological conditions that allow market growth, opportunity cost, few financing opportunities and low productivity that makes factors such as livestock and agriculture take precedence over other activities that have less impact on forests. In addition, the expansion area of the project has its beginnings in agriculture and cattle ranching almost a century ago, so they are considered traditional activities because they have been passed from generation to generation and do not see conservation as an option to ensure the economic resources to sustain themselves.

Historically, cattle ranching was introduced not only as a market option but also to secure land tenure, which led to its expansion until it became one of the most lucrative businesses for ranchers. As a result, there is a lot of land in few owners, which led to a productivity of 0.79 head/hectare in 2019 in the municipalities of the project's expansion region, equivalent to an average of 1.26 hectares per cow. At

¹³⁸ FAO and ADR, 'Plan Integral de Desarrollo Agropecuario y Rural Con Enfoque Territorial', 2019.

present, the loss of primary and secondary forests by cattle ranching due to low productivity is alarming, because cattle ranchers stopped using agricultural land (post-use due to nutrient deficiency) to continue with nearby forests in order to ensure better pasture growth. Another factor that helped was the lack of knowledge of alternative systems to improve production.

On the other hand, small-scale agriculture and cattle ranching have become relevant in the territory as the main activities to reduce the unsatisfied basic needs of the population, and therefore the level of poverty. When they have the opportunity to increase their purchasing power, they buy land to continue expanding their business and often resort to deforestation because forested areas are considered of little value.

Attractive sites with the need to expand their access roads generate speculation on land prices, generating an increase in land prices and attracting livestock and agricultural producers from other regions who will continue to expand alternative roads to enter previously untouched areas, promoting deforestation.

The armed conflict and the production of illicit crops mean that in many cases patches of forest are deforested for their establishment, which is intermittent but continues throughout history. Evidenced in a high influence over the years in Valdivia and Briceño that belong to the expansion area, because despite the signing of the Peace Agreements in 2016, its increase continued.



Figure 48. Chain of events leading to deforestation in the REDD+ Project Magnolios de Yarumal.

Source: South Pole (2020).

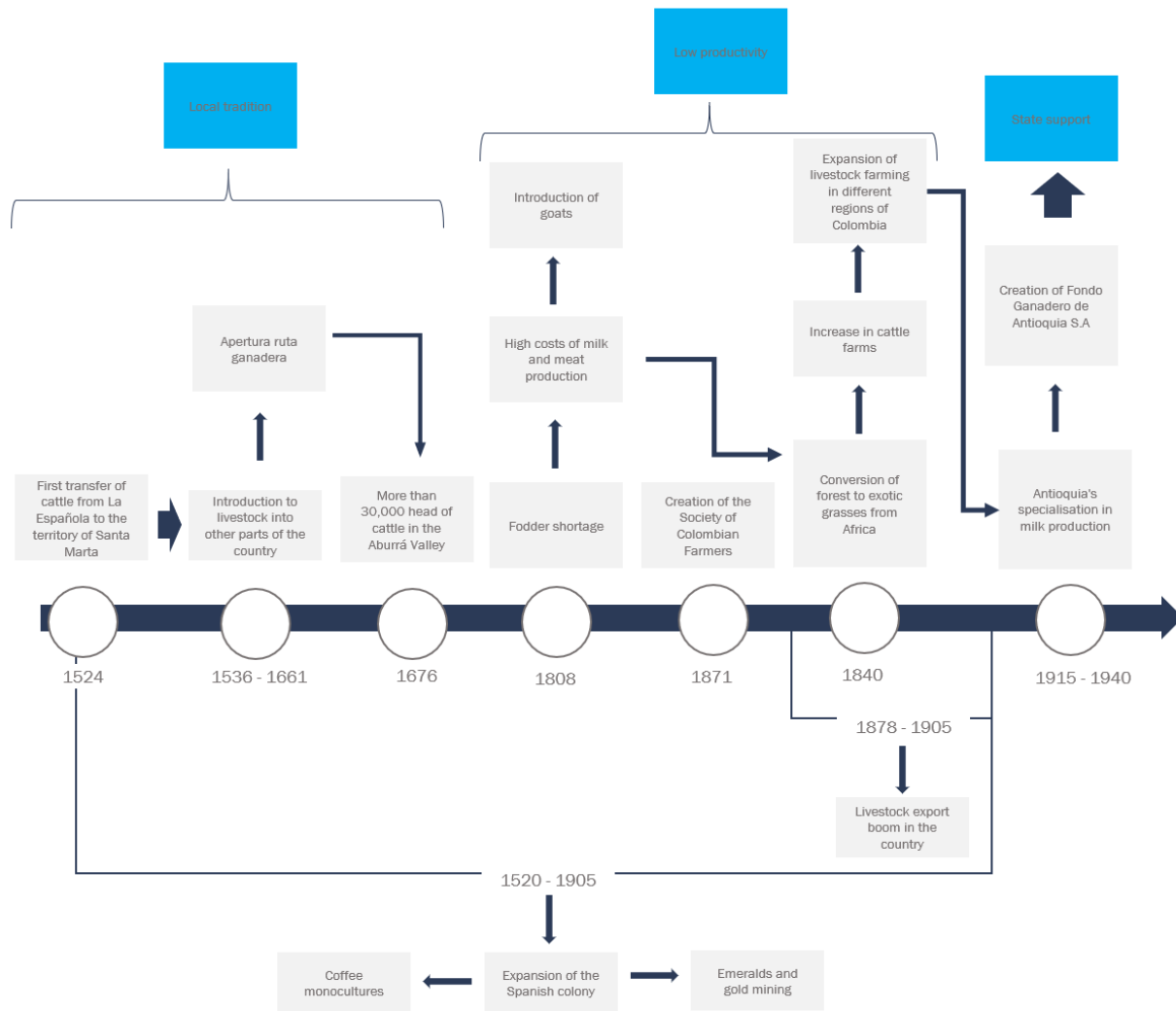


Figure 49. Timeline (part 1).

Source: South Pole (2020).

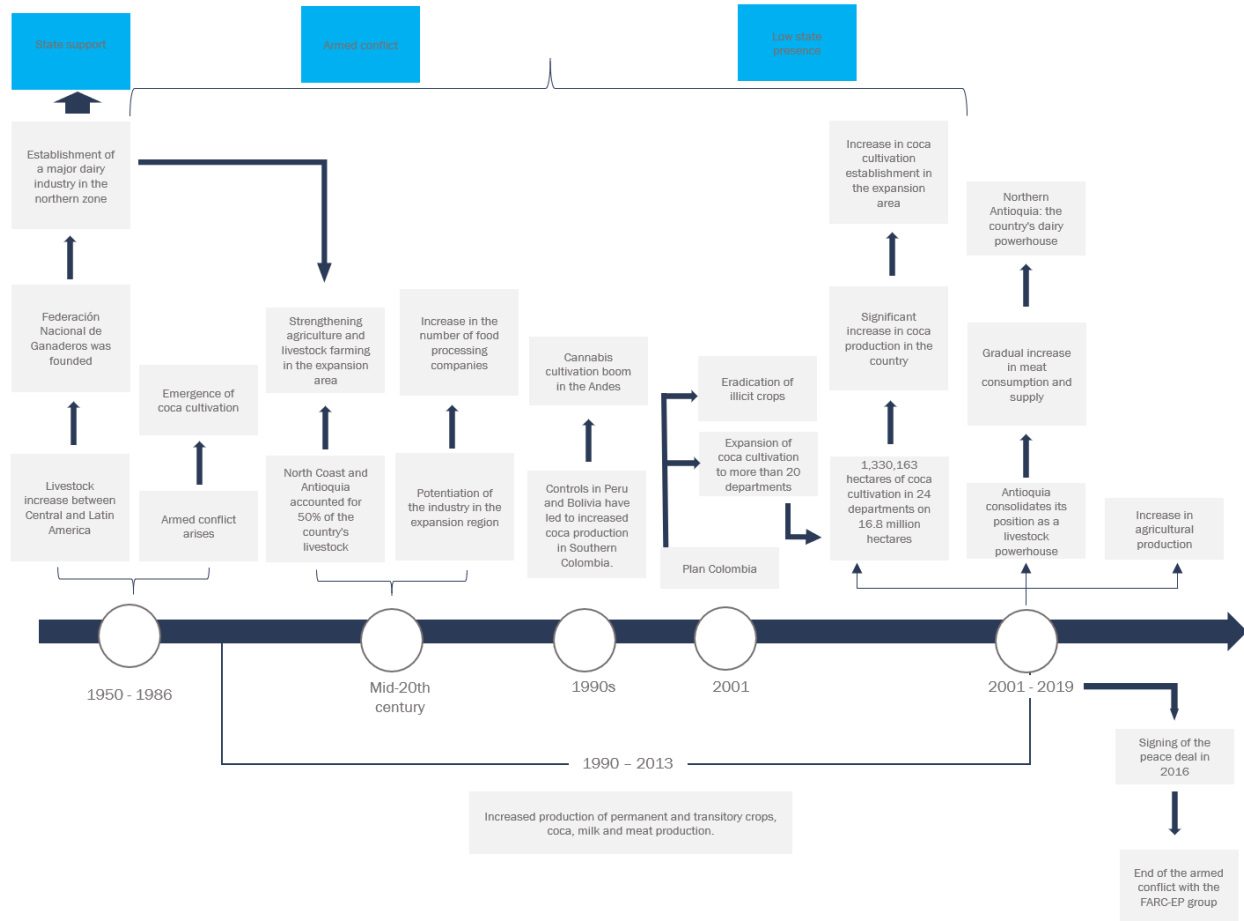


Figure 50. Timeline (part 2)

Source: South Pole (2020).

Conclusion

The analysis in this section shows that there is a strong relationship between the agents, drivers and underlying causes of deforestation. The deforestation found in the period analyzed is directly related to the agents, since approximately 75% of the reference area is associated with the agricultural frontier and only 0.4% with natural causes (landslides). It can be inferred that there is conclusive evidence of the relationship between the agents evaluated and deforestation, since throughout the entire period evaluated there is a positive deforestation rate as well as an increase in the number of agents that have been expanding into previously undisturbed areas, dramatically affecting the forests.

Additionally, the modelling of variables that could affect future deforestation was carried out and it was found that although some variables are related to historical deforestation, the detail of the cartographic information is low, so it was not possible to infer that any specific spatial variable affects deforestation. (Table 36) (see Annex 12 for more details).

Table 36. Variables influencing deforestation.

Variable	Variable increment	Minimum value	Maximum value
Mining	100	0	23,500
Crops	100	0	16,100
Pastures	100	0	2,400
Roads	100	0	5,100
Constructions	100	0	4,600
Number of People	Categorical	-	
Elevation	Categorical	-	

Source: South Pole (2021).

4.1.7 Projected future deforestation in the project area

Selection of the baseline approach

The VM0015 methodology suggests the use of three approaches to estimate the amount of future deforestation:

- (i) Historical average deforestation
- (ii) Deforestation as a function of time
- (iii) Modelling of deforestation rate

Approach 1 (historical average deforestation) was selected because historical deforestation in the reference region does not show a trend (Table 37) and no detailed spatial information is available to model future deforestation behavior, although the analysis of agents, drivers and underlying causes allowed the identification of the chain of events that explains the historical behavior of deforestation in the reference region (see Annex 12). Under the historical average approach, the rate of baseline deforestation is assumed to be a continuation of the average annual rate measured during the historical reference period within the reference region. For the first baseline validity period of the project this rate is -0.83% (calculated in the step 4.1.5). The modelling of the location of future deforestation was developed with the Dinamica EGO tool.

Table 37. Historical deforestation rate in the reference region.

Period	Deforestation rate
2005 – 2010	-0.49%
2010 – 2013	-0.72%
2013-2016	-1.29%
Average historical deforestation	-0.83%

Source: South Pole, 2020.

The deforestation projection for the project area was calculated taking into account the baseline scenario for REDD+ actions described and the historical land use change analysis presented in Section 4.1.1

The annual baseline deforestation area that applies in year t for stratum i within the reference region is calculated as follows:

$$ABSLRR_{i,t} = APA_{i,t-1} * RBSLRR_{i,t}$$

Where:

ABSLPA_{i,t} Area deforested over time within the baseline in stratum i for the year t; ha/year

APA_{t-1} Area of forest in stratum i within the project area for year t-1; ha

RBSLRR_{i,t} Deforestation rate applicable to stratum i within the reference region in year t; %

t 1, 2, 3... T years of the project's crediting period (20 years); without dimensions

i 1,2,3... IRR, stratum within the region of reference; dimensionless

x

4.1.8 Projection of the location of future deforestation

The projection of the location of deforestation in the project consists of analyzing where future deforestation is most likely to occur in the reference region in order to match projected deforestation with carbon stocks and determine annual deforestation in the project area and reference region.

The modelling was carried out with the Dinamica EGO V5, program that allows modelling of environmental dynamics from the generation of future scenarios to understand their evolution over time. The simulation

sought to determine changes in forest coverage based on geographic information (raster files) from the years 2005 and 2016, identifying variables associated and factors related to changing forest to non-forest.

Annex 12 contains the specifications of modelling the future deforestation in the reference region (RR), project area (AP) and leakage belt (LB) of REDD+ Magnolios during 2016-2046. According to VM0015 methodology, the process performs the basic tasks described below:

Cartographic supplies

The modelling began with the layers of forest-no forest for the years 2005, 2010, 2013 and 2016, these layers were processed by South Pole, using satellite images from Landsat 7 and 8 sensors, for the identification of forest and non-forest coverage through the methodology of visual inspection and manual digitization through an expert in spatial solutions.

The selection of variables was made according to the analysis of Agents and Drivers of deforestation. For the model, 13 possible variables or drivers of deforestation were proposed, but after analyzing the results 7 variables significantly affect deforestation (Table 38). The final variables that influence deforestation in the REDD+ Magnolios project are Forest cover, Distance to roads, Distance to pasture, Distance to crops, Distance to mining, elevation, Distance to constructions, and population data.

Table 38. Cartographic outputs and inputs required in modelling

Factor Map		Source	Variable represented		Meaning of the categories or pixel value		Other Maps and Variables used to create the Factor Map		Algorithm or Equation used	Comments
ID	File Name		Unit	Description	Range	Meaning	ID	File Name		
	Forest cover	Processed by South pole	ha	Forest cover years 2005, 2013, 2010 to 2016	1-2	1-Forest 2-No forest	NA	NA	Euclidean Distance	Cartographic outputs
	Distance to roads	IGAC - Instituto Geográfico Agustín Codazzi	Meters	Euclidean distance to roads	0 to 5,274.21	Distance in meters to roads	NA	NA	Euclidean Distance	The date of the roads is not known exactly, and some of them are bridle paths and were included because they represent one of the routes for extracting timber in the Andean Region
	Distance to pasture	Marine and Coastal Ecosystems data from IDEAM -2016	Meters	Euclidean distance to pasture, include areas classified as Clean, Wooded, Weedy Pastures and Mosaic of Pastures with natural spaces	0 to 2,339.34	Distance in meters to pasture	NA	NA	Euclidean Distance	Within the classifications such as Mosaic or wooded pastures, it is not possible to identify which ones belong to clean pastures dedicated to cattle raising
	Distance to crops	Marine and Coastal Ecosystems data from IDEAM -2016	Meters	Euclidean distance to crops, areas classified as Mosaic of pastures and crops, Mosaic of crops, pastures and natural spaces, Mosaic of crops with natural spaces	0 to 16,307.8	Distance in meters to crops	NA	NA	Euclidean Distance	No accuracy to identify the types of crops and other coverages in the classification
	Distance to mining		Meters	Euclidean distance to mining titles, mining titles granted in the area, but does not include unapproved applications	0 to 23,590.7	Distance in meters to mining	NA	NA	Euclidean Distance	

Factor Map		Source	Variable represented		Meaning of the categories or pixel value		Other Maps and Variables used to create the Factor Map		Algorithm or Equation used	Comments
ID	File Name		Unit	Description	Range	Meaning	ID	File Name		
	Elevation	Corantioquia	masl	Elevation in meters above sea level. Elevation reclassifies in 4 classes	1 to 4	1: 147-1,255; 2: 1,255-1,862 3: 1,862-2,392 4: 2,392-2,952	NA	NA	Natural breaks classification	
	Distance to constructions	Cadaster Department of Antioquia	Meters	Euclidean distance to constructions, rural constructions registered in the Departmental Cadaster	0 to 4,794.41	Distance in meters to constructions	NA	NA	Euclidean Distance	The constructions do not contain information associated with the type of construction; such as house, barn, coffee drying site or other. The size of the constructions is smaller than the resolution established for the transformation to raster type
	Population data	Dane – 2014	Number of people by municipality	Reclassification by municipality and number of persons	1 to 4	1: Valdivia 368 2: Briceño 768 3: Yarumal 2,474 4: Santa Rosa de Osos 2,660	NA	NA	Manual reclass	The settlements were created before 2005

Source: South Pole (2023).

Model

The simulation process with Dinamica EGO is determined by a series of logical steps whose goal is to calibrate, execute and validate a model of change in land use and land cover, resulting from the intervention of agents or causes, all of which is detailed in **Error! Reference source not found.** below.

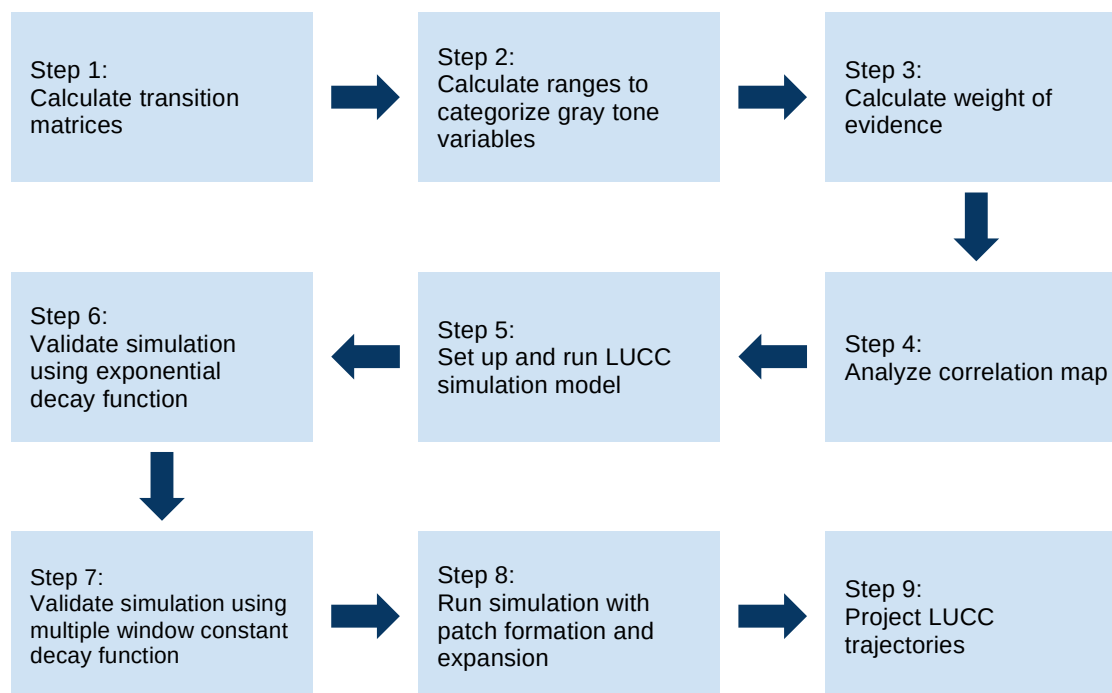


Figure 51. Steps of the modelling process

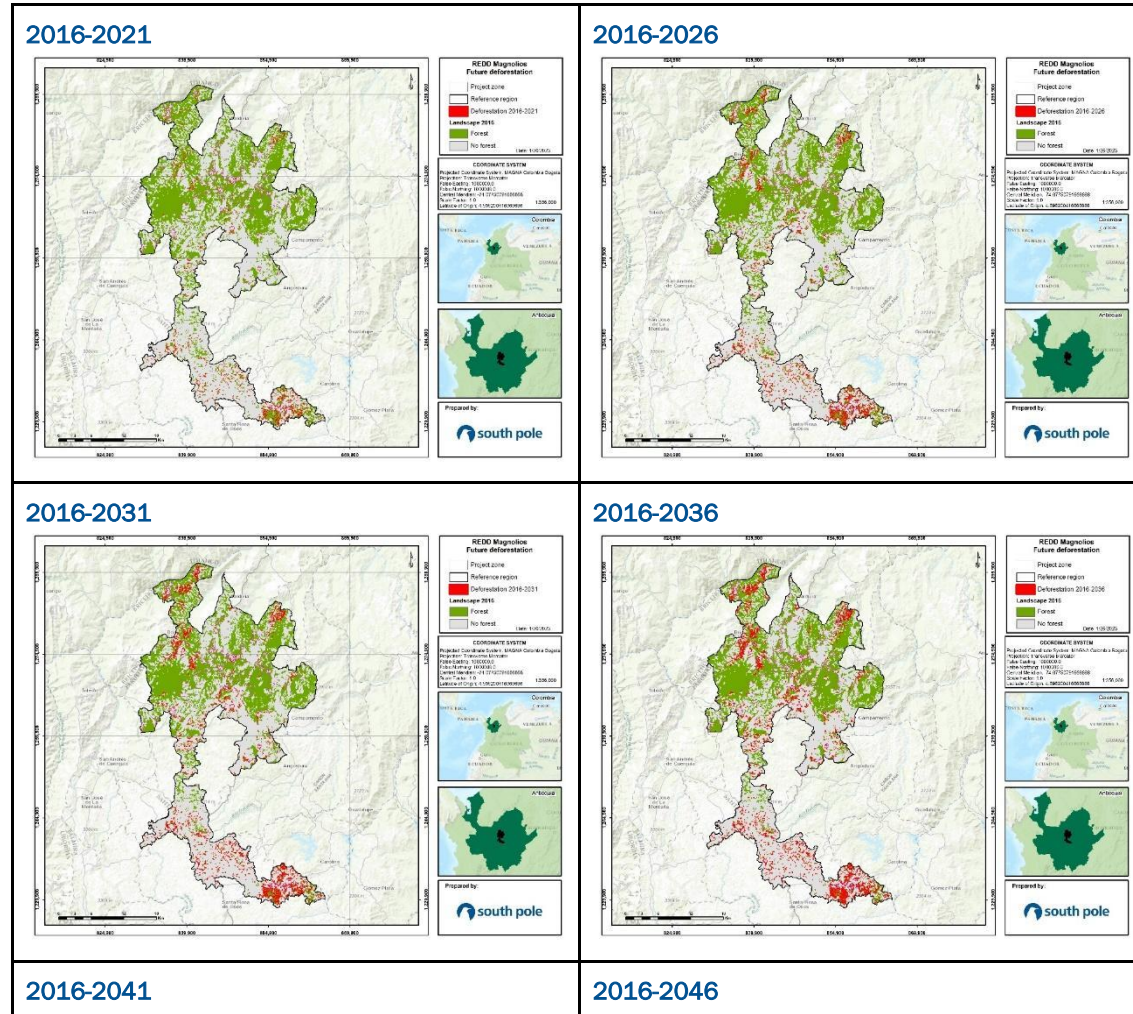
Source: South Pole (2023).

The process of the model only considered the change in coverage from Forest (1) to No Forest (2), and the evident weights are based on the Bayesian method, which calculates the effect that a spatial variable has on the occurrence of a transition. Once the ranges have been determined, the software allows the evidence weights to be established through a function that uses the initial and final forest cover maps as input data, as well as the variables file and the file generated. After the Bayesian method is used in the calculation of the weights of evidence, it is necessary to apply some measures that allow verification.

In order to build the simulation model, the following must be entered as inputs: the initial landscape (Forest/No Forest 2005.tiff), the set of variables, the multi- step transition matrix and the file of coefficients of weights (weights.cvs) obtained in the previous steps. After the execution of the initial modelling, the program has to validate the results in order to identify the relevance of the model in predicting the behavior of the dynamics of the forest cover in the jurisdiction. Once the structured model

has been verified in terms of inputs and input characteristics, it is necessary to set a final parameter to run the final simulation that will determine the projected deforestation trajectories in the jurisdiction for the period 2016–2046. For this assignment we must consider the results of the validation, where we can determine that in the REDD Magnolios the dynamics of deforestation responds to the generation of patches, and in a lower proportion, the expansion of old ones. Therefore, it has been decided to assign a ratio of 10% to the expander and 90% to the patcher.

The simulation maps obtained are shown in Figure 52 and relate to the forest areas and deforestation for the period 2016 to 2046, between each pair of years.



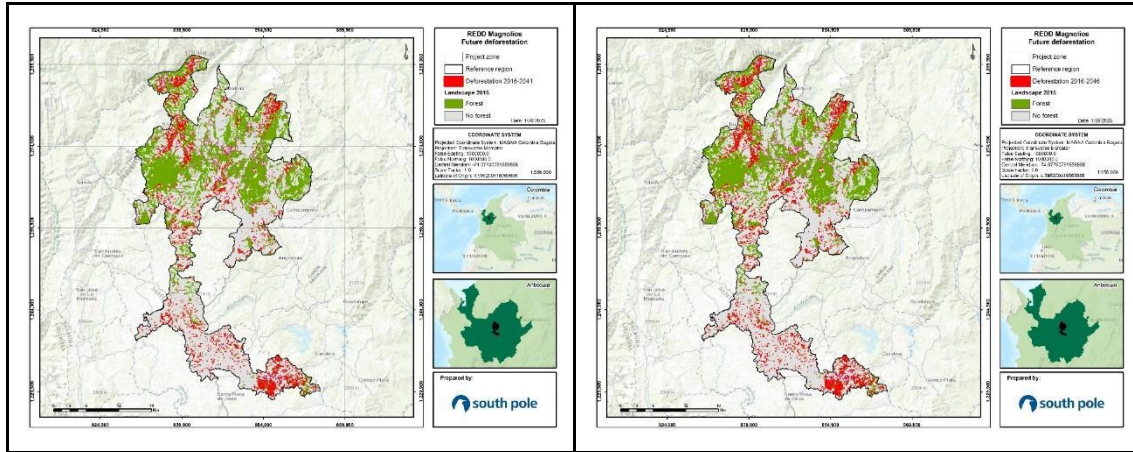


Figure 52. Deforestation modelling 2016-2046

Source: South Pole (2023).

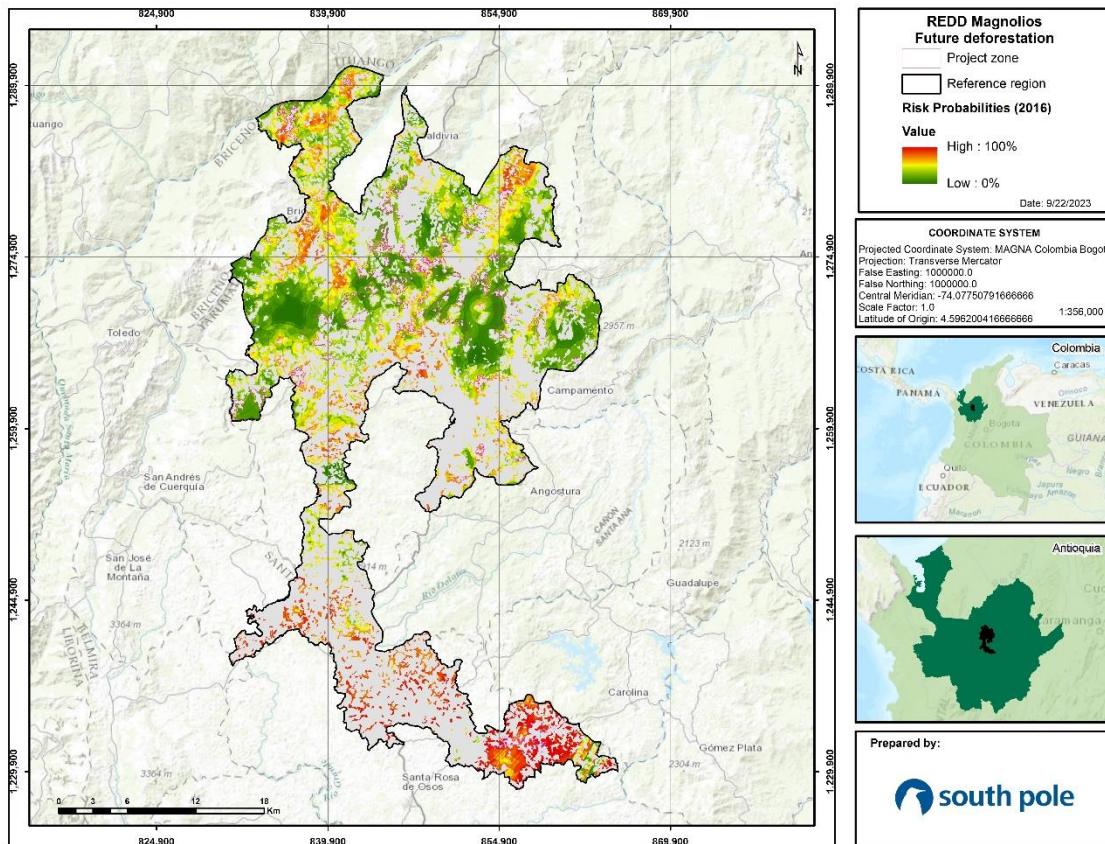


Figure 53. Deforestation risk in the Reference Region, and Project Area

Source: South Pole (2023).

According to the data obtained through the projection of deforestation, it is expected that during the period 2016–2046, the forest in the project area will decrease by 11.5%. In 2026, it will be deforested 215 ha, in 2036 it will be deforested 356 ha and in 2046 (end of the simulation) it will be deforested 499 ha, with respect to the year the simulation started (2016), as outlined in

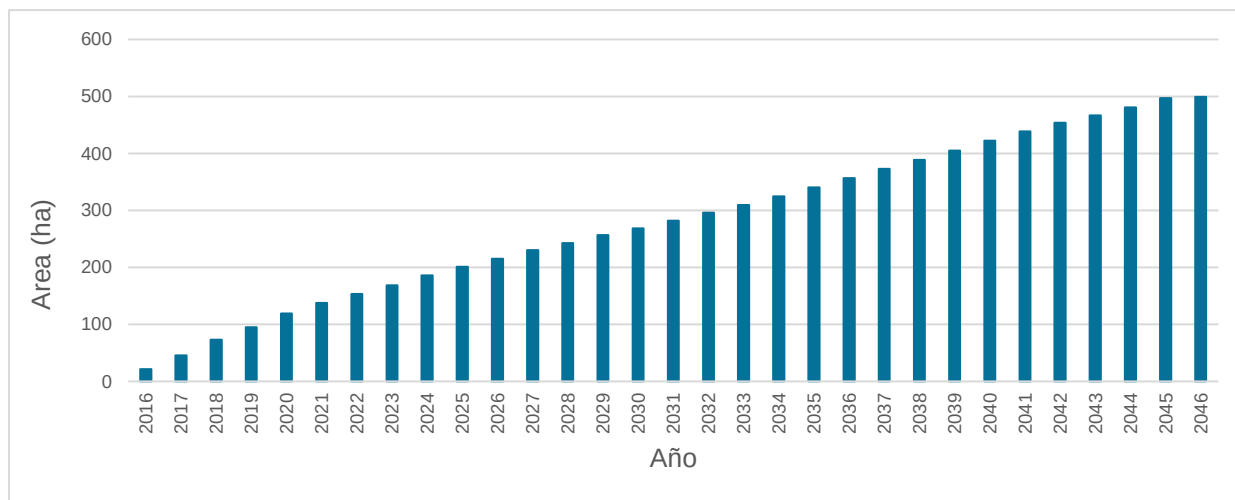


Figure 54.

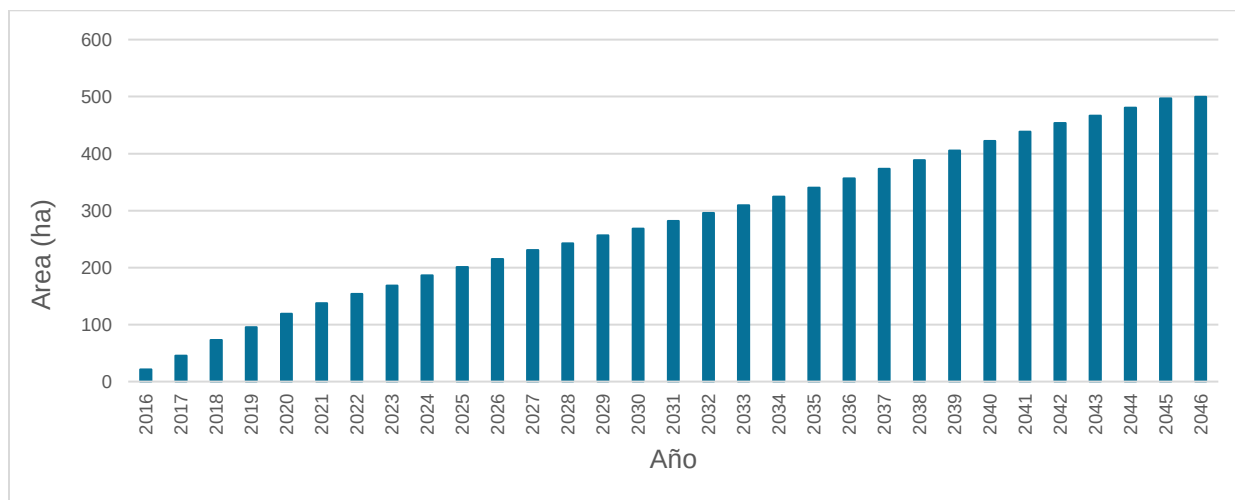


Figure 54. Accumulated deforestation in the project area

Source: South Pole (2023).

Projection of the annual areas of baseline deforestation in the project area and leakage belt

Based on the historical average of deforestation approach and the modelling of projection of the location of future deforestation for the period 2016 to 2046, the annual areas of baseline deforestation in the project area and leakage belt are presented as follows (Table 39 and Table 40Error! Reference source not found.).

Table 39. Annual area of deforestation in the baseline for the project area (PA).

Project year	Calendar year	Area of forest in the stratum i (ha)	Projected annual deforestation (ha)	Cumulative projected deforestation (ha)
		$APA_{i,t-1}$	$ABSLPA_{i,t}$	$\Sigma ABSLPA_{i,t}$
1	2016*	4,319	21	21
2	2017	4,298	24	45
3	2018	4,274	28	73
4	2019	4,246	22	95
5	2020	4,224	24	119
6	2021	4,200	19	138
7	2022	4,181	16	154
8	2023	4,165	15	169
9	2024	4,150	18	186
10	2025	4,133	15	201

Source: South Pole (2023).

*The amount of deforested area for the first year corresponds to the period spans between February 23, 2016 and December 31, 2016.

Table 40. Annual area of deforestation in the baseline for the 10,457 (LB).

Project year	Calendar year	Area of forest in the stratum i (ha)	Projected annual deforestation (ha)	Cumulative projected deforestation (ha)
		$LK_{i,t-1}$	$ABSLK_{i,t}$	$\Sigma ABSLK_{i,t}$
1	2016	10,458	34	34
2	2017	10,424	41	75
3	2018	10,383	47	122
4	2019	10,336	40	161
5	2020	10,297	39	201
6	2021	10,257	39	240
7	2022	10,218	44	284
8	2023	10,174	42	326
9	2024	10,132	40	366
10	2025	10,092	37	403

Source: South Pole (2023).

4.1.9 Definition of land cover and land use change component

Step five of the VM0015 methodology considers the calculation of the activity data of the initial forest classes that will be deforested and the activity data of the post-deforestation classes that will replace them in the baseline scenario.

Given that the national NREF for the baseline scenario considers as activity data only the change in the area covered by forest; that is, areas for which forest is detected on the first date and non-forest on the second date, so that there is certainty that the deforestation event occurred in the time period analyzed; the REDD+ Project Magnolios de Yarumal did not consider the definition of post-deforestation scenarios associated with specific land cover or land use, nor activity data associated with these changes.

Thus, for the estimation of carbon stock changes the project considered only the gross change from forest to non-forest and the general emission factor proposed by the national NREF (see Annex 4 and Section 4.1.10).

4.1.10 Estimating changes in carbon pools in the baseline scenario

Carbon stocks and emission factor

The national NREF defines the carbon contents for the five biomes of Colombia, the total biomass was estimated from the sum of aboveground and belowground biomass per hectare for each of the five natural regions. Subsequently, the carbon content of the total biomass for each of the natural regions was determined as the product of the total biomass and the carbon fraction of dry matter suggested by the IPCC (2006) Guidelines (0.47). For the estimation of deforestation emission from soil deposition the national NREF assumes a gross emission where the soil carbon content is emitted in equal proportions for 20 years after the deforestation event occurs. Table 41 presents the NREF emission factors for the Andean biome used to estimate GHG emission reductions from REDD+ Magnolios.

Table 41. Natural forest emission factors in the Andean biome.

Above ground biomass (tCO _{2e} /ha)	Below ground biomass (tCO _{2e} /ha)	Total biomass (tCO _{2e} /ha)	Annual rate of soil carbon emitted over 20 years (tCO _{2e} /ha)
C_{ab}_{icl}	C_{bb}_{icl}	C_{tot}_{icl}	(1/20) * C_{so}_{icl}
265	60	326	23

Source: (MADS & IDEAM, 2019)¹³⁹.

¹³⁹ MADS and IDEAM.2019. Propuesta de nivel de referencia de las emisiones forestales por deforestación en Colombia para pago por resultados de REDD+ bajo la CMNUCC

Emission factors were calculated from 301 sampling points established in the National Forest Inventory (NFI) during the period 2015-2018. The national NREF does not consider carbon contents in litter and dead wood debris, given that, currently the country does not have sufficient information for the estimation of these sinks.

Considering that the uncertainty¹⁴⁰ of carbon stocks is less than 10% of the average value (6% for aboveground biomass and 5.6% for belowground biomass, respectively), it is possible to use the average carbon values proposed by the NREF for the quantification of the project's emission reductions. For carbon content in soils, the NREF does not present data on the coefficient of variation with respect to the average, so the average value reported in Table 41.

Calculation of baseline carbon stock changes

The quantification of emission reductions associated with changes in carbon stocks within the project area for year t was performed according to the guidelines in Section 6.1.3 of Methodology VM0015 (Method 2). Considering that the NREF assumes the release of all carbon in above and below ground forest biomass at the time of deforestation, the change in carbon stocks was calculated by multiplying the annual deforested area by the change factors proposed by the NREF for the Andean biome.

$$\Delta C_{BSLPA} = \sum_{P=1}^P \left(\sum_{icl=1}^{icl} ABSLPA_{icl,t} * \Delta Cp_{icl,t=t*} - \sum_{z=1}^z ABSLPA_{z,t} * \Delta Cp_{z,t} + \dots \sum_{icl=1}^{icl} ABSLPA_{icl,t-19} * \Delta Cp_{icl,t=t*+19} - \sum_{z=1}^z ABSLPA_{z,t-19} * \Delta Cp_{z,t=t*+19} \right)$$

Where:

ΔC_{BSLPA_t}	Total change in carbon stocks within the project area under the baseline scenario over time. t; tCO ₂ e
$ABSLPA_t$	Area deforested at time t within the project area adjusted for national circumstances; ha
$ABSLPA_{t+1}$	Area deforested at time t+1 within the project area adjusted for national circumstances; ha
$ABSLPA_{t+19}$	Area deforested at time t+19 within the project area adjusted for national circumstances; ha

¹⁴⁰ Uncertainty estimation for above-ground and below-ground biomass carbon contents was performed with the same simple error propagation equations as proposed in NREF section 7.7.

ΔC_{pt}	Carbon value change factor applicable per year t ; tCO ₂ e/ha
ΔC_{pt+1}	Factor of change in carbon value of sink p applicable to year $t+1$; tCO ₂ e/ha
ΔC_{pt+19}	Factor of change in the carbon value of the sink p in the initial forest class applicable to year $t+19$; tCO ₂ e/ha
p	Carbon pools considered, without dimensions.
t	1, 2, 3... T years of the project's crediting period (20 years); no dimensions.

Table 42. Change in carbon stocks in the project area under the baseline scenario.

Project year	Calendar year	Deforestation (ha)	Total biomass emissions (tCO ₂ e)	Emissions from soils (tCO ₂ e)	Change in C stock under baseline scenario (tCO ₂ e)	
		ABSLPA _t	$\Delta C_{tot\ PA}$	$\Delta C_{soc\ PA}$	ΔC_{BSLPA_t}	Cummulative CBSLPA
1	2016	21	6,975	493	7,467	7,467
2	2017	24	7,837	1,046	8,883	16,350
3	2018	28	8,974	1,680	10,653	27,003
4	2019	22	7,253	2,192	9,444	36,447
5	2020	24	7,775	2,741	10,516	46,963
6	2021	19	6,085	3,170	9,255	56,219
7	2022	16	5,163	3,535	8,698	64,917
8	2023	15	4,886	3,880	8,766	73,683
9	2024	18	5,716	4,284	10,000	83,683
10	2025	15	4,886	4,629	9,515	93,198

Source: South Pole (2023).

4.2 Project Emissions

Changes in carbon stocks in the REDD+ Project Magnolios de Yarumal under the project scenario correspond to changes due to unplanned deforestation that cannot be avoided. Considering the behavior of deforestation in the project area and the success of REDD+ related mitigation activities in other previous initiatives implemented in Colombia, an effectiveness index (EI) in controlling deforestation was established at 0.70.¹⁴¹

¹⁴¹ For the estimation of the Effectiveness Index (EI), the actual effectiveness of five REDD+ projects registered in the country for the first monitoring period was reviewed. The projects reviewed were REDD+ Project Resguardo Indígena Unificado-Selva de Mataven (REDD+ RIU-SM) and Forest Mitigation Project Resguardo Indígena TICOYA in the Amazon

The baseline projections were multiplied by the factor $(1 - EI)$ and the result was taken as the carbon emissions due to unplanned and unavoided deforestation within the project area in year t .

$$\Delta CUDdPA_t = \Delta CBSLPA_t * (1 - EI)$$

Where:

$\Delta CUDdPA_t$	Carbon emissions due to unplanned and unavoided deforestation within the project area over time. t ; tCO_2e
$\Delta CBSLPA_t$	Total change in carbon stocks within the project area under the baseline scenario over time t ; tCO_2e
EI	Effectiveness index; no dimensions
t	1, 2, 3... T years of the project's crediting period (20 years); no dimensions.

In this way, it was assumed $\Delta CPSPA_t = \Delta CUDdPA_t$.

Table 43. Carbon emissions due to unplanned and avoided deforestation under the project scenario.

Project year	Calendar year	Change in C stock under baseline scenario (tCO_2e)	Carbon emissions due to unplanned and unavoided deforestation under project scenario (tCO_2e)	
		$\Delta CBSLPA_t$	$\Delta CUDdPA_t$	Cummulative CUDdPA
1	2016	7,467	2,240	2,240
2	2017	8,883	2,665	4,905
3	2018	10,653	3,196	8,101
4	2019	9,444	2,833	10,934
5	2020	10,516	3,155	14,089
6	2021	9,255	2,777	16,866
7	2022	8,698	2,609	19,475
8	2023	8,766	2,630	22,105
9	2024	10,000	3,000	25,105

Biome, Chocó-Darién Conservation Corridor REDD+ Project and Cajambre REDD+ Project in the Pacific Biome and the Emissions Offset Project Galilea-Amé Forest Conservation in the Andean Biome.

Project year	Calendar year	Change in C stock under baseline scenario (tCO ₂ e)	Carbon emissions due to unplanned and unavoided deforestation under project scenario (tCO ₂ e)	
		ΔCBSLPA_t	ΔCUDdPA_t	Cummulative CUDdPA
10	2025	9,515	2,855	27,959

Source: South Pole (2023).

4.3 Leakage

According to the information in Section 4.1.1, for the quantification of activity displacement leakage, the project applied an optional deduction of 15 percent to gross GHG emission reductions and/or removals.

Thus, it was assumed $\Delta\text{CLK}_t = \Delta\text{CADLK}_t$

Table 44. Carbon emissions due to leakage due to change of activity.

Project year	Calendar year	Change in C stock under baseline scenario (tCO ₂ e)	Carbon emissions due to unplanned and unavoided deforestation under project scenario (tCO ₂ e)	Leakage due to change of activity (tCO ₂ e)	
		ΔCBSLPA_t	ΔCUDdPA_t	ΔCADLK_t	Cummulative ΔCADLK
1	2016	7,467	2,240	784	784
2	2017	8,883	2,665	933	1,717
3	2018	10,653	3,196	1,119	2,835
4	2019	9,444	2,833	992	3,827
5	2020	10,516	3,155	1,104	4,931
6	2021	9,255	2,777	972	5,903
7	2022	8,698	2,609	913	6,816
8	2023	8,766	2,630	920	7,737
9	2024	10,000	3,000	1,050	8,787
10	2025	9,515	2,855	999	9,786

Source: South Pole (2023).

4.4 Estimated Net GHG Emission Reductions and Removals

The net emissions reduction of the project was calculated using the following equation:

$$\Delta\text{REDD}_t = \Delta\text{CBSLPA}_t - \Delta\text{CPSPA}_t - \Delta\text{CLK}_t$$

Where:

ΔREDD_t	Net emission reductions attributed to project mitigation actions in the year t ; tCO ₂ e
ΔCBSLPA_t	Total change in carbon stocks within the project area under the baseline scenario over time t ; tCO ₂ e
ΔCPSPA_t	Estimated current ex-ante carbon emissions for the project area over time t ; tCO ₂ e
ΔCLK_t	Leakage emissions over time t ; tCO ₂ e

Table 45. Net reduction of ex-ante GHG emissions attributable to the Project's REDD+ activities.

Project year	Calendar year	Estimation of baseline emissions (tCO ₂ e)	Estimated current carbon emissions ex-ante for the project area (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Estimated net emissions reductions (tCO ₂ e)	
		ΔCBSLPA_t	ΔCPSPA_t	ΔCLK_t	ΔREDD_t	Cummulative ΔREDD
1	2016	7,467	2,240	784	4,443	4,443
2	2017	8,883	2,665	933	5,285	9,728
3	2018	10,653	3,196	1,119	6,339	16,067
4	2019	9,444	2,833	992	5,619	21,686
5	2020	10,516	3,155	1,104	6,257	27,943
6	2021	9,255	2,777	972	5,507	33,450
7	2022	8,698	2,609	913	5,175	38,625
8	2023	8,766	2,630	920	5,216	43,841
9	2024	10,000	3,000	1,050	5,950	49,791
10	2025	9,515	2,855	999	5,662	55,453

Source: South Pole (2023).

According to the non-permanence risk analysis¹⁴² and the VM0015 methodology guidelines, there will be a reserve of 22% of the total gross emission reductions, which cannot be traded. This percentage will cover aspects related to the permanence and risk of the activities and the uncertainty in the quantification of emission reductions.

Thus, the results of mitigation or marketable emission reductions (REC) to be generated by the project were calculated considering the following equations:

¹⁴² Risk Analysis available in the folder Anexos/Anexo 5_Non-Permanence Risk

$$VCU_t = \Delta REDD_t - VBC_t$$

$$VBC_t = (\Delta CBSLPA_t - \Delta CPSPA_t) * RF_t$$

Where:

VCU_t	Verified Carbon Units marketable in the year t; tCO ₂ e
$\Delta REDD_t$	Net emission reductions attributed to project mitigation actions in the year t; tCO ₂ e
VBC_t	Number of loans discounted for non-permanence risks at time t; tCO ₂ e
$\Delta CBSLPA_t$	Total change in carbon stocks within the project area under the baseline scenario over time. t; tCO ₂ e
$\Delta CPSPA_t$	Carbon emissions due to unplanned and unavoided deforestation within the project area over time t; tCO ₂ e
RF_t	Discount factor for non-permanence risks; dimensionless

Table 46. Mitigation results or tradable emission reductions (RECs) to be generated by the project.

Project year	Calendar year	Estimation of baseline emissions (tCO ₂ e)	Estimated current carbon emissions ex ante for the project area (tCO ₂ e)	Reserving carbon emissions for non-permanence risk (tCO ₂ e)	Net emissions reduction (tCO ₂ e)	Verifiable Carbon Units (tCO ₂ e)	
		$\Delta CBSLPA_t$	$\Delta CPSPA_t$	VBC_t	$\Delta REDD_t$	VCU_t	Cummulative VCU
1	2016	7,467	2,240	1,150	4,443	3,293	3,293
2	2017	8,883	2,665	1,368	5,285	3,917	7,210
3	2018	10,653	3,196	1,641	6,339	4,698	11,908
4	2019	9,444	2,833	1,454	5,619	4,165	16,073
5	2020	10,516	3,155	1,619	6,257	4,638	20,711
6	2021	9,255	2,777	1,425	5,507	4,082	24,792
7	2022	8,698	2,609	1,339	5,175	3,836	28,628
8	2023	8,766	2,630	1,350	5,216	3,866	32,494
9	2024	10,000	3,000	1,540	5,950	4,410	36,904
10	2025	9,515	2,855	1,465	5,662	4,196	41,100

Source: South Pole (2023).

5 MONITORING

5.1 Data and Parameters Available at Validation

Below are all the data and parameters that will be available at the time of validation and will remain fixed throughout the project accreditation period.

Data/Parameter	PA
Data unit	Hectares (ha)
Description	Project area
Source of data	See Section 3.3.2
Value applied	4,319 ha
Justification of choice of data or description of measurement methods and procedures applied	For the selection of the eligible project area, a supervised classification of medium resolution (30 m) Landsat 7 and Landsat 8 OLI satellite images was carried out. Satellite images from the period 2005-2016 were used; the project area was classified as the stable forest during this mentioned period. Detailed processing information is presented in Section 1.3.
Purpose of data	Estimated emission reductions in the baseline scenario and the project scenario.
Comments	-

Data/Parameter	ABSLRR _t
Data Unit	Hectares (ha)
Description	Annual Average deforestation in the reference region.
Source of data	See Section 4.1.5
Value applied	344.26 ha/year average
Justification of choice of data or description of measurement methods and procedures applied	It comes from the processing and analysis of satellite images from 2005 to 2016.
Purpose of data	Detailed processing information is presented in Section 5
Comments	-

Data / Parameter	RBSLRR _t
Data unit	Percentage (%)

Description	<i>Average deforestation rate in the reference region between 2005 and 2015.</i>
Source of data	<i>See Section 4.1.15</i>
Value applied	<i>0.83 % per year</i>
Justification of choice of data or description of measurement methods and procedures applied	<i>Processing and analysis of satellite images from 2005 to 2016. Detailed processing information is presented in Section 4.1.5. The deforestation rate was estimated using the equation proposed by Puyravaud (2003), as recommended by VM0015 methodology in its Section 4.1.2.1.</i>
Purpose of data	<i>Estimated emission reductions in the baseline scenario</i>
Comments	<i>See Puyravaud, J.P. (2003). Standardizing the calculation of the annual rate of deforestation. Forest Ecology and Management, 177: 593-596</i>

Data / Parameter	<i>ABSLAP_t</i>
Data unit	<i>Hectares per year (ha/year)</i>
Description	<i>Area deforested at time t within the project area under the baseline scenario.</i>
Source of data	<i>See Section 4.1.7</i>
Value applied	<i>16.7 ha/year on average</i>
Justification of choice of data or description of measurement methods and procedures applied	<i>Derived from multiplication of RBSLRR_t and AP_t-1. Detailed processing information is presented in Section 4.1.7.</i>
Purpose of data	<i>Estimated emission reductions in the baseline scenario.</i>
Comments	<i>NA</i>

Data / Parameter	<i>C_{tot}</i>
Data unit	<i>Tons of CO₂ equivalent per hectare (tCO₂e/ha)</i>
Description	<i>Carbon stocks in forest biomass in the Andean Biome of Colombia (includes aboveground and belowground biomass).</i>
Source of data	<i>MADS and IDEAM (2019)</i>
Value applied	<i>326 tCO₂e/ha</i>
Justification of choice of data or description of measurement methods and procedures applied	<i>The national NREF defines the carbon contents for the five biomes of Colombia, the total biomass was estimated from the sum of aboveground and belowground biomass per hectare for each of the five natural regions. Subsequently, the carbon content of the total biomass for each of the natural regions was determined as the product of the total biomass and the carbon fraction of dry matter suggested by the IPCC (2006) Guidelines (0.47).</i>

	Emission factors were calculated from 301 sampling points established in the National Forest Inventory (NFI) during the period 2015-2018. The selection of baseline values is done to give compliance with the provisions of MADS Resolution 1447 of 2018 on mitigation actions at the national level.
Purpose of data	Estimated emission reductions in the baseline scenario.and the project scenario.
Comments	NA

Data / Parameter	$(1/20) * C_{soil}$
Data unit	Tons of CO2 equivalent per hectare (tCO2e/ha)
Description	Emissions factor for soil organic carbon in forests in the Andean Biome of Colombia.
Source of data	MADS and IDEAM (2019)
Value applied	23 tCO2e/ha
Justification of choice of data or description of measurement methods and procedures applied	The national NREF defines the carbon contents for the five biomes of Colombia, the total biomass was estimated from the sum of aboveground and belowground biomass per hectare for each of the five natural regions. Subsequently, the carbon content of the total biomass for each of the natural regions was determined as the product of the total biomass and the carbon fraction of dry matter suggested by the IPCC (2006) Guidelines (0.47). Emission factors were calculated from 301 sampling points established in the National Forest Inventory (NFI) during the period 2015-2018. The selection of baseline values is done to give compliance with the provisions of MADS Resolution 1447 of 2018 on mitigation actions at the national level.
Purpose of data	Estimated emission reductions in the baseline scenario.and the project scenario.
Comments	NA

Data / Parameter	FCO_2e
Data unit	Tons of carbon dioxide equivalent per ton of carbon (tCO2e/tC)
Description	CO2e factor
Source of data	IPCC (2006)
Value applied	3.667
Justification of choice of data or description of	Value proposed by the 2006 Intergovernmental Panel on Climate Change (IPCC) guidelines for converting tons of carbon sequestered (tC) by tree to tons of carbon dioxide equivalent (tCO2e).

measurement methods and procedures applied	2006 IPCC Guidelines for National Greenhouse Gas Inventories. Available at: https://www.ipcc-nggip.iges.or.jp/public/2006gl/spanish/vol4.html
Purpose of data	Estimated emission reductions in the baseline scenario and the project scenario.
Comments	NA

Data / Parameter	El
Data unit	No dimensions
Description	Effectiveness index of deforestation reduction activities under the project scenario.
Source of data	Estimated by South Pole according to other project's results and success of the activities to prevent deforestation in the project area.
Value applied	0.70
Justification of choice of data or description of measurement methods and procedures applied	Considering the behavior of deforestation in the project area and the success of REDD mitigation activities in the country, an effectiveness index (El) for deforestation control of 0.70 was established.
Purpose of data	For the estimation of the Effectiveness Index (El), the actual effectiveness of five REDD+ projects registered in the country for the first monitoring period was reviewed. The projects reviewed were REDD+ Project Resguardo Indígena Unificado-Selva de Mataven (REDD+ RIU-SM) and Forest Mitigation Project Resguardo Indígena TICOYA in the Amazon Biome, Chocó-Darién Conservation Corridor REDD+ Project and Cajambre REDD+ Project in the Pacific Biome and the Emissions Offset Project Galilea-Amé Forest Conservation in the Andean Biome.
Comments	NA

Data / Parameter	RF_t
Data unit	Percentage (%)
Description	Discount factor for non-permanence risks
Source of data	Guide for the formulation, validation, and verification of forestry projects for climate change mitigation (Guide ES-I-CC-002)
Value applied	22 %
Justification of choice of data or description of measurement methods and procedures applied	To ensure the permanence of mitigation activities for the duration of the project, the REDD+ Project Magnolios de Yarumal will maintain a reserve of 22% of the total verified emission reductions, which cannot be traded. This percentage will cover aspects related to the permanence of activities and uncertainty in the quantification of emissions reductions.
Purpose of data	Quantification of net mitigation results
Comments	NA

5.2 Data and Parameters Monitored

Data / Parameter	$APSAP_t$
Data unit	Hectares per year (ha/year)
Description	Area deforested at time t within the project area and under the project scenario.
Source of data	Landsat 8 satellite images from OLI mission.
Description of measurement methods and procedures applied	For monitoring deforestation during the monitoring period in the project area, multispectral Landsat 8 images from OLI mission, respectively, will be used for each year to be evaluated. The images have a spatial resolution ranging from 15m to 100m. These images are provided by the United States Geological Survey (USGS) and can be viewed and downloaded free of charge on the internet at: https://earthexplorer.usgs.gov/ . Detailed processing information can be found in Section 6.3
Frequency of monitoring/recording	At least every 5 years
Monitoring equipment	The monitoring instruments used are detailed in Section 6.3.
QA/QC procedures applied	See Section 5.3.2 and Annex 7.
Purpose of data	The estimation methods used are detailed in Section 4
Calculation method	NA

Data / Parameter	$APSLB_t$
Data unit	Hectares per year (ha/year)
Description	Area deforested at time t within the leakage belt and under the project scenario.
Source of data	Landsat 8 satellite images from OLI mission.
Description of measurement methods and procedures applied	For monitoring deforestation during the monitoring period in the project area, multispectral Landsat 8 images from OLI mission, respectively, was used for each year to be evaluated. The images have a spatial resolution ranging from 15m to 100m. These images are provided by the United States Geological Survey (USGS) and can be viewed and downloaded free of charge on the internet at: https://earthexplorer.usgs.gov/ . Detailed processing information can be found in Section 6.3
Frequency of monitoring/recording	At least every 5 years

Monitoring equipment	<i>The monitoring instruments used are detailed in Section 6.3</i>	
QA/QC procedures applied	<i>See Section 5.3.2 and Annex 7</i>	
Purpose of data	<i>Estimated emission reductions in the project scenario.</i>	
Calculation method	<i>The estimation methods used are detailed in Section 4</i>	
	NA	

5.3 Monitoring Plan

The following is a description of the monitoring plan that presents the procedures for the monitoring process associated with the REDD+ project activities.

5.3.1 Monitoring of Project Emissions

Monitoring of project activities

To meet the GHG emissions reduction target the proponent foundations of the initiative will be responsible for the implementation and monitoring of the project activities described in section 1.11.

The monitoring of carbon activities will consist of:

- Monitoring of resources invested in the strategic lines and project activities described in Section 1.11.
- Monitoring of the direct impacts of the implemented project activities, according to the defined indicators.
- Recording of project activities led or implemented with the support of other institutions.

In accordance with the theory of change scheme, a monitoring plan was designed for the next five years, with the possibility of modifying or including new indicators according to the dynamics of the project and the fulfillment of the project's long-term objectives.

Emission reductions and environmental and social benefits related to the implementation of project activities will be monitored through a transparent structure that integrates remote sensing actions and the participation of project proponents and participating community stakeholders, which will allow for the proper execution and consistency of activities with the Project's conservation objectives.

For the 2016 -2020 monitoring period, the achievements of some of the output and outcome indicators will be presented; however, there are other indicators that did not have information at the time of monitoring, which will be followed up for the next verification period based on the guidelines provided herein.

All records (including photographs, forms, reports, etc.) generated during the implementation of initiatives related to project activities will be collected by the proponent Foundations prior to the next project verification and made available for inspection by the Validation and Verification Body (VVB).

All results of the Monitoring Plan will be made available in the media defined by the proponents in their Communication Plan (see Section 2.5.2) and efforts will be made to develop summaries to be communicated to community stakeholders and other interested parties identified in the stakeholder mapping prior to the opening of the project's public comment periods. In addition, all documents and information on monitoring results will be published on the VCS standard platforms.

The monitoring plan and results will be disseminated in Spanish (local language); additionally, each verification will have a strategy that proposes solutions to key questions on the dissemination of results, such as:

- What will be done to make knowledge generation and assimilation successful?
- What barriers exist to knowledge sharing?
- What is known about what other people need to know (e.g., community vs. researchers, researchers vs. policy makers, policy makers vs. the community, other sectors?)
- What tools can be used and what tools can be designed for more effective knowledge products and pathways?

All of this is aligned with the aforementioned Communication Plan (see Annex 9).

Below are the monitoring activities and indicators for each strategic line of the project.

Table 47. Monitoring activities and indicators.

Strategic line	Project activity	Short-term goal or expected impact	Short-term monitoring					
			Indicator	Tipo de indicador	¿Existen datos?	Método	Indicator	Who carries out?
1. Strengthening local governance.	Legal formalization of non-profit entities and involvement in participatory environmental management processes.	By 2026 the foundations will have a greater presence in participatory spaces through the creation of committees that will be involved in key areas for the environmental management of the municipalities in the PEA.	Number of meetings or participatory spaces attended	Result	No	Minutes of participation in meetings	Annual	Proponent foundations
2. Forest conservation and restoration	Consolidation of forest ranger groups	By 2026 the foundations will have a group of 13 rangers.	Number of people employed in project activities, expressed as total number of full-time jobs.	Product	Yes	Labor contracts	Annual	Proponent foundations
	Acquisition of land for forest conservation.	By 2026 the reserves will have 10,400 ha of areas dedicated to forest conservation and care.	Area of protected mountain ecosystems in hectares	Result	Yes	Certificates of ownership and freedom of the land and monitoring of the	Annual	Proponent foundations

Strategic line	Project activity	Short-term goal or expected impact	Short-term monitoring					
			Indicator	Tipo de indicador	¿Existen datos?	Método	Indicator	Who carries out?
						areas with Geographic Information Systems.		
	Strategy for the conservation of magnolias (<i>Magnoliaceae</i>)	By 2026, populations of 3 Magnolia species will be recovered with 1,000 new individuals planted in the Alto de Ventanas corridor.	Number of <i>Magnolia</i> sp individuals planted	Product	No	Inventory of plantings	Annual	Proponent foundations
	Propagation of native cloud forest species	By 2026 there will be at least three nurseries with a production capacity of 500 seedlings per year, prioritizing promising species such as mortiño.	Number of nurseries established	Product	yes	Databases with the inventory of propagated material.	Annual	Proponent foundations
	Passive restoration	By 2026 the reserves will have 2,000 ha of areas dedicated to forest conservation and care.	Area of mountain ecosystems in the process of passive restoration in hectares	Result	yes	Certificates of tradition and freedom, photographs and monitoring of the areas with Geographic	Annual	Proponent foundations

Strategic line	Project activity	Short-term goal or expected impact	Short-term monitoring					
			Indicator	Tipo de indicador	¿Existen datos?	Método	Indicador	Who carries out?
						Information Systems.		
	Program to increase wax palm (<i>Ceroxylon</i> spp.) populations	By 2026, Fundación Guanacas will have sold 1,000 wax palm vouchers and propagated 1,000 additional individuals.	Numbers of wax palms (<i>Ceroxylon</i> sp) propagated	Product	yes	Databases and photographs	semi-annual	FundaciónGuanacas
	Conservation on rural properties	By 2026 there will be 10,000 hectares of peasant properties linked to conservation initiatives.	Number of landowners integrated into the project who have signed agreements to implement climate change mitigation activities.	Product	yes	Signed letters of intent	Annual	Fundación Alto de Ventanas and Fundación Magnolios
3. Promoting environmental education in rural communities.	Environmental education workshops	By 2026 there will be institutional leadership in the promotion of environmental education, where community	Number of educational spaces or sensitizations carried out to educate about sustainable development	Product	yes	Databases and photographs	Annual	Proponent foundations

Strategic line	Project activity	Short-term goal or expected impact	Short-term monitoring					
			Indicator	Tipo de indicador	¿Existen datos?	Método	Indicator	Who carries out?
		participatory research is promoted.	and sustainable lifestyles.					
	Presentation of activities in the media	By 2026, 10 audiovisual pieces will be produced annually to be disseminated in the media.	Number of audiovisual pieces presented in the media.	Result	yes	Database	semi-annual	Proponent foundations
4. Biodiversity research	Wildlife inventories	By 2026 there will be a representative inventory of the taxonomic groups that will serve to direct conservation activities.	Number of investigations, monitoring processes, inventories or biodiversity characterization activities carried out in the project's expansion area	Product	yes	Database	Annual	Proponent foundations
5. Financial sustainability	Application to grants	By 2026 there will be a diversified portfolio of donors, guaranteeing 40% of the administrative costs required by the	Total investment in Colombian pesos (COP) in biodiversity and ecosystem conservation, restoration, or	Result	yes	Database	Annual	Proponent foundations
	Donations							

Strategic line	Project activity	Short-term goal or expected impact	Short-term monitoring					
			Indicator	Tipo de indicador	¿Existen datos?	Método	Indicator	Who carries out?
		foundations to manage the project.	sustainable use activities.					
	Ecotourism	By 2026, private reserves will have adequate facilities for tourism development that allow for the income of at least 10% of the foundations' administrative costs.	Number of tourism programs implemented	Result	No	Database	Annual	Proponent foundations

Source: South Pole (2021).

Natural Disturbance Monitoring

Natural disturbances and catastrophic events are not expected to occur in the project area. If they do occur during the project crediting period, they will be reported and evaluated according to the VM0015 methodology guidelines and the results will be included in the monitoring report. The owners of each property will be responsible for identifying significant disturbances in the forest. For each disturbance event the following minimum information shall be identified and recorded:

- Type of disturbance: fires, pests and diseases, extreme weather events such as hurricanes, blizzards, prolonged droughts, floods or geological events such as earthquakes;
- Location of the disturbance: geo-reference with GPS and indicate sector and community;
- Date:
- Estimated area: number of hectares that could have been affected by the disturbance.

Similarly, photographs and interviews with witnesses should be taken to identify the causes and responsible parties, and in any case, communicate directly to the management of the proponent foundations.

Finally, if the area affected by natural disturbances or man-made events generated mitigation results in previous verifications, the total net change in carbon stocks and GHG emissions in the area that generated those results will be estimated and an equivalent amount of credits will be paid from the emissions pool for non-permanence risk.

Monitoring of unplanned deforestation

Basic information

Satellite images of medium spatial resolution (30 m) from sensor Landsat 8, with processing level 2, were downloaded from the EROS server of the USGS. Level 2 processing guarantees products with atmospheric correction in relation to the surface reflectance, radiometric correction and geometric correction, pixel by pixel, without displacement, and quality band to process clean pixels.

To address areas with missing information due to cloud cover or cloud shadows in the year 2020, images from 2019 were downloaded to fill in these areas. It was chosen to use 2019 imagery close to 2020 without cloud cover because the 2021 imagery had high percentage cloud cover in the project area and the leakage belt. A total of 25 Landsat 8 sensor satellite images from the year 2021 were reviewed which contained high percentage cloud cover in the project area and leakage belt. landsat

Land cover digitizing

A thorough and detailed classification through on-screen digitization at a scale of 1:10,000 for both forest and non-forest covers for the year 2020, considering the definition of forest for Colombia and areas greater than 1 ha.

Accuracy of classifications

The classification accuracy for 2020 was validated through a confusion matrix with errors of commission (pixels classified as a land cover to which it does not belong) and omission (pixels that correspond to a land cover class but were not classified as such), which results in a percentage of the overall accuracy, comparing randomly distributed control points within the study area. The total number of points for the evaluation was calculated from the total number of polygons in the 2016 cover layer, considering the finite population methodology proposed by Morillas (2007). The GIS and RS expert evaluated this information point by point, at a scale of 1:10,000, assigning the forest cover class to each point, by observing imagery from different sources than the sensors used for the classification, such as Google Earth image repository, Microsoft Bing, and the ESRI map, and Sentinel 2A for the year previously mentioned (Table .

Final forest cover - non-forest and cover

Based on the classification obtained with the Landsat image, the forest and non-forest classes was reclassified by assigning values of 1 to the pixels that represent forest and 2 to those that represent non-forest, in order to have the same values of the forest and non-forest covers of the initial year; for the non-forest areas, the land uses were classified as it is shown in Table 48.

Monitoring and cover

A cartographic combination between the initial and final layers was made to determine the change in the analyzed period, thus obtaining deforested areas and forest regeneration (Table 48).

Table 48. Combination of years and change in cover.

Year 2016	Year 2020	Cover changes
Forest	Forest	Stable forest
Forest	Non-forest	Deforestation
Non- forest	Forest	Regeneration
Non-forest	Non-forest	not stable forest

Source: South Pole (2020).

5.3.2 Information management and information quality control

The main guidelines for information management are presented below. For more details on the standard operating procedure, information management and document control, see Annex 7.

Information quality management

Each proponent will designate an internal member responsible for ensuring the implementation of a management system, which will ensure the quality of the mitigation project information, South Pole suggests the following persons to be in charge of the management system:

- Fundación Magnolios: Christian Dannecker
- Corporación Salvamontes: Sebastian Vieira
- Fundación Alto de Ventanas: Liliana Pérez
- Fundación Guanacas: María Alejandra Moreno

South Pole's delegated persons shall establish, implement and maintain documented procedures for managing information on GHG emission reductions that ensure the following:

- Routine and consistent reviews/audits to ensure accuracy and full coverage of activities in the forestry sector.
- Identification and treatment of errors and omissions identified in the quantification of GHG removals.

Delegates shall present the actions taken to correct the errors and omissions identified, as well as manage the results of routine reviews/audits to ensure that this does not happen again.

Control of documents and records

Annex 7 presents the documented procedure defining the controls necessary to:

- The collection, indexing, access, filling, storage, protection and recovery of records, as well as the definition of retention times and final disposal of the same, ensuring traceability of information and verification of the project.
- Approval of documents that are part of the management system, identification of changes in documents and removal of obsolete documents at the time of use.

5.3.3 Monitoring of land use planning guidelines

Table 49 presents the main aspects to be taken into account for monitoring the Project's land use planning guidelines in accordance with the regulatory framework (see Section 1.14).

Table 49. Monitoring guidelines for land use planning guidelines.

Regional or local land use planning guideline	Monitoring guidelines
Consolidation of conservation initiatives in the municipality of Santa Rosa de Osos – Antioquia ¹⁴³	Considering that the articulation of the Mitigation Project with the guidelines of regional conservation initiatives such as SILAP and the Alto de Ventanas DRMI is based on the implementation of the project's strategic lines, monitoring activities will be subject to the guidelines set forth in Section 5.3.1.
Alto de Ventanas Integrated Regional Management District	

Source: South Pole (2021)

¹⁴³ Regional Autonomous Corporation of Central Antioquia (Corantioquia), Municipality of Santa Rosa de Osos. Consolidation of Conservation Initiatives In The Municipality of Santa Rosa de Osos - Antioquia - Local System of Protected Areas. Santa Rosa de Osos; 2015

6 GHG EMISSION REDUCTIONS AND REMOVALS

6.1 Data and Parameters Monitored

Data / Parameter	AP_{SAP_t}
Data unit	Hectares per year (ha/year)
Description	Area deforested at time t within the project area and under the project scenario.
Source of data	Landsat 8 satellite images from OLI mission.
Description of measurement methods and procedures applied	For monitoring deforestation during the monitoring period in the project area, multispectral Landsat 8 images from OLI mission, respectively, was used for each year to be evaluated. The images have a spatial resolution ranging from 15m to 100m. These images are provided by the United States Geological Survey (USGS) and can be viewed and downloaded free of charge on the internet at: https://earthexplorer.usgs.gov/ . Detailed processing information can be found in Section 6.3
Frequency of monitoring/recording	At least every 5 years
Monitoring equipment	The monitoring instruments used are detailed in Section 6.3
QA/QC procedures applied	See Section 5.3.2 and Annex 7
Purpose of data	Estimated emission reductions in the project scenario.
Calculation method	The estimation methods used are detailed in Section 4
Comments	NA

Data / Parameter	AP_{SLB_t}
Data unit	Hectares per year (ha/year)
Description	Area deforested at time t within the leakage belt and under the project scenario.
Source of data	Landsat 8 satellite images from OLI mission.
Description of measurement methods and procedures applied	For monitoring deforestation during the monitoring period in the project area, multispectral Landsat 8 images from OLI mission, respectively, was used for each year to be evaluated. The images have a spatial resolution ranging from 15m to 100m. These images are provided by the United

	States Geological Survey (USGS) and can be viewed and downloaded free of charge on the internet at: https://earthexplorer.usgs.gov/ . Detailed processing information can be found in Section 6.3
Frequency of monitoring/recording	At least every 5 years
Monitoring equipment	The monitoring instruments used are detailed in Section 6.3
QA/QC procedures applied	See Section 5.3.2 and Annex 7
Purpose of data	Estimated emission reductions in the project scenario.
Calculation method	The estimation methods used are detailed in Section 4
Comments	NA

6.2 Baseline Emissions

Baseline emissions associated with the REDD+ project are presented in (Table 50). The expected emissions data under the baseline scenario correspond to the period from February 23, 2016, to February 10, 2020.

Table 50. Baseline emissions associated with the REDD+ project.

Year project (t)	Calendar year	Expected deforestation (ha) ABSLPA _t	Annual issuance (Change in C stock) in tCO ₂ e	
			ΔCBSLPA _t	Accumulated ΔCBSLPA
1	2016	21	7,467	7,467
2	2017	24	8,883	16,350
3	2018	28	10,653	27,003
4	2019	22	9,444	36,447
5	2020	24	10,516	46,963

Source: South Pole (2023).

6.3 Project Emissions

Monitoring of project activities

In the period 2016 - 2020, the proponent foundations developed different initiatives within the framework of the strategic lines and activities described in Section 1.11. Table 52 presents the supports of the activities and the achievements obtained per strategic line are described below:

In the monitoring period 2016 - 2020 the following progress was achieved with respect to the implementation of project activities:

- **Legal incorporation of Corporación Salvamontes**, Fundación Magnolios and Alto de Ventanas. This, together with the previous formalization of Fundación Guanacas in 2007, promoted the participation of the NGOs in working groups with the municipalities, such as the Río Grande and Río Chico watershed council, of which Fundación Guanacas and Corporación Salvamontes are members.
- **In addition, Fundación Guanacas** received recognition from the public and private sectors for its conservation work in northern Antioquia.
- **Consolidation of a group of forest rangers:** six rangers were hired with the social benefits required by Colombian law.
- **Acquisition of land for forest conservation:** purchase of eleven plots of land that became part of the private reserves of the proponent foundations.
- **Strategy for the conservation of magnolias (*Magnoliaceae*):** propagated individuals of three species of magnolias and initiated two research projects on phenology and germination processes.
- **Program to increase wax palm (*Ceroxylon spp*) populations:** 1,000 wax palm individuals were propagated and 186 vouchers were sold.
- **Propagation of native species of cloud forests:** four nurseries were created where 5,520 individuals of native species were propagated.
- **Passive restoration:** passive ecological restoration processes were carried out in areas degraded by agriculture and cattle ranching in private reserves.
- **Conservation in rural properties:** 103 rural properties committed to conservation in their territory.
- **23 audiovisual pieces were generated for the dissemination** of activities associated with the REDD+ project (Table 51).
- The foundations promoted **educational spaces** where awareness-raising on environmental issues and planting days were held with a diverse public: children, high school and undergraduate students, senior citizens, and environmental tables. (Figure 55)
- **Flora and fauna inventories** were conducted, identifying 701 plant species, 58 of which are endangered or endemic, and 489 fauna species, 12 of which are endangered.
- Close to **3 billion Colombian pesos** invested in activities for the conservation, restoration or sustainable use of biodiversity and ecosystems.

Table 51. Audiovisual pieces of the Magnolios REDD+ Foundations proponents for the period 2016 - 2020.

Proponent	Year	Topic of the video	Access link
Fundación Guanacas	2015	Participation in the program "Guanacas - Bosques Nativos" (Guanacas - Native Forests) of TV Agro channel.	https://www.youtube.com/watch?v=ATMatfiASg
	2017	Participation in the program "Gran Reserva Ecológica en Guanacas-Colombia" of TV Agro channel.	https://www.youtube.com/watch?v=pW7sVePx2Dc
		Participation in the program "Antioquia Asombrosa" of Teleantioquia Channel.	https://www.youtube.com/watch?v=ztzGkQIMe0
	2018	Presentation of the project "Felinos en la niebla".	https://www.youtube.com/watch?v=9FAgFb_7drg&t=106s
	2020	Participation in Capsos tv channel (local channel of Santa Rosa de Osos).	https://www.youtube.com/watch?v=ZNGvew00gpk
		Participation in El cubo podcast: "Guanacas Reserve, a water factory to take care of".	https://open.spotify.com/episode/5iu_a82Mt3rCWSwmWHsT94A
		Report of the Capsos tv channel on the visit of the council of the municipality of Santa Rosa de Osos to the Guanacas Reserve.	https://www.facebook.com/watch/?v=802792233562752
Corporación Salvamontes	2016	Presentation of Salvamontes at the Antioquian Ornithological Society of Antioquia	https://www.youtube.com/watch?v=uJmnlc_OwV8
	2017	Presentation of the magnolia conservation strategy in the Caracol channel.	https://www.youtube.com/watch?v=g2DWGeAOGsA
		Outings to Natura	https://www.salvamontes.org/medios
		The challenge of Saving Antioquia's trees. Press article	https://www.elcolombiano.com/especiales/antologia-periodistica/el-reto-de-salvar-los-arboles-de-antioquia-XA6002660

Proponent	Year	Topic of the video	Access link
	2018	Camera trap records, La Esperanza Natural Reserve.	https://www.salvamontes.org/#
		Participation of Corporación Salvamontes in Yarumal's bird exhibition at the Universidad de Antioquia Sede Norte.	https://www.youtube.com/watch?v=cXHYRXuTbw
		Participation in the documentary "Buscando el Almanegra de Guatapé".	https://www.youtube.com/watch?v=rVrzdNoR4&t=418s
	2019	Invitation to participate in the project "Buscatón del Montañerito Paisa (<i>Atlapetes-blancæ</i>) - endemic bird that was thought to be extinct and rediscovered in 2019".	https://www.youtube.com/watch?v=FSi9o2zJ77I
		Participation in the TV program "Antioquia Asombrosa" regional channel Teleantioquia.	https://www.youtube.com/watch?v=21mHkSap0kU
	2020	Results of the project "Buscatón 2.0 del Montañerito Paisa (<i>Atlapetes-blancæ</i>)".	https://www.facebook.com/SalvaMontesCo/videos/194211192178392
		Newspaper article	https://www.elmalpensante.com/articulo/4361/almanegra
		Podcast El Espectador: Colombian Magnolias, Primitive Trees at Risk of Disappearance	https://open.spotify.com/episode/29jzRTPcgqSquTJxRHLZJ
		Presentation of the Corporación Salvamontes and the importance of magnolias in the youtube channel of "Rainforest Trust".	https://www.youtube.com/watch?v=IG4yFHR8I3s
		Participation in chapter 7 of the program "Conversa-Acción" of the San Luis de Yarumal Educational Institution with the presentation of "A heritage to take care of".	https://www.youtube.com/watch?v=dcYFYn130fw
	2020	Publication of the Almanegra Newsletter	https://www.facebook.com/SalvaMontesCo/photos/pcb.3586154571449765/3586154304783125/?_cft__[0]=AZUPF57zYK2W8-CEBrnQilrvN_89cUK1xGRAIUqPNipXbH

Proponent	Year	Topic of the video	Access link
			EtVDxLEiFmkWQTPdidaIjPCZeTp7KWAIK_WMPHqog7LrOfJb2si2jTYCRvzlZJfiqAs12uM9sZGguUVK0laYOT1dk-CSp2eZFn4Lv_Bidb&tn=*bH-R
Fundación Magnolios	2018	Presentation of the Fundación Magnolios and the importance of magnolias.	https://www.youtube.com/watch?v=z-FakFozLfl&feature=share&fbclid=IwAR0XXMmpYLthWQDQqAhavHMo2R6AleJ2Z74ZqxwXbHgJf5giY2BAAt-23v3Y

Source: Proponents REDD+ Magnolios.





Figure 55. Educational spaces realized by the proponent Foundations for the period 2026 - 2020.

Source: South Pole (2021).

Table 52 presents information on the implementation dates of the project activities and references the supports associated with each one for the 2016-2020 monitoring period. In addition, Table 53 presents results regarding the implementation of the strategic lines highlighting the evaluation of the indicator set out in the monitoring Plan (see Section 5.3.1).

During the monitoring period, mechanisms for accessing and disseminating project information were implemented, they are described in more detail in Section 2.2. All results will be publicly available prior to the public comment period of this Project Document (PD) in the most appropriate means defined by the project proponents in their Communications Plan (see Section 2.5.2 and Annex 9) and efforts will be made to develop summaries that will be communicated to associated community stakeholders and other interested parties prior to the completion of the audit process. In addition, all documents and information on the results of monitoring and verification will be published on the VCS standard platforms following project validation and verification.

During the implementation of the EPCAC, different newsletters were shared with stakeholders with project details specifying the participating entities and contact details, project objective, contributions to national mitigation actions, expected emission reduction volumes, alignment of the initiative with public policies, applied methodology, additionality, alignment with SDGs and expected impacts and benefits. It is expected to generate an additional bulletin with information on the monitoring results before the end of the audit process.

Finally, the project documents and monitoring report will be shared with project participants and community leaders of the associations by means of an electronic communication from South Pole and at this time the start of the public comment period and information for accessing the documents in the VCS database will also be informed.

Table 52. Support for REDD+ Project Magnolios de Yarumal activities developed in the 2016 - 2020 period.

Strategic line	Project activity	Activity	Start date	Support
1. Strengthening local governance.	Legal formalization of non-profit entities	Legal constitution of the foundations	19 de febrero de 2019	Certificates of existence and legal representation of the proposing foundations. The information can be found in Soportes/1_Actividades de proyecto/ Línea 1_Fortalecimiento de gobernanza local
		Participation in institutional spaces such as the Rio Grande and Rio Chico River basin council. Recognition of public and private actors for their work in the territory in favor of conservation.	2017	Update of the Management Plan for the Grande and Chico River Basin and summary of the Guanacas Foundation's participation in the Council. Minutes and photos of the awards received by the proponents. The information can be found in Soportes/1_Actividades de proyecto/ Línea 1_Fortalecimiento de gobernanza local
2. Forest conservation and restoration	Consolidation of forest ranger groups	Creation of families and forest ranger groups	February 23, 2016	Fores Rangers contracts. The information can be found in Soportes/1_Actividades de proyecto/ Línea 2_ Conservación y restauración de bosques/1_Guardabosques

Strategic line	Project activity	Activity	Start date	Support
	Acquisition of lands for forest conservation	Purchase of land	March 02, 2016	Database and certificates of tradition and freedom The information can be found in Soportes/1_Actividades de proyecto/ Línea 2_ Conservación y restauración de bosques/2_Predios
	Strategy for the conservation of magnolias (Magnoliaceae)	Propagation and conservation of magnolias	2016	Presentation of the "Saving Magnolias" program, research projects, photos and Table 4. The information can be found in Soportes/1_Actividades de proyecto/ Línea 2_ Conservación y restauración de bosques/3_Magnolios
	Program to increase wax palm (<i>Ceroxylon</i> spp) populations	Propagation and planting of 1,000 wax palms and sale of 186 vouchers.	2017	Database, photos and palm voucher sample. The information can be found in Soportes/1_Actividades de proyecto/ Línea 2_ Conservación y restauración de bosques/4_Palmas
	Propagation of native cloud forest species	Establishment of nurseries and propagation of native species	2016	Photographs and database The information can be found in Soportes/1_Actividades de proyecto/ Línea 2_ Conservación y restauración de bosques/5_Viveros

Strategic line	Project activity	Activity	Start date	Support
	Passive restoration	Passive restoration on degraded land acquired by the foundations	March 02, 2016	Photographs The information can be found in Soportes/1_Actividades de proyecto/ Línea 2_ Conservación y restauración de bosques/6_Restauración pasiva
	Conservation in rural properties	Conservation with small landowners	2019	Letters of Intent The information can be found in Soportes/3_Tenencia de la tierra
3. Promotion of environmental education in rural communities.	Environmental education workshops	Workshops on environmental education in communities near reserves	April 25, 2017	Databases and photographs The information can be found in Soportes/1_Actividades de proyecto/ Línea 3_Educación ambiental
	Presentation of activities in the media	Video production and participation	2016	See Table 4
4. Biodiversity research	Wildlife inventories	Fauna and flora inventories	2016	Database, photographs, scientific paper and Table 51 . The information can be found in Soportes/1_Actividades de proyecto/ Línea 4_Investigación
5. Financial sustainability	Grant applications	Grant application	2017	Database, photographs, ecotourism project formulation and Table 4

Strategic line	Project activity	Activity	Start date	Support
	Donations	Donation campaigns through social networks and websites.		The information can be found in Soportes/1_Actividades de proyecto/ Línea 5_Sostenibilidad financiera
	Ecotourism	Visits and development of long-term tourism strategies		

Source: South Pole (2021).

Table 53. Results of the 2016 - 2020 monitoring period with respect to the implementation of the strategic lines.

Strategic line	Direct effect	Indicator	Indicator value for the 2016-2020 monitoring period
1. Strengthening local governance.	Creation of environmental NGOs and participation in environmental roundtables.	Number of meetings or participatory spaces attended	There is no qualitative value for this period.
2. Forest conservation and restoration	Establishment of environmental conservation areas and recovery of degraded zones.	Number of people employed in project activities, expressed as total number of full-time jobs.	6 people
		Area of mountain ecosystems protected in hectares	4,319 ha
		Number of landowners integrated into the project who have signed agreements to implement climate change mitigation activities.	70 landowners
		Area of mountain ecosystems in the process of passive restoration in hectares	607 ha
	Implementation of strategies to increase native species, with emphasis on endangered flora	Numbers of wax palms (<i>Ceroxylon sp</i>) propagated	1,000 palms propagated
		Number of Magnolia sp. individuals planted	There is no qualitative value for this period.

Strategic line	Direct effect	Indicator	Indicator value for the 2016-2020 monitoring period
		Number of nurseries established	4 nurseries
3. Promotion of environmental education in rural communities.	Raise awareness among neighbors of the private reserves about the importance of biodiversity and conservation of natural forests.	Number of educational spaces or sensitizations carried out to educate about sustainable development and sustainable lifestyles	57 educational spaces
		Number of audiovisual pieces presented in the media	23 pieces
4. Biodiversity research	Characterization of biodiversity and identification of endangered species in the territory.	Number of investigations, monitoring processes, inventories, or biodiversity characterization activities carried out in the project expansion area	One inventory Six groups inventoried (birds, herps, mammals, orchids, trees and orchids)
5. Financial sustainability	Management of economic resources for the purchase of land, financial support for research and administrative support for the foundations.	Total investment in Colombian pesos (COP) in conservation, restoration, or sustainable use of biodiversity and ecosystems activities	3,010,278,676 COP
	Financial support for research		
	Administrative support for the foundations	Number of tourism programs implemented	There is no qualitative value for this period.

Source: South Pole (2021).

Natural Disturbance Monitoring

No natural disturbances were identified in the period 2016 - 2020.

Monitoring of co-benefits and sustainable development priorities

Table 54 shows the monitoring for the sustainable development priority indicators of the REDD+ Project Magnolios de Yarumal.

Table 54. Identification and prioritization of sustainable development priorities for the REDD+ Project Magnolios de Yarumal

Expected project achievement	SDG	Target associated with SDG	Indicator	Indicator value for the 2016-2020 monitoring period
Strengthen environmental management activities through the creation of non-profit entities that manage financial resources for the implementation of forest conservation and restoration activities and the recovery of endangered species.	SDG 8 DECENT WORK AND ECONOMIC GROWTH	8.3 - <i>Promote policies to support job creation and enterprise growth.</i> Promote development-oriented policies that support productive activities, the creation of decent jobs, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro and small enterprises.	Number of people employed in project activities, expressed as the total number of full-time jobs.	6 people
	SDG 15 TERRESTRIAL ECOSYSTEM LIFE	15.4 - <i>Ensuring the conservation of mountain ecosystems</i> By 2030, ensure the conservation of mountain ecosystems, including their biological diversity, in order to enhance their capacity to provide essential benefits for sustainable development	Area of protected mountain ecosystems in hectares	4,319hectares

Expected project achievement	SDG	Target associated with SDG	Indicator	Indicator value for the 2016-2020 monitoring period
Advance in the recovery and maintenance of forest cover in northern Antioquia, especially in areas degraded by natural or anthropogenic agents, as a measure to mitigate and adapt to climate change	SDG 13 CLIMATE ACTION	13.2 - <i>Integrate climate change measures</i> Incorporate climate change measures into national policies, strategies and plans.	Reduction in total Greenhouse Gas (GHG) emissions	15,431 tCO ₂ e
	SDG15 TERRESTRIAL ECOSYSTEMS LIFE	15.5 - <i>Protecting biodiversity and natural habitats</i> Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect threatened species and prevent their extinction.	Number of propagated wax palms (<i>Ceroxylon sp</i>)	1,000 palms propagated
		15.A - <i>Increase Financial Resources to Conserve and Sustainably Use Ecosystems and Biodiversity</i> To mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.	Total investment in Colombian pesos (COP) in activities for the conservation, restoration or sustainable use of biodiversity and ecosystems	3,010,278,676 COP
Promote educational spaces around environmental issues of regional importance, as a basis for strengthening rural communities in the management of natural resources.	SDG4 QUALITY EDUCATION	4.7 - <i>Global Citizenship Education</i> By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including through education for sustainable development and sustainable lifestyles	Number of educational spaces or sensitizations carried out to educate about sustainable development and sustainable lifestyles.	57 educational spaces

Expected project achievement	SDG	Target associated with SDG	Indicator	Indicator value for the 2016-2020 monitoring period
	ODS 13 CLIMATE ACTION	<i>13.3 - Building knowledge and capacity to address climate change challenges</i> Improve education, awareness and human and institutional capacity regarding climate change mitigation, adaptation, mitigation and early warning.	Number of landowners, integrated into the project, who have signed agreements to implement climate change mitigation activities.	70 landowners
Fomentar el conocimiento de la biodiversidad como herramienta para preservar y proteger el territorio.	ODS15 TERRESTRIAL ECOSYSTEM LIFE	<i>15.5 - Protect biodiversity and natural habitats</i> Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect threatened species and prevent their extinction.	Number of investigations, monitoring processes, inventories or biodiversity characterization activities carried out in the project expansion area.	One inventory Six groups inventoried (birds, herps, mammals, orchids, trees and orchids)

Source: South Pole, (2021).

Estimate of the areas of unplanned deforestation in the monitoring period

Quantification of actual deforestation during the 2016 - 2020 monitoring period was performed for the project area (PA) and leakage belt (LB).

Basic information

Basic information

Satellite images of medium spatial resolution (30 m) from sensor Landsat 8, with processing level 2, were downloaded from the EROS server of the USGS. Level 2 processing guarantees products with atmospheric correction in relation to the surface reflectance, radiometric correction and geometric correction, pixel by pixel, without displacement, and quality band to process clean pixels (**Table 55**).

To address areas with missing information due to cloud cover or cloud shadows in the year 2020, images from 2019 were downloaded to fill in these areas. It was chosen to use 2019 imagery close to 2020 without cloud cover because the 2021 imagery had high percentage cloud cover in the project area and the leakage belt. A total of 25 Landsat 8 sensor satellite images from the year 2021 were reviewed which contained high percentage cloud cover in the project area and leakage belt.

Land cover digitizing

A thorough and detailed classification through on-screen digitization at a scale of 1:10,000 for both forest and non-forest covers for the year 2020, considering the definition of forest for Colombia and areas greater than 1 ha.

Accuracy of classifications

The classification accuracy for 2020 was validated through a confusion matrix with errors of commission (pixels classified as a land cover to which it does not belong) and omission (pixels that correspond to a land cover class but were not classified as such), which results in a percentage of the overall accuracy, comparing randomly distributed control points within the study area. The total number of points for the evaluation was calculated from the total number of polygons in the 2016 cover layer, considering the finite population methodology proposed by Morillas (2007). The GIS and RS expert evaluated this information point by point, at a scale of 1:10,000, assigning the forest cover class to each point, by observing imagery from different sources than the sensors used for the classification, such as Google Earth image repository, Microsoft Bing, and the ESRI map, and Sentinel 2A for the year previously mentioned (**Table 55**).

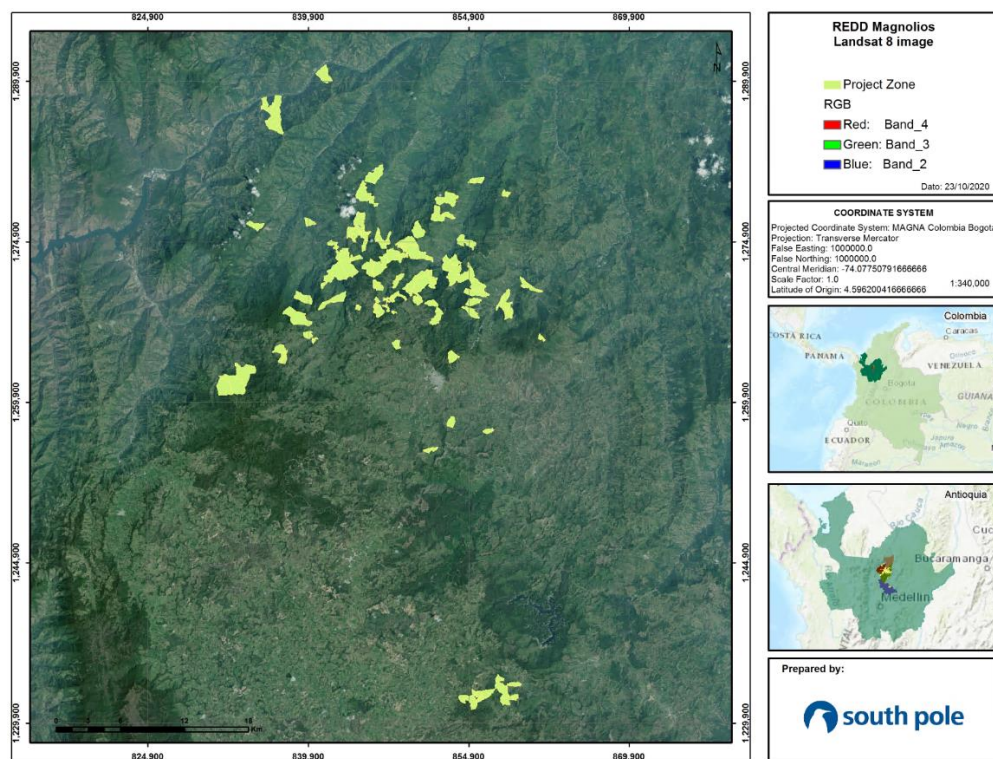
Final forest cover - non-forest and cover

Based on the classification obtained with the Landsat image, the forest and non-forest classes were reclassified by assigning values of 1 to the pixels that represent forest and 2 to those that represent non-forest, in order to have the same values of the forest and non-forest covers of the initial year; for the non-forest areas (**Table 56**).

Table 55. Satellite images used for monitoring.

Satellite	Level	Path	Row	Date (YYYY/MM/DD)
Landsat 8	L2	9	55	2020/01/09
Landsat 8	L2	9	55	2020/02/10
Landsat 8	L2	9	55	2020/10/23
Landsat 8	L2	9	55	2019/07/17
Landsat 8	L2	9	55	2019/09/03
Sentinel 2A ¹⁴⁴	2	T18NVN		2020/02/18

Source: South Pole (2023).


Figure 56. Landsat 8 image used for monitoring.

¹⁴⁴ This image was used to do the accuracy assessment included in section “Accuracy of classifications” page 196

Source: South Pole (2023).

Table 56. Combination of years and change in cover.

Year 2016	Year 2020	Cover changes
Forest	Forest	Stable forest
Forest	Non-forest	Deforestation
Non- forest	Forest	Regeneration
Non-forest	Non-forest	Not stable forest

Source: South Pole (2020).

Results

With a total of 2,161 polygons for the 2020 forest cover layer and based on Morillas' methodology (2007), 328 points were randomly created for the evaluation of classification accuracy. Table 57 shows the other parameters used.

Table 57. Parameters for calculating the number of points in the accuracy evaluation.

Variable	Description	Value
N	Number of polygons	2,161
$Z\alpha$	Z value	1.96 (95%)
p	Probability	0.5 (50%)
q	1-p	0.5 (50%)
d	Maximum acceptance error accepted	0.05 (5%)
n	Number of points	328

Source: South Pole (2023).

Table 58 shows the results of the confusion matrix for the 2020 forest and non-forest classification, in project area, where an overall accuracy of 95% is obtained. In the forest class, there is an accuracy of over 94% in the assignment of training areas by the GIS expert and in the classifier used (SVM), an accuracy of over 96%. Also, this table shows the calculation of the accuracy for the leakage belt, where an overall accuracy of 92% was obtained, with an accuracy of over 93% in the forest class by the GIS expert and over 97% by the classifier used.

Table 58. Forest and non-forest classification accuracy values for the year 2020 in the project area and leakage belt.

Cover Landsat 8	Forest	Non forest	Total	User accuracy
Forest	137	10	147	93.18%
Non-forest	13	168	181	91.01%
Total	150	178	328	-
Producer accuracy	91.33%	94.38%	-	92.99%

Source: South Pole (2023).

2016-2020

Based on the information from cover monitoring in the project area, annual deforestation during the monitoring period was estimated for the project area (PA) and the leakage belt (LB) (Table 59). The deforestation monitoring data corresponds to period from February 23, 2016 to October 23, 2020.

Table 59. Monitoring results of unplanned deforestation in the project area (eligible forest) and leakage belt, period 2016-2020.

Year	Project area			Leakage belt		
	Forest (ha)	Deforested area in the project scenario APSPAt (ha)	Deforestation rate (%)	Forest (ha)	Deforested area in the project scenario APSLBt (ha)	Deforestation rate (%)
2016	4,319.01	-12	-	10,457.86	-12	-

Year	Project area			Leakage belt		
	Forest (ha)	Deforested area in the project scenario APSPAt (ha)	Deforestation rate (%)	Forest (ha)	Deforested area in the project scenario APSLBt (ha)	Deforestation rate (%)
2017	4,306.67	-15	-0.29%	10,445.64	-14	-0.12%
2018	4,292.16	-15	-0.34%	10,431.26	-14	-0.14%
2019	4,277.64	-15	-0.34%	10,416.87	-14	-0.14%
2020	4,250.07	-13	-0.65%	10,389.55	-13	-0.26%

Source: South Pole (2023).

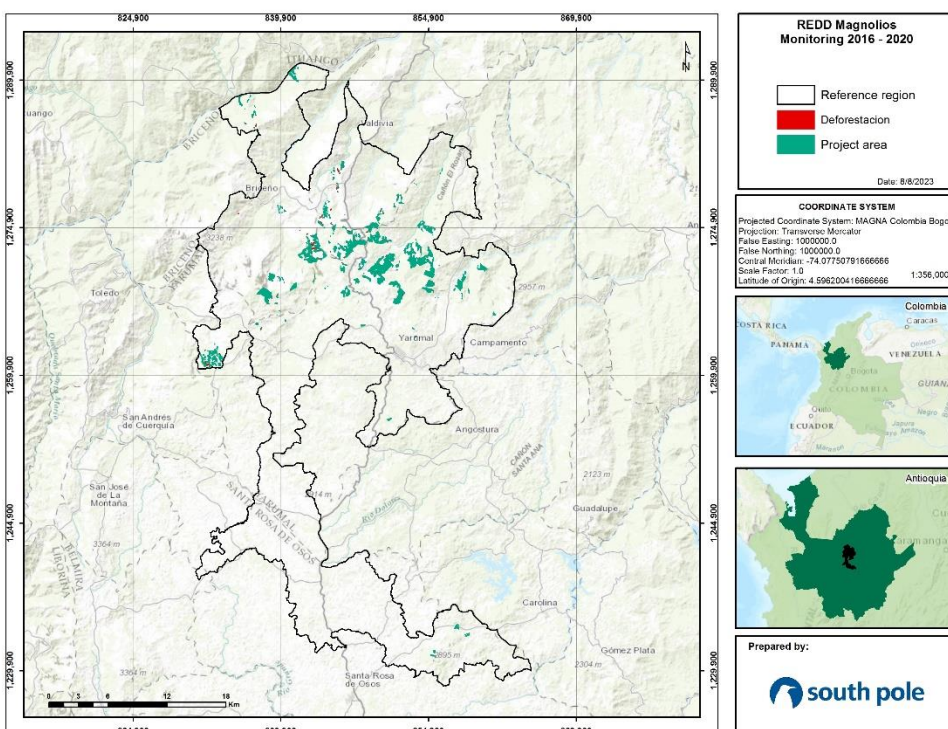


Figure 57. Deforestation in the project area (eligible forest) for 2016 – 2020 period.

Source: South Pole (2023).

Project emissions from unplanned and unavoided deforestation

Once actual deforestation in the project area was estimated, project emissions from unplanned and unavoided deforestation were estimated following the same methodological reasoning as that used for the baseline in Section 4.1.10. This time the actual deforestation from the monitoring results was used as the basis for calculation.

Table 60. Ex post emissions in the project area during the monitoring period.

Project year (t)	Calendar year	Actual deforestation not avoided (ha) APSPA _t	Annual issuance (Change in C stock) in tCO ₂ e	
			ΔCPSPA _t	ΔCPSPA
1	2016	12.34	4,302	4,302
2	2017	14.51	5,345	9,646
3	2018	14.51	5,678	15,325
4	2019	14.51	6,012	21,337
5	2020	13.06	5,840	27,177

Source: South Pole (2023).

6.4 Leakage

Delineation of the leakage belt

The leakage belt of the REDD+ Project Magnolios de Yarumal covers an area of 10,457 ha and corresponds to those forest areas located within the reference region, in which deforestation could be displaced by the implementation of the project activity within the boundaries of the PA. For this case, the leakage belt corresponds with forests as of 2015-2016 (project start date) that were not defined as project area but are like PA forests with respect to landscape factors and social factors.

The leakage belt boundaries were defined based on a spatial correlation analysis in which a selection of explanatory variables of deforestation was made, considering the results of the agent and drivers of deforestation analysis. In addition, Forest-Non- Forest data generated by IDEAM in the period 2005-2015 were used to predict the behavior of deforestation in a future period of 10 years (first fixed baseline period).

Based on the landscape and future deforestation probability maps produced for the period 2016-2046 (section 4.1.8, and Annex 12) the forest areas closest to the PA with **high and medium probability** of being deforested during the first fixed baseline period, and the weights of evidence test was defined the leakage belt.

The factors of cover were evidenced with respect to the presence of Minings (with greater pressure between 0 and 5 Km), distance to pastures, and crops (with a greater probability of deforestation at distances between 1 and 1.5 Km), and elevation (with a greater probability of being deforested those forest in the tropical rainforest life zone bh-T at altitudes between 150, and 1,500 meters above sea level).

Towards the southern part of the project area, where the model showed a low probability of deforestation, a 2 km buffer was created from the boundaries of the properties in that area (the maximum distance that deforestation agents are willing to travel to make use of forest products), in order to avoid ignoring the possibility of displacement of deforestation towards the nearest forest relicts and so that the leakage belt would not be biased towards the northern part of the reference region. However, during the EPCAC meetings, some community stakeholders participating in the project argued that the probability of such displacement is low, since in the area it is more common for people to sell their land to move to urban areas due to the lack of economic opportunities.

The leakage belt is present in Figure 58.

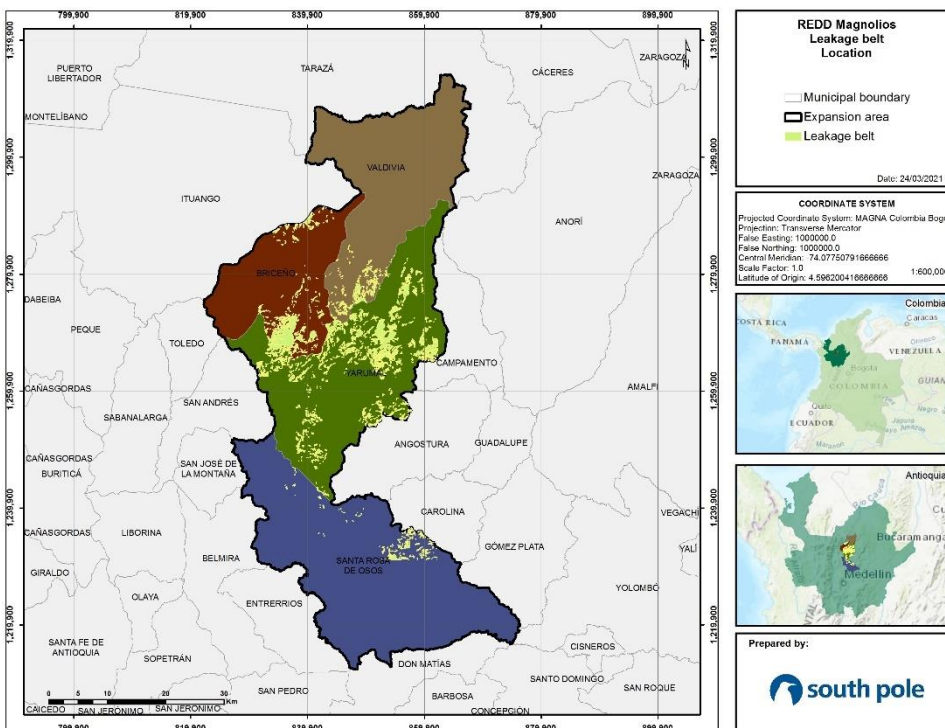


Figure 58. Map of the leakage belt.

Source: South Pole (2020).

Leakage emissions

The estimation of expected emissions from leakage in the baseline scenario was performed following the same methodological reasoning used for the project area in section 4.1. The expected emissions data under the baseline scenario correspond to the period between February 23, 2016 and October 23, 2020.

Table 61. Emissions in the leakage belt expected under the baseline scenario.

Year project (t)	Calendar year	Area of forest in the stratum i $ALB_{i,t-1}$	Expected deforestation (ha) $APSLB_t$	Annual issuance (Change in C stock) in tCO _{2e}	
				$\Delta CPSLB_t$	Cummulated $\Delta CPSLB$
1	2016	10,457.86	33.68	784	784
2	2017	10,424.18	41.33	933	1,717
3	2018	10,382.85	46.61	1,119	2,835
4	2019	10,336.24	39.53	992	3,827
5	2020	10,296.70	39.35	1,104	4,931

Source: South Pole (2023)

Table 62 presents the ex post emissions for the leakage belt during the 2016 - 2020 monitoring period.

Table 62. Ex post emissions in the leakage belt during the monitoring period.

Year project (t)	Calendar year	Actual deforestation not avoided (ha) * $APSLB_t$	Annual issuance (Change in C stock) in tCO _{2e}	
			$\Delta CPSLB_t$	$\Delta CPSLB$
1	2016	12.22	4,263	4,263
2	2017	14.38	5,296	9,559
3	2018	14.38	5,627	15,185
4	2019	14.38	5,958	21,143
5	2020	12.94	5,787	26,930

Source: South Pole (2023).

It is noted that tCO_{2e} are not discounted in the net estimate of GHG reductions because deforestation in the leakage belt in the monitoring period was less than expected from the baseline, therefore, $\Delta CADLK_t = \Delta CLK_t = 0$.

6.5 Net GHG Emission Reductions and Removals

Estimates of net GHG reductions attributed to the project are made following equation 19 of the VCS VM0015 methodology (for more detail see Section 4.2).

The net emissions reduction of the project was calculated using the following equation:

$$\Delta REDD_t = \Delta CBSLPA_t - \Delta CPSPA_t - \Delta CLK_t$$

Where:

$\Delta REDD_t$	Net emission reductions attributed to project mitigation actions in the year t; tCO _{2e}
$\Delta CBSLPA_t$	Total change in carbon stocks within the project area under the baseline scenario over time t; tCO _{2e}
$\Delta CPSPA_t$	Estimated current ex-ante carbon emissions for the project area over time t; tCO _{2e}
ΔCLK_t	Leakage emissions over time t; tCO _{2e}

Table 63 presents the results of the net emission reductions per year.

Table 63. Net reduction of ex post GHG emissions attributable to the REDD+ activities of the project.

Year project (t)	Calendar year	Emissions or removals at baseline (tCO _{2e})	Emissions or removals from the project scenario(tCO _{2e})	Leakage emissions (tCO _{2e})	Net emissions reduction (tCO _{2e})	
		$\Delta CBSLPA_t$	$\Delta CPSPA_t$	ΔCLK_t	$\Delta REDD_t$	$\Delta REDD$
1	2016	7,467	4,302	-	3,165	3,165
2	2017	8,883	5,345	-	3,538	6,703
3	2018	10,653	5,678	-	4,975	11,678
4	2019	9,444	6,012	-	3,432	15,110

Year project (t)	Calendar year	Emissions or removals at baseline (tCO ₂ e)	Emissions or removals from the project scenario(tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net emissions reduction (tCO ₂ e)	
		ΔCBSLPA _t	ΔCPSPAt	ΔCLKt	ΔREDDt	ΔREDD
5	2020	10,516	5,840	-	4,676	19,786

Source: South Pole (2023).

The number of Verified Carbon Units (VCUs) of the project was calculated using the following equation:

$$VCU_t = \Delta REDD_t - VBC_t$$

Where:

VCU_t Number of Verified Carbon Units that can be traded at time t; t CO₂-e

ΔREDD_t Net emission reductions attributed to project mitigation actions in the year t; tCO₂e

VBC_t Number of Buffer Credits deposited in the VCS Buffer at time t; tCO₂e

Table 64 shows the results of Verified Carbon Units (VCUs)per year.

Table 64. Verified Carbon Verifiable Units tradeable

Year project (t)	Calendar year	Net emissions reduction (tCO ₂ e)	Reserving issues for non-permanence risk (tCO ₂ e)	Net emissions reduction (tCO ₂ e)	
		ΔREDDt	VBC _t	ΔREDDt	ΔREDD
1	2016	3,165	696	2,468	2,468
2	2017	3,538	778	2,759	5,227
3	2018	4,975	1,094	3,880	9,107
4	2019	3,432	755	2,677	11,784
5	2020	4,676	1,029	3,647	15,431

Source: South Pole (2023).

APPENDIX AND SUPPORTING DOCUMENTS

The annexes of the REDD+ Project Magnolios de Yarumal are:

- Annex 1: Proprietary Information
- Annex 2: Socioeconomic, Cultural and Territorial Baseline (LBSCT)
- Annex 3: Stakeholder Map
- Annex 4: National NREF Reconstruction
- Annex 5: Non-permanence analysis
- Annex 6: Analysis of actors, drivers and underlying causes of deforestation
- Annex 7: Information management
- Annex 8: Theory of change
- Annex 9: Communication Proposal for the Implementation Phase
- Annex 10: Complaints and Grievance Mechanism
- Annex 11: Significance analysis of sawn timber products
- Annex 12: Modelling future deforestation of the REDD+ Project Magnolios de Yarumal using EGO Dynamics
- Annex 13: Benefit sharing mechanism proposal

The supporting documents of the REDD+ Magnolios de Yarumal project are:

- Support 1: Project activities
- Support 2: Proponent documents
- Support 3: Land tenure
- Support 4: Biodiversity
- Support 5: Social strategy
- Support 6: Estimates